ENGLISH CORE -Code No. 301
MARKING SCHEME
CLASS-XII-(2025-26)

General Instructions: -

1.   The Marking Scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, then due marks should be awarded accordingly.

2.   If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note "Extra Question".

3.   If more than one option is mentioned in the answer of multiple choice questions, then no marks to be awarded.

	SECTION A: READING SKILLS (22 marks)	
	1. Answer the following questions, based on the passage above. (Literary Passage**)**	**12**
I	'...the small bundle of shivers growing afraid of it all...'	**1**
II	…that the sea is a wild, untamed, and menacing force / contribute to the ominous atmosphere of the scene / amplifying the sense of danger that Pip feels	**1**
III	D) Pip's knowledge of the surrounding area [a) speaks of a scene in a place that feels cold, oppressive, and dangerous, which heightens Pip's sense of fear and helplessness. b) creates a feeling of menace due to the man's appearance, reinforcing Pip's fear and powerlessness in the situation. c) shows his terror and helplessness. d) is the Key because it refers to qualities that would imply Pip is capable and confident, which contradicts the idea of vulnerability.]	**1**
IV	B) threat [caution would be advice; prediction would involve stating what will happen in the future and an announcement would be a formal declaration. The Key is b) 'threat' as it directly communicates a potential consequence of harm or punishment.]	**1**
V	(Any one) ▪ Being soaked in water and smothered in mud, which are physical conditions that typically cause discomfort) ▪ Limping, which indicates possible injury or physical strain, contributing to discomfort. ▪ Shivering and teeth chattering, which suggests cold or nervousness, both of which are associated with discomfort.	**1**
VI	C) Answer the question [The phrase is not specifically asking for increased volume or referring to a physical action like opening the mouth. The phrase is urging Pip to give a verbal response.]	**1**

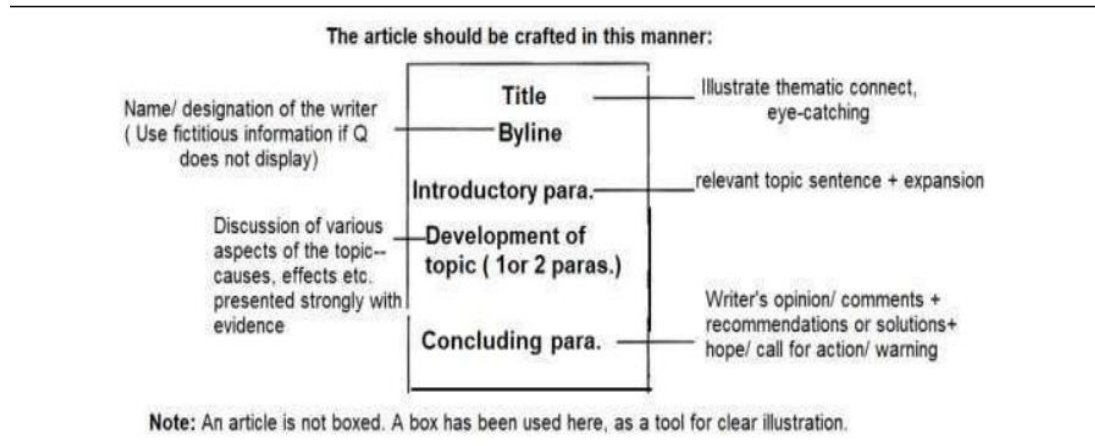|		
VII	It suggests that the man was extremely hungry.	**1**
VIII	It suggests that he is trying to gather information about Pip's family. When he asks about Pip's mother and looks over his shoulder, it shows he is possibly evaluating his surroundings or considering where Pip's family might be, perhaps to assess if anyone is around to stop him and contemplating the best way to proceed without interference.	**2**
IX	It increases the tension by emphasising the power dynamic between them. Pip is physically tilted backward, which makes him feel small and defenseless. This action not only makes Pip vulnerable but also intensifies the fear he feels. The man's control over Pip's position enhances the sense of intimidation, creating a more fearful and uneasy atmosphere in the scene.	**2**
X	A) Pip's encounter with a frightening man who demands information [a) directly addresses the core of the scene, where the man's aggressive behavior and questioning of Pip create tension and fear. b), though relevant to the setting, is more of a background detail than the main focus. c) could have been possible, but it is more of an internal reaction of Pip rather than the central idea of the extract. d), doesn't capture the primary conflict of the scene and the family context is just briefly mentioned.]	**1**
2.	**Answer the following questions, based on given passage.**	**10**
I	B) To explore patterns in career aspirations and the factors influencing them	**1**
II	Representative	**1**
III	Start-ups/Family Business	**1**
	For the Visually Impaired Candidates	
	…capturing diverse perspectives from individuals of varying genders, socio-economic statuses, educational backgrounds, and career stages.	**1**
IV	C) Service professions have a higher percentage of respondents marking them as 'Highly Preferred' compared to corporate jobs.	**1**
	For the Visually Impaired Candidates	
	A) They allow individuals to independently make decisions and innovate.	**1**
V	A corporate job is better suited for Riya because it provides financial stability through a steady salary and offers structured career paths with clear opportunities for growth. Start-ups, on the other hand, often involve higher risks, irregular income, and less defined progression, which may not align with her preference for stability and predictability. (Response requires reason for corporate job -1 m + reason why start-up / family business is unsuitable- 1 m)	**2**
VI	D) Difficulty in finding experienced professionals to guide career paths	**1**
VII	Further studies on emerging industries would provide insights into new and evolving career opportunities, helping youth align their aspirations with market demands. Research on technological advancements could highlight tools like virtual training platforms, AI-driven career guidance, and remote work technologies, making career resources more accessible. (Response requires explanation for emerging industries -1 m + technological advancements - 1 m)	**2**

VIII	b) The impact of gender on career preferences	**1**

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SECTION B-CREATIVE WRITING SKILLS (18 marks)

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3.	▪ Format :1 Box, name of issuing authority- organisation/ agency (top centre), NOTICE (centre), date of issue (aligned left) Authorisation name, designation & signature (bottom left) NOTE-full credit if all aspects included. Partial credit (½ mark) if one-two aspects are missing. No credit if more than two aspects are missing. ▪ Content: 2 ▪ Accuracy of Spelling and Grammar: 1	4
4.	Format – 1 Content -2 Accuracy of spelling and grammar -1 A-(Letter type formal / third person) B-(Letter type formal, first/ third person)	4

5.	A. Letter to the Editor
	
	▪ Format: 1
	  (Note -use of 'Yours truly' at close)
	▪ Organisation of Ideas: 1
	▪ Content: 2
	  As per cues + ideas
	▪ Accuracy of Spelling and Grammar :1
	
	B. Job Application
	
	▪ Format: 1
	▪ Organisation of Ideas: 1
	▪ Content: 2
	  → Covering Letter
	    • Reference to the advertisement
	    • Conveying suitability for the position (as advertised)
	    • Submission of application
	  → Bio data as separate enclosure
	    • Profile of self
	    • Educational Qualifications (include advertised requirements)
	    • Work experience/s (if relevant)
	    • References
	    • Any other relevant information
	
	▪ Accuracy of Spelling and Grammar :1
		5

6.	Format: 1 Organisation of Ideas: 1 Content: 2 Accuracy of Spelling and Grammar :1	

Article Writing

Format
• Title & By line

Organisation & Content:

The article should be crafted in this manner:

Name/ designation of the writer (Use fictitious information if Q does not display) → **Title**
Byline

Title — Illustrate thematic connect, eye-catching

Introductory para. — relevant topic sentence + expansion

Discussion of various aspects of the topic-- causes, effects etc. presented strongly with evidence → **Development of topic (1or 2 paras.)**

Concluding para. — Writer's opinion/ comments + recommendations or solutions+ hope/ call for action/ warning

Note: An article is not boxed. A box has been used here, as a tool for clear illustration.

Report Writing

Format
• Headline & By line
• Reporting place and date

Paragraphing organisation (Introductory paragraph + one or two Body paragraphs including event details + Concluding paragraph inclusive of witness accounts)

Organisation & Content:

The **report should answer these questions**			
WHO? name of event, sponsor/ organiser special guests, if any	WHERE & WHEN? date, time, place - town/ city + venue	WHAT & HOW? events/ programme details	WHAT DID THOSE PRESENT THINK? observations/ comments

SECTION C-LITERATURE (40 marks)			
7	**Read the following extracts and solve ANY ONE of the given two, (A) or (B)**		6
A			
I	(Any two) she is frail, aged, in a declining physical condition, vulnerable, weakening health, lacks vitality		1
II	sudden		1

III	It introduces a contrast of vitality, joy and exuberance against the sombre and reflective mood created by the imagery of the mother's frailty.	**1**	
IV	(Any one) certainty of mortality / inevitability of death / transient nature of life	**1**	
V	C) Overwhelmed by a sense of anguish	**1**	
VI	B) The poet makes exclusive use of melancholic imagery in the given lines. [a) True: The 'ashen face' compared to a 'corpse' suggests the speaker's fear of mortality and loss. b) False: While melancholic imagery ('ashen face' etc.) is present, the poet also uses vibrant imagery ('young trees sprinting' and 'merry children spilling') to create a contrast. Thus, melancholic imagery is not used exclusively. c) True: The internal conflict of hiding her sadness resonates deeply with human relationships. d) True: Universal themes such as aging, mortality, and the passage of time make the extract relatable to readers.]	**1**	
	OR		
B			
I	The phrase suggests that Aunt's life has been filled with struggles shaped by fear, anxiety, and oppression / The phrase signifies her emotional and psychological state, shaped by years of fear and oppression	**1**	
II	…the enduring power of Aunt Jennifer's creative spirit, even after her death	**1**	
III	The tigers in the panel are bold, fearless, and free, symbolising strength, courage, and confidence. In contrast, Aunt's life is marked by fear, struggle, and oppression, which prevents her from living with the same power and freedom that her tigers represent.	**1**	
IV	wedding band on her finger	**1**	
V	C) A child playing freely in a park, unburdened by responsibilities.	**1**	
VI	B) Art is a timeless expression that outlives its creator, continuing to embody their spirit and desires. [a) is correct because the poet prevails upon the enduring nature of art in this line, as the tigers, symbolising fearlessness and freedom, will persist even after Aunt Jennifer's death. This highlights how art immortalises the creator's emotions, aspirations, and essence, transcending the limitations and constraints of their mortal life. Option b) - d) incorrectly focus on the transience of art or misinterpret the tigers' symbolism.]	**1**	
8.	**Read the following extracts and solve ANY ONE of the given two, (A) or (B)**	**4**	
A.			
I	Charley's indifference to the cost of old-style bills and his focus on the cheap price of eggs in 1894 shows that he values the simplicity and affordability of the past, where things were less expensive and more relaxed.	**1**	
II	frequent efforts at locating it	**1**	

III	The irony lies in the fact that Louisa initially worries and urges Charley to stop searching for the third level, but later, both of them end up looking for it together every weekend. [Her initial worry about Charley's obsession with the third level contrasts with her eventual participation in the same quest, which creates an ironic shift in her behaviour]	1
IV	a) finding comfort in a hobby that is familiar	1
B		
I	Mr. Lamb means that Derry's appearance is not his whole identity. He sees beyond the scarred face to the person within and wants Derry to understand that he is more than what people see on the surface.	1
II	Correct option: c) "Maybe he really sees more than just my face." The pause suggests Derry is processing Mr. Lamb's words, possibly reconsidering his belief that no one sees beyond his disfigurement.	1
III	Mr. Lamb's response suggests that he sees Derry's face as only one aspect of who he is.	1
IV	The exchange reveals that Derry feels deeply misunderstood and defined by his appearance, while Mr. Lamb tries to connect with him on a human level by challenging Derry's belief that no one can see beyond his scar.	1
9.	**Read the following extracts and solve ANY ONE of the given two, (A) or (B)**	6
A		
I	B) 2 and 4 [b) is correct because Edla's entire demeanor toward the rattrap peddler is built on kindness (2) and she does not look down on him despite his being a vagabond, treating him with respect (4). Her tone is formal not casual / excited (5) , doesn't offer money(3) and there is no evidence of any compliment paid (1) hence a) , c) and d) are incorrect.]	1
II	silently	1
III	D) He recognised and appreciated her compassion. (This shows genuine appreciation and trust, not just politeness or obligation. His willingness to go with her and accept the fur coat without resistance indicates that he feels seen and valued—something he likely hasn't experienced in a long time.) (a) implies insincerity, which isn't supported by the extract ; (b) The extract doesn't suggest obligation; his response feels voluntary. (c) There is no sign of doubt or suspicion in his words or actions at that moment.	1
IV	Because the peddler, a poor vagabond in rags, was treated with respect and generosity by Edla, which was an unusual gesture of kindness for someone of his status.	1
V	Because his thoughts explicitly reveal regret and anxiety about stealing the 'fellow's' money / show that his guilt over the theft is weighing heavily on him This self-awareness and fear of being caught clearly stem from his guilt, making it the primary driver of his forebodings.	1
VI	…Edla's kindness and the situation at the manor house might lead to his exposure as a thief	1

B		
I	arrival of the night	**1**
II	A) 1, 3 and 5	**1**
	[Option a) is correct because (1) aligns with the tone of resignation and wistfulness in the mother's sigh. (3) is a direct reflection of their financial hardships. The mother's sigh likely conveys her acceptance of the reality that money has always been scarce for their family. (5) mother's awareness of the impracticality of Sophie's grand dreams given their circumstances. (2) doesn't fit as the context does not indicate the mother perceives Derek's remark as 'troubling Sophie.' (4) suggests irritation or fatigue but mother's sigh in this context appears more reflective of their financial struggles and her resignation]	
III	A) appearance vs. reality	**1**
	[The delicate bow on Sophie's mother's apron symbolises grace and beauty, whereas her crooked back represents the harsh realities of her life, such as physical toil and hardship.]	
IV	Sophie felt a tightening in her throat.	**1**
V	The writer emphasises the oppressive and suffocating environment of Sophie's household. The heavy breathing of her father is not just a physical sound but a metaphorical representation of the overwhelming weight of fatigue, labour, and monotony that dominates their lives.	**1**
	[The word 'cluttered' conveys a sense of overcrowding and disorder, suggesting that even intangible elements like exhaustion and hardship fill and overwhelm the small, confined space of their home.]	
VI	The setting of the room, which is cluttered and steamy from the stove, creates a sense of discomfort and hardship. This contributes to the mood of weariness and tension in the family's daily life, which Sophie is acutely aware of.	**1**
10.	**Answer ANY FIVE of the following six questions in 40 50 words each:** **1 -Content 1- Expression ½ -1 deducted from overall, for Accuracy**	**5 x 2 = 10**
I	The narrator's feelings towards the French language shift from indifference to deep appreciation and respect when it is no longer allowed to be taught. Also, French, in the story, symbolises the loss of freedom and the imposition of foreign control over the region. Therefore, the narrator's sense of loss and regret reflects the emotional impact of this change.	**2**
II	Individuals can learn that fear can be overcome through perseverance, determination, and gradual exposure to the source of fear. Douglas's experience teaches that facing challenges step by step, with proper guidance and practice, allows one to conquer even the most deep-seated fears, leading to personal growth and freedom.	**2**

III	Keats portrays beauty as something that 'will never pass into nothingness,' implying that, unlike fleeting material comforts, beauty offers lasting emotional and psychological support. In the real world, during times of hardship, turning to the enduring beauty of nature, art, or meaningful experiences can provide a sense of peace and restoration OR Just as Keats speaks of beauty creating a 'bower quiet' and offering 'sweet dreams,' recognising beauty in our surroundings or lives can act as a refuge from stress, offering perspective and a sense of tranquility. This connection with beauty can help shift focus from negativity and provide hope, strength, and a reminder that there is always something uplifting to turn to, even in the toughest times.	2
IV	The reference signifies a pause in exploitative and destructive human activities. It reflects the poet's call for introspection and awareness of the harm humans cause to nature and themselves. By pausing, the fishermen and the salt gatherer are shown as reconnecting with their humanity and reflecting on their actions.	2
V	Kipling's refusal highlights the invasion of privacy that often accompanies public life. The refusal shows that the value of an individual's work or thoughts should not be reduced to a commercial or public spectacle. Kipling's stance emphasises the discomfort and control that is often stripped away during the process of an interview.	2
VI	The narrator in Lost Spring adds depth and empathy, offering critical insights into Saheb and Mukesh's struggles within systemic poverty. Unlike a plain narrative, the narrator reflects on social inequalities and privileges, making readers more emotionally engaged. Her observations contextualise the boys' lives within broader social issues, urging reflection and creating a more impactful critique of injustice.	2
11.	**Answer ANY TWO of the following three questions in 40 50 words each.** **1 -Content 1- Expression ½ -1 deducted from overall, for Accuracy**	**2 x 2 =4**
I	Programmes like 'Students on Ice' provide hands-on experiences, allowing students to witness environmental changes firsthand. This immersive learning fosters a deeper understanding of geological shifts and the importance of addressing climate change, encouraging informed action and advocacy for the planet's future. It also inspires a sense of responsibility in young people to actively contribute to sustainability and environmental conservation.	2
II	The comparison to a puppet suggests that she is being manipulated by external forces, unable to act according to her own will. This metaphor point towards her feelings of being dehumanised and treated like an object rather than a person with free will. It also reflects the broader theme of cultural displacement, as she is forced into an environment where her Native American identity is undermined, and she must comply with the rigid rules of the boarding school.	2
III	This remark reflects Derry's frustration with the way people console others by comparing struggles. He feels such comparisons dismiss his pain, highlighting his sensitivity and resentment toward invalidating his personal experiences. It shows his	2

	desire to be understood for his individual challenges rather than being generalised or pitied.	
12.	**Answer ANY ONE of the following two questions, in about 120-150 words.** **Content 2 Expression 2 Accuracy 1**	
	A. While 'Indigo' delves into the economic and systemic oppression of sharecroppers by British landlords, 'The Roadside Stand' highlights the plight of rural people exploited by urban elites and a neglectful system. Both works emphasise the imbalance of power and the struggles of those at the bottom of the societal hierarchy. In 'Indigo', the exploitation of Champaran's peasants is evident in the oppressive sharecropping system, where British landlords forced them to grow indigo on a portion of their land and unfairly profited from it. Similarly, 'The Roadside Stand' portrays a countryside inhabitant selling their goods by the roadside, hoping for a fair chance at economic survival. Their disappointment reflects the false promises of development, as urban buyers and authorities fail to address their needs, leaving them trapped in poverty. Both texts reveal a shared truth—exploitation persists when power dynamics remain unchecked, and progress often bypasses those who need it most. While Gandhi's efforts in 'Indigo' offer a path of hope through resistance, Frost's poem serves as a poignant reminder of the ongoing neglect faced by rural communities. Together, they highlight the importance of empathy, equity, and advocacy in combating exploitation.	
	B. In both 'Poets and Pancakes' and 'Going Places', the characters of the office boy and Sophie share common traits of ambition and dreams that surpass their immediate realities. The office boy, like Sophie, dreams of achieving something greater—he aspires to be a star actor, director, or writer, but is stuck in a subordinate role in the make-up department. Similarly, Sophie dreams of running a boutique or becoming an actress, yet is constrained by financial limitations and family's expectations. Both characters, despite their seemingly humble positions, hold onto lofty dreams that offer them an escape from their current circumstances. However, while Sophie is often dismissive of the practicality of her ambitions, focusing instead on grand ideals, the office boy seems more realistic in his understanding of the obstacles he faces, despite his unfulfilled aspirations. Both characters represent dreams and ambitions constrained by their environments. While their pursuits are met with limitations, they reflect the universal desire to transcend one's current situation and achieve something greater.	
13.	**Answer any one of the following two questions, in about 120-150 words.** **Content 2 Expression 2 Accuracy 1**	1 x 5 =5
	A. Sadao's character arc in 'The Enemy' is central to the moral dilemma of the story. Initially, Sadao is deeply loyal to his country and driven by a sense of patriotism, yet he is a doctor sworn to	

preserve life. When the American prisoner washes ashore, Sadao's internal conflict emerges—should he help an enemy soldier, risking his own safety, or adhere to his nationalistic duty.

As the story progresses, Sadao's arc moves from hesitation and reluctant duty to genuine compassion for the soldier. He goes beyond his initial patriotic impulses, deciding to save the life of the wounded man, showing his internal growth and moral courage. His arc symbolises the triumph of humanity over nationalism, as he eventually values the life of an individual over political allegiances.

In contrast, Hana's transformation is subtler. While she starts with fear and repulsion, her compassion grows, but she does not undergo the same profound transformation as Sadao. Her evolution is more passive, as she supports her husband's decision rather than leading it.

Thus, Sadao's arc is more central to the story's moral conflict.

B.

The satirical tone is central to the narrative, as Kalki uses humour and irony to critique the Maharaja's blind obsession with fulfilling a prophecy. Through exaggerated events, such as the Maharaja's declaration to kill 100 tigers or the astrologer's dramatic predictions, the narrative highlights the absurdity of human arrogance and misplaced priorities.

The detached third-person omniscient narrator adds to this effect, providing sardonic commentary on the Maharaja's actions, which invites readers to critically evaluate his decisions rather than empathise with him.

The use of foreshadowing and dramatic irony keeps the reader engaged. The prophecy of the 100th tiger causing the Maharaja's death looms over the narrative, creating anticipation and humour as the Maharaja ironically believes he can outwit fate.

The ultimate twist, where a wooden tiger indirectly causes his death, adds a layer of poignant irony. Additionally, Kalki critiques human folly and power through the dialogues, hyperbole, and absurdities of the plot, leaving readers entertained yet reflective.

MATHEMATICS – Code No. 041
MARKING SCHEME
CLASS – XII (2025-26)

	SECTION-A (MCQs of 1 mark each)	
Sol. N.	**Hint / Solution**	**Marks**
1	Clearly from the graph Domain is $\left[-\frac{1}{2},\frac{1}{2}\right]$ So graph is of the function $\sin^{-1}(2x)$ **Answer is (B)** $\sin^{-1}(2x)$	**1**
1 **(V.I.)**	Domain is $\left[-\frac{1}{3},\frac{1}{3}\right]$ So the function is $\cos^{-1}(3x)$ **Answer is (C)** $\cos^{-1}(3x)$	**1**
2	AB is defined so n=4 AC is defined so p=4 AB and AC are square matrices of same order so $m \times 3 = m \times q \Rightarrow q = 3 = m$ **Answer is (A)** $m = q = 3 \ \ and \ n = p = 4$	**1**
3	As A is skew symmetric So $p = 0, q = 2, r = -3, t = 4$ So $\frac{q+t}{p+r} = \frac{6}{-3} = -2$ **Answer is (A) -2**	**1**
4	$\|adj\ A\| = 27 \Rightarrow \|A\|^3 = 27 = 3^3 \Rightarrow \|A\| = 3$ $A\ (adj\ A) = \ \|A\|\ I = 3\ I$ **Answer is (C) 3 I**	**1**
5	Inverse of the matrix $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 5 \end{bmatrix} = \begin{bmatrix} \frac{1}{3} & 0 & 0 \\ 0 & \frac{1}{2} & 0 \\ 0 & 0 & \frac{1}{5} \end{bmatrix}$ **Answer is (B)**	**1**
6	$\begin{vmatrix} \cos 67^o & \sin 67^o \\ \sin 23^o & \cos 23^o \end{vmatrix} = \cos 67^o \cos 23^o - \sin 67^o \sin 23^o = \cos(67^o + 23^o) =$ $\cos 90^o = 0$ **Answer is (A) 0**	**1**
7	$f(x)$ is continuous at $x = \pi$ $\Rightarrow \lim_{x \to \pi^-}(kx + 1) = \lim_{x \to \pi^+} \cos x = \ f(\pi)$ $\Rightarrow \lim_{h \to 0}[k(\pi - h) + 1] = \lim_{h \to 0} cos(\pi + h\ ) \ = k\pi + 1$ $\Rightarrow k\pi + 1 \ = \ -1 \qquad \Rightarrow k \ = \ \frac{-2}{\pi}$ **Answer is (D)** $\frac{-2}{\pi}$	**1**

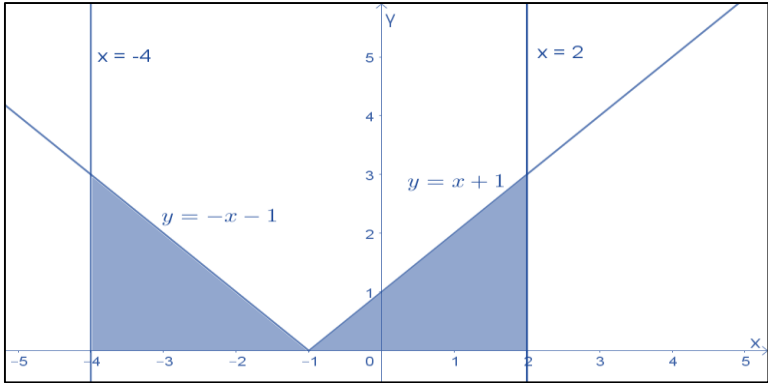|		
8	$f(x) = x \tan^{-1} x$ $f'(x) = 1. \tan^{-1} x + x . \frac{1}{1+x^2}$ $f'(1) = 1 . \tan^{-1} 1 + \frac{1}{1+1} = \frac{\pi}{4} + \frac{1}{2}$ **Answer is (B) $\frac{\pi}{4} + \frac{1}{2}$**	1
9	$f(x) = 10 - x - 2x^2$ $\Rightarrow f'(x) = -1 - 4x$ For increasing function $f'(x) \geq 0$ $\Rightarrow \quad -(1 + 4x) \geq 0$ $\Rightarrow \quad (1 + 4x) \leq 0$ $\Rightarrow \quad x \leq -1/4$ $\Rightarrow \quad x \in \left(-\infty, -\frac{1}{4}\right]$ **Answer is (A) $\left(-\infty, -\frac{1}{4}\right]$**	1
10	$x dx + y dy = 0$ $\Rightarrow \int x dx = -\int y dy$ $\Rightarrow \frac{x^2}{2} = -\frac{y^2}{2} + k$ $\Rightarrow x^2 + y^2 = 2k$ Solution is $x^2 + y^2 = 2k, k$ being an arbitrary constant. **Answer is (C) Circles**	1
11	$I = \int_a^b x f(x) dx = \int_a^b (a + b - x) f(a + b - x) dx$ $\Rightarrow I = \int_a^b (a + b - x) f(x) dx \quad$ (given $f(a + b - x) = f(x)$) $\Rightarrow I = \int_a^b (a + b) f(x) dx - \int_a^b x f(x) dx$ $\Rightarrow 2 I = (a + b) \int_a^b f(x) dx$ $\Rightarrow I = \frac{1}{2} (a + b) \int_a^b f(x) dx$ **Answer is (D) $\frac{a+b}{2} \int_a^b f(x) dx$**	1
12	Let $I = \int x^3 \sin^4(x^4) \cos(x^4) \, dx$ Let $\sin(x^4) = t \Rightarrow 4x^3 \cos(x^4) \, dx = dt \Rightarrow x^3 \cos(x^4) = \frac{1}{4} dt$ Thus $I = \int t^4 \left(\frac{1}{4} dt\right) = \frac{1}{20} t^5 + C = \frac{1}{20} \sin^5(x^4) + C$ $\Rightarrow I = \frac{1}{20} \sin^5(x^4) + C = a \sin^5(x^4) + C$ So, $a = \frac{1}{20}$ **Answer is (B) $\frac{1}{20}$**	1
13	The projection of the vector $\hat{i} + 2\hat{j} + \hat{k}$ on the line $\vec{r} = (3\hat{i} - \hat{j}) + \lambda(\hat{i} + 2\hat{j} + 3\hat{k})$ is $\frac{1 \times 1 + 2 \times 2 + 1 \times 3}{\sqrt{1^2 + 2^2 + 3^2}} = \frac{8}{\sqrt{14}}$ units **Answer is (C) $\frac{8}{\sqrt{14}}$ units**	1

14	The distance of the point (a, b, c) from the y-axis is $\sqrt{a^2 + c^2}$ So, the distance is $\sqrt{3^2 + 5^2}$ = $\sqrt{34}$ units. **Answer is (B) $\sqrt{34}$ units**	**1**
15	$(2\vec{a}.\hat{\imath})\hat{\imath} - (\vec{b}.\hat{\jmath})\hat{\jmath} + (\vec{c}.\hat{k})\hat{k} = (2 \times 3)\hat{\imath} - (1)\hat{\jmath} + (2)\hat{k}$ $\quad = 6\hat{\imath} - \hat{\jmath} + 2\hat{k} = \vec{c}$ **Answer is (D) $\vec{c}$**	**1**
16	The points (1,0) and (0,2) satisfy the equation $2x + y = 2$ And shaded region shows that (0,0) doesn't lie in the feasible solution region So, the inequality is $2x + y \geq 2$ **Answer is (B) $2x + y \geq 2$**	**1**
16 **(V.I.)**	(4,0) and (0,3) gives maximum value so $Z_{(4,0)} = Z_{(0,3)} \Rightarrow 4a + c = 3b + c \Rightarrow 4a = 3b$ **Answer is (A) $4a = 3b$**	**1**
17	The student may read the point (2,9) from the line on the graph. The student may find the equation $3x + y = 15$ joining (5,0) and (0,15) and then verify the point (2,9) satisfies it. **Answer is (A) (2,9)**	**1**
17 **(V.I.)**	**Answer is (C)** Open Half plane that contains origin, but not the points of the line $3x + 5y = 10$	**1**
18	**Answer is (B) $\frac{1}{100}$** The person knows the first 4 digits. So the person has to guess the remaining two digits. P (guessing the PIN)=1×1×1×1×$\frac{1}{10}$ × $\frac{1}{10}$ = $\frac{1}{100}$	**1**
19	$\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) + \tan^{-1} 1 - \sec^{-1}\left(\sqrt{2}\right) = \frac{\pi}{3} + \frac{\pi}{4} - \frac{\pi}{4} = \frac{\pi}{3} \neq \frac{\pi}{4}$ So, A is false. Principal Value branch of $\sin^{-1} x$ is $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ and that of $sec^{-1} x$ is $[0, \pi] - \left\{\frac{\pi}{2}\right\}$. So, R is true **Answer is (D)Assertion is false, but Reason is true**	**1**
20	C. $\vec{r} \times (\vec{a} + \vec{b}) = \vec{0} \Rightarrow \vec{r}$ is parallel to $(\vec{a} + \vec{b})$ and $(\vec{a} + \vec{b})$ lies on the plane of $\vec{a}$ and $\vec{b}$. So, $\vec{r}$ is parallel to the plane of $\vec{a}$ and $\vec{b} \Rightarrow \vec{r}$ is perpendicular to $(\vec{a} \times \vec{b})$. So, Assertion is true But $(\vec{a} + \vec{b})$ lies on the plane of $\vec{a}$ and $\vec{b}$, so $(\vec{a} + \vec{b})$ is not perpendicular to the plane of $\vec{a}$ and $\vec{b}$ Therefore, Reason is false. **Answer is (C) Assertion is true, but Reason is false**	**1**

SECTION B
(VSA type questions of 2 marks each)

21A	$\tan\left(\tan^{-1}(-1) + \frac{\pi}{3}\right) = \tan\left(-\frac{\pi}{4} + \frac{\pi}{3}\right)$	½
	$= \frac{\tan\frac{\pi}{3} - \tan\frac{\pi}{4}}{1 + \tan\frac{\pi}{3}\tan\frac{\pi}{4}}$	1
	$= \frac{\sqrt{3}-1}{1+\sqrt{3}}$ or $2 - \sqrt{3}$	½
	OR	OR
21B	For domain, $-1 \le 3x - 2 \le 1$	½
	$\Rightarrow 1 \le 3x \le 3$	½
	$\Rightarrow \frac{1}{3} \le x \le 1$	½
	So, domain of $\cos^{-1}(3x - 2)$ is $\left[\frac{1}{3}, 1\right]$	½
22	$y = \log\tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$	
	Differentiating with respect to x	
	$\frac{dy}{dx} = \frac{1}{\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)} . sec^2\left(\frac{\pi}{4} + \frac{x}{2}\right) . \frac{1}{2}$	½
	$= \frac{\cos\left(\frac{\pi}{4}+\frac{x}{2}\right)}{\sin\left(\frac{\pi}{4}+\frac{x}{2}\right)} . \frac{1}{\cos^2\left(\frac{\pi}{4}+\frac{x}{2}\right)} . \frac{1}{2}$	
	$= \frac{1}{2\sin\left(\frac{\pi}{4}+\frac{x}{2}\right)\cos\left(\frac{\pi}{4}+\frac{x}{2}\right)} = \frac{1}{\sin\left(\frac{\pi}{2}+x\right)} = \frac{1}{\cos x}$	1
	$\Rightarrow \frac{dy}{dx} - \sec x = 0$	½
23A	$\int \frac{(x-3)e^x}{(x-1)^3} dx = \int \frac{(x-1-2)e^x}{(x-1)^3} dx$	
	$= \int\left(\frac{1}{(x-1)^2} - \frac{2}{(x-1)^3}\right)e^x dx = \int\left(\frac{1}{(x-1)^2} + \frac{d}{dx}\left(\frac{1}{(x-1)^2}\right)\right)e^x dx$	1
	$= \frac{e^x}{(x-1)^2} + $ c $\quad\quad\quad$ (as $\int(f(x) + f'(x))e^x dx = e^x f(x) + $ c)	1
	OR	OR
23B	A $= \int_0^4 x \, dy = \int_0^4 \sqrt{y} \, dy$	
	$= \frac{2}{3} \times y^{3/2}\Big]_{y=0}^{y=4} = \frac{16}{3}$ sq. units	1
		1
23B	**For Visually Impaired:**	
	A $= \int_0^3 y \, dx = \int_0^3 \sqrt{x} \, dx$	1
	$= \frac{2}{3} \times x^{3/2}\Big]_{x=0}^{x=3} = 2\sqrt{3}$ sq. units	1

24	Given $f(x + y) = f(x)f(y)$ $\quad\quad f(0 + 5) = f(0)f(5)$ $\implies \quad f(0) = 1$ $f'(5) = \lim\limits_{h \to 0} \dfrac{f(5+h)-f(5)}{h} = \lim\limits_{h \to 0} \dfrac{f(5)f(h)-f(5)}{h} \quad [\because f(x+y) = f(x)f(y)]$ $\quad\quad = \lim\limits_{h \to 0} \dfrac{2f(h)-2}{h} \quad\quad\quad\quad\quad\quad [\because f(5) = 2]$ $\quad\quad = 2 \lim\limits_{h \to 0} \dfrac{f(h)-1}{h} = 2 \lim\limits_{h \to 0} \dfrac{f(h)-f(0)}{h} = 2 f'(0)$ $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad = 2 (3) \quad\quad [\because f'(0) = 3]$ $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad = 6$	½ 1 ½
25	The vector $\overrightarrow{OP} = \dfrac{1}{2}\left(4\hat{\imath} + 4\hat{k}\right) = 2\hat{\imath} + 2\hat{k}$ Area of the parallelogram formed by the two adjacent sides as OA and OP $\quad\quad\quad = \left|\left(\overrightarrow{OA} \times \overrightarrow{OP}\right)\right| = \begin{vmatrix} \hat{\imath} & \hat{\jmath} & \hat{k} \\ 1 & 1 & 1 \\ 2 & 0 & 2 \end{vmatrix}$ $\quad\quad\quad\quad = \left|2\hat{\imath} - 2\hat{k}\right|$ $\quad\quad\quad\quad = 2\sqrt{2} \text{ square units.}$	½ ½ ½ ½

SECTION C
(SA type questions of 3 marks each)

| 26A | $x^y = e^{x-y}$
 Taking log of both sides
 $y \log x = (x - y) \log e$
 $\quad y \log x + y = x \ (\text{since } \log e = 1)$
 $\quad\implies \quad y = \dfrac{x}{1+\log x}$
 Differentiating with respect to x
 $\dfrac{dy}{dx} = \dfrac{(1+\log x).1 - x.\frac{1}{x}}{(1+\log x)^2}$
 $\quad = \dfrac{\log x}{(\log e + \log x)^2}$
 $\quad = \dfrac{\log x}{(\log(x\,e))^2}$
 Now $\dfrac{dy}{dx}\Big]_{x=e} = \dfrac{\log e}{(\log e^2)^2} = \dfrac{1}{(2 log e)^2} = \dfrac{1}{2^2} = \dfrac{1}{4} \quad\quad (\text{as } \log e = 1)$

 Alternative Solution:

 $x^y = e^{x-y}$
 Taking log of both sides
 $y \log x = (x - y) \log e$
 $\quad y \log x + y = x \ (\text{since } \log e = 1)$
 Differentiating both sides w.r.t. x
 $\log x \dfrac{dy}{dx} + \dfrac{y}{x} + \dfrac{dy}{dx} = 1$
 $\Rightarrow \dfrac{dy}{dx}(1 + \log x) = 1 - \dfrac{y}{x}$
 $\Rightarrow \dfrac{dy}{dx} = \dfrac{x-y}{x(1+\log x)} = \dfrac{x - \frac{x}{1+\log x}}{x(1+\log x)} = \dfrac{x(1+\log x)-x}{x(1+\log x)^2} = \dfrac{x(1+\log x-1)}{x(\log e + \log x)^2} = \dfrac{\log x}{(\log(xe))^2}$
 Now $\dfrac{dy}{dx}\Big]_{x=e} = \dfrac{\log e}{(\log e^2)^2} = \dfrac{1}{(2 log e)^2} = \dfrac{1}{2^2} = \dfrac{1}{4} \quad\quad (\text{as } \log e = 1)$ | 1

 1
 1 |

	OR	OR
26B	$\frac{dx}{d\theta} = a(1 - \cos\theta)$, $\frac{dy}{d\theta} = a(0 + \sin\theta)$,	1
	$\Rightarrow \frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{a\sin\theta}{a(1-\cos\theta)}$	
	$\qquad = \frac{2\sin\left(\frac{\theta}{2}\right)\cos\left(\frac{\theta}{2}\right)}{2sin^2\left(\frac{\theta}{2}\right)} = \cot\frac{\theta}{2}$	1
	$\Rightarrow \frac{d^2y}{dx^2} = -\frac{1}{2}cosec^2\left(\frac{\theta}{2}\right)\frac{d\theta}{dx}$	
	$\qquad = -\frac{1}{2a}cosec^2\left(\frac{\theta}{2}\right)\frac{1}{2sin^2\left(\frac{\theta}{2}\right)}$	
	$\qquad = -\frac{1}{4a}cosec^4\left(\frac{\theta}{2}\right)$	1

27	Let r be the radius of ice ball at time t .	
	$V = \frac{4}{3}\pi r^3$............ (1)	
	$S = 4\pi r^2$..............(2)	½
	Given $\frac{dV}{dt} \propto S$	
	$\Rightarrow \frac{dV}{dt} = -kS$ (where k is some positive constant) ....(3)	½
	Differentiating (1) w.r.t. t, we get	
	$\frac{dV}{dt} = \frac{4}{3}\pi.(3r^2)\frac{dr}{dt}$	
	$\frac{dV}{dt} = 4\pi r^2\frac{dr}{dt}$ .... (4)	1
	$\Rightarrow -kS = 4\pi r^2\frac{dr}{dt}$ (from (3) and (4))	½
	$\Rightarrow -kS = S\frac{dr}{dt}$ (using (2))	
	$\Rightarrow \quad \frac{dr}{dt} = -k$	½
	$\Rightarrow$ radius of the ice-ball decreases at a constant rate	

28A		
		1
	$\int_{-4}^{2}\lvert x + 1\rvert dx = \int_{-4}^{-1}(-x - 1)\,dx + \int_{-1}^{2}(x + 1)\,dx$	½
	$\qquad = -\frac{(x+1)^2}{2}\Big]_{-4}^{-1} + \frac{(x+1)^2}{2}\Big]_{-1}^{2}$	½
	$\qquad = -\left(0 - \frac{9}{2}\right) + \left(\frac{9}{2} - 0\right) = 9$	½
	It represent the area of shaded region bounded by the curve $y = \lvert x + 1\rvert$, $x -$ axis and the lines $x = -4$ and $x = 2$	½

OR

28B
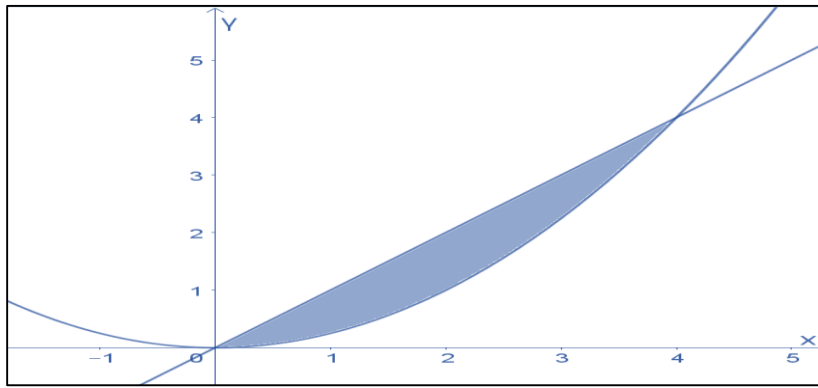
Required Area = $\int_0^4 x \, dx - \int_0^4 \frac{x^2}{4} dx$ 1

$$= \frac{x^2}{2}\Big]_0^4 - \frac{1}{12}[x^3]_0^4$$ ½

$$= \frac{1}{2}(16 - 0) - \frac{1}{12}(64 - 0) = 8 - \frac{16}{3} = \frac{8}{3} \text{ sq. units}$$ ½

For Visually Impaired:

$$y = |x + 1| = f(x) = \begin{cases} -x - 1, & x < -1 \\ x + 1, & x \geq -1 \end{cases}$$ 1

$$\int_{-4}^{2} |x + 1| dx = \int_{-4}^{-1} (-x - 1) \, dx + \int_{-1}^{2} (x + 1) \, dx$$

$$= -\frac{(x+1)^2}{2}\Big]_{-4}^{-1} + \frac{(x+1)^2}{2}\Big]_{-1}^{2}$$ 1

$$= -\left(0 - \frac{9}{2}\right) + \left(\frac{9}{2} - 0\right) = 9$$

It represent the area of shaded region bounded by the curve $y = |x + 1|$,   1

$x -$ axis and the lines $x = -4 \ and \ x = 2$

OR

$$25x^2 + 16y^2 = 400 \Rightarrow \frac{x^2}{16} + \frac{y^2}{25} = 1 \Rightarrow \frac{x^2}{4^2} + \frac{y^2}{5^2} = 1 \Rightarrow y = \frac{5}{4}\sqrt{4^2 - x^2}$$

Required Area = $4 \int_0^4 \frac{5}{4}\sqrt{4^2 - x^2}\, dx$ | 1

$$= 5\left[\frac{x\sqrt{4^2 - x^2}}{2} + \frac{4^2}{2}\sin^{-1}\left(\frac{x}{4}\right)\right]_0^4$$ | 1

$$= 5[0 + 8\sin^{-1}(1) - 0]$$

$$= 40 \times \frac{\pi}{2} = 20\pi \text{ sq. units}$$ | 1

29A	The line through $(2, -1, 3)$ parallel to the z-axis is given by	1
	$\vec{r} = (2\hat{\imath} - \hat{\jmath} + 3\hat{k}) + \lambda(\hat{k})$	½
	Any point on this line is $\ P(2, -1, 3 + \lambda)$	
	Any point on the given line $\vec{r} = (2\hat{\imath} - \hat{\jmath} + 2\hat{k}) + \mu(3\hat{\imath} + 6\hat{\jmath} + 2\hat{k})$ is	
	$Q(2 + 3\mu, -1 + 6\mu, 2 + 2\mu)$	
	For the intersection point	½
	$Q(2 + 3\mu, -1 + 6\mu, 2 + 2\mu)$ = $P(2, -1, 3 + \lambda) \Rightarrow 2 = 2 + 3\mu \ \Rightarrow \mu = 0$	½
	The point of intersection is $(2, -1, 2)$	½
	The distance from $(2, -1, 3)$ to $(2, -1, 2)$ is clearly 1 unit.	
	Alternative Solution:	
	Any point on the line through $(2, -1, 3)$ parallel to the z-axis is $(2, -1, \lambda)$	
	Any point on the given line is $\ \ (2 + 3\mu, -1 + 6\mu, 2 + 2\mu)$	1
	Therefore, $\ 2 = 2 + 3\mu \ \Rightarrow \mu = 0$	
	The point of intersection is $(2, -1, 2)$	1
	The distance from $(2, -1, 3)$ to $(2, -1, 2)$ is clearly 1 unit.	½
		½
29B	**OR**	
	The line through $(2, -1, 1)$ parallel to the z-axis is $\vec{r} = (2\hat{\imath} - \hat{\jmath} + \hat{k}) + \lambda(\hat{k})$	1
	Any point on this line is $\ P(2, -1, 1 + \lambda)$	
	Any point on the given line is $\ A(3 + \mu, \mu, 1 + \mu)$	
	$A(3 + \mu, \mu, 1 + \mu) = P(2, -1, 1 + \lambda) \ \Rightarrow \mu = -1$	1
	The point of intersection is $(2, -1, 0)$	½
	The distance of $(2, -1, 0)$ from the z-axis is $\sqrt{2^2 + (-1)^2} = \sqrt{5}$ units.	½
30	Sketching the graph	$1\frac{1}{2}$

$C = (800, 400)$
$D = (400, 200)$
$A = (600, 0)$
$B = (1200, 0)$

	Corner points A(600,0), B(1200,0), C(800,400), D(400,200)		
	Values of Z: $Z_A = 1200, Z_B = 2400, Z_C = 2000, Z_D = 1000$		½
	Maximum $Z = 2400$ when $x = 1200$ and $y = 0$		½
			½
	For Visually Impaired:		
30	At Corner points A(600,0), B(1200,0), C(800,400), D(400,200)		
	Values of Z are $Z_A = 1800, Z_B = 3600, Z_C = 3200, Z_D = 1600$		1
	Maximum Value of Z = 3600 at B(1200,0)		1
	And Minimum Value of Z= 1600 at D(400,200)		1
31	Let the events be:		
	A: Mehul is selected		
	B: Rashi is selected		
	Then according to the question,		
	A and B are independent events and		
	$P(A) = 0.4, \quad P(A \cap \bar{B}) + P(B \cap \bar{A}) = 0.5$		
	Let $P(B) = x$		1
	Then $P(A \cap \bar{B}) + P(B \cap \bar{A}) = 0.5$		
	$\Rightarrow P(A)P(\bar{B}) + P(B)P(\bar{A}) = 0.5$		
	$\Rightarrow 0.4(1 - x) + x(1 - 0.4) = 0.5$		
	$\Rightarrow 0.4 - 0.4x + 0.6x = 0.5$		
	$\Rightarrow 0.2x = 0.5 - 0.4 = 0.1$		
	$\Rightarrow x = \frac{0.1}{0.2} = \frac{1}{2} = 0.5$		1
	So, probability of selection of Rashi = 0.5		
	Probability of selection of at least one of them $= 1 - P(\bar{A} \cap \bar{B})$		
	$\qquad\qquad\qquad\qquad\qquad = 1 - P(\bar{A})P(\bar{B})$		
	$\qquad\qquad\qquad\qquad\qquad = 1 - 0.6 \times 0.5$		
	$\qquad\qquad\qquad\qquad\qquad = 1 - 0.3 = 0.7$		1

<div align="center">

SECTION D
(LA type questions of 5 marks each)

</div>

32	$AB = \begin{bmatrix} 3 & -6 & -1 \\ 2 & -5 & -1 \\ -2 & 4 & 1 \end{bmatrix} \begin{bmatrix} 1 & -2 & -1 \\ 0 & -1 & -1 \\ 2 & 0 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = I$	1
	So, $A^{-1} = B \ and \ B^{-1} = A$	½
	Given system of equations is	
	$\quad 3x - 6y - z = 3, \ 2x - 5y - z + 2 = 0, \ -2x + 4y + z = 5$	
	In matrix form it can be written as: $AX = C$,	½
	$\qquad\qquad$ where $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ and $C = \begin{bmatrix} 3 \\ -2 \\ 5 \end{bmatrix}$	½
	Here $|A| = -3 - 0 + 2 = -1 \neq 0$	½
	So, the system is consistent and has unique solution given by the	
	expression $X = A^{-1}C = BC$	½
	$\Rightarrow X = \begin{bmatrix} 1 & -2 & -1 \\ 0 & -1 & -1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} 3 \\ -2 \\ 5 \end{bmatrix} \Rightarrow \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ -3 \\ 21 \end{bmatrix}$	1
	Thus $x = 2, y = -3, z = 21$	½

33A	Let $x = \tan\theta \implies dx = \sec^2\theta \, d\theta$	½
	$I = \int_0^{\frac{\pi}{4}} \frac{\log(1+\tan\theta)}{1+\tan^2\theta} \cdot \sec^2\theta \, d\theta$	
	$I = \int_0^{\frac{\pi}{4}} \log(1+\tan\theta) d\theta = \int_0^{\frac{\pi}{4}} \log\left[1 + \tan\left(\frac{\pi}{4} - \theta\right)\right] d\theta$	1
	$= \int_0^{\frac{\pi}{4}} \log\left[1 + \frac{1-\tan\theta}{1+\tan\theta}\right] d\theta$	1
	$= \int_0^{\frac{\pi}{4}} \log\left[\frac{1+\tan\theta+1-\tan\theta}{1+\tan\theta}\right] d\theta$	
	$= \int_0^{\frac{\pi}{4}} \log\left[\frac{2}{1+\tan\theta}\right] d\theta$	
	$= \int_0^{\frac{\pi}{4}} \log 2 \, d\theta - \int_0^{\frac{\pi}{4}} \log[1+\tan\theta] \, d\theta$	1
	$= \log 2 \times x]_0^{\frac{\pi}{4}} - I$	
	$\implies 2I = \frac{\pi}{4}\log 2$	1
	$\implies I = \frac{\pi}{8}\log 2$	½
33B	**OR**	OR
	$I = \int \frac{(3\sin\theta - 2)\cos\theta}{5 - \cos^2\theta - 4\sin\theta} d\theta = \int \frac{(3\sin\theta - 2)\cos\theta}{5 - (1-\sin^2\theta) - 4\sin\theta} d\theta$	½
	$Let \quad \sin\theta = t \implies \cos\theta \, d\theta = dt$	
	$I = \int \frac{(3t-2)}{5-(1-t^2)-4t} dt$	
	$= \int \frac{(3t-2)}{t^2-4t+4} dt = \int \frac{3t-2}{(t-2)^2} dt$	1
	Let $\frac{3t-2}{(t-2)^2} = \frac{A}{(t-2)} + \frac{B}{(t-2)^2}$	
	$3t - 2 = A(t-2) + B$	
	Comparing the coefficients of t and constant terms on both sides	
	$A = 3, -2A + B = -2, B = 4$	½
	$\int \frac{(3\sin\theta - 2)\cos\theta}{5 - \cos^2\theta - 4\sin\theta} d\theta = \int \frac{3}{t-2} dt + \int \frac{4}{(t-2)^2} dt$	+½
	$= 3\log|t-2| - \frac{4}{t-2} + C$	1+1
	$= 3\log|\sin\theta - 2| - \frac{4}{\sin\theta - 2} + C$	½
34A	$y + \frac{d}{dx}(xy) = x(\sin x + x)$	
	$\implies y + (x\frac{dy}{dx} + y) = x(\sin x + x)$	
	$\implies 2y + x\frac{dy}{dx} = x(\sin x + x)$	1
	$\implies \frac{dy}{dx} + \frac{2y}{x} = (\sin x + x)$	
	This a linear differential equation of the form $\frac{dy}{dx} + Py = Q$	
	$P = \frac{2}{x}, Q = (\sin x + x)$	
	I.F $= e^{\int \frac{2}{x} dx} = e^{2\log x} = e^{\log x^2} = x^2$	1
	Solution will be $y \cdot$ I.F $= \int Q \cdot IF \, dx$	
	$yx^2 = \int (\sin x + x)x^2 \, dx$	1
	$yx^2 = \int \sin x \cdot x^2 \, dx + \int x^3 \, dx$	

$$\Rightarrow \quad yx^2 = -x^2\cos x + 2\int x\cos x\,dx + \frac{x^4}{4} + C$$

$$\Rightarrow yx^2 = -x^2\cos x + 2(x\sin x + \cos x) + \frac{x^4}{4} + C$$

<div align="center">Which is the required solution</div>

<div align="center">**OR**</div>

34B

$$2y\,e^{x/y}dx + (y - 2x\,e^{x/y})\,dy = 0$$

$$\Rightarrow \quad \frac{dx}{dy} = \frac{2x\,e^{x/y} - y}{2y\,e^{x/y}} = \frac{2\frac{x}{y}e^{\frac{x}{y}} - 1}{2\,e^{\frac{x}{y}}}$$

It is a homogeneous differential equation.

Let $x = vy \Rightarrow \frac{dx}{dy} = v + y\frac{dv}{dy}$

$$v + y\frac{dv}{dy} = \frac{2ve^v - 1}{2e^v}$$

$$\Rightarrow y\frac{dv}{dy} = \frac{2ve^v - 1}{2e^v} - v = \frac{2ve^v - 1 - 2ve^v}{2e^v}$$

$$\Rightarrow y\frac{dv}{dy} = \frac{-1}{2e^v}$$

$$\Rightarrow 2e^v\,dv = -\frac{dy}{y}$$

$$\int 2e^v\,dv = -\int \frac{dy}{y}$$

$$\Rightarrow 2e^v = -\log|y| + C$$

$$\Rightarrow 2e^{\frac{x}{y}} +" \log|y| = C$$

When $x = 0$, $y = 1$, C = 2

Required solution $2\,e^{\frac{x}{y}} + \log|y| = 2$

35		
	Let $\frac{x-1}{3} = \frac{y-0}{-1} = \frac{z+1}{0} = \lambda \quad \Rightarrow$ Any point on it is $(3\lambda + 1, -\lambda, -1)$	½
	For the point where $y = 1 \quad \Rightarrow \lambda = -1$	1
	$\Rightarrow$ The point is $(-2, 1, -1)$	½
	The directions of the two lines are $\vec{m} = 3\hat{i} - \hat{j}$	1
	and $\vec{n} = -2\hat{i} + 2\hat{j} + \hat{k}$	½
	$\vec{m} \times \vec{n} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & -1 & 0 \\ -2 & 2 & 1 \end{vmatrix} = -\hat{i} - 3\hat{j} + 4\hat{k}$	1
	The equation of the required line is	
	$\vec{r} = (-2\hat{i} + \hat{j} - \hat{k}) + \mu(-\hat{i} - 3\hat{j} + 4\hat{k})$	½

Alternative Solution:

Let $\frac{x-1}{3} = \frac{y-0}{-1} = \frac{z+1}{0} = \lambda \Rightarrow$ Any point on it is $(3\lambda + 1, -\lambda, -1)$	½
For the point where $y = 1 \quad \Rightarrow \lambda = -1$	1
$\Rightarrow$ The point is $(-2, 1, -1)$	½
Let the direction ratios of the required line be a, b, c	
Then $3a - b = 0$	
And $-2a + 2b + c = 0$	1
Solving we get $\frac{a}{-1} = \frac{-b}{3} = \frac{c}{4} \Rightarrow \frac{a}{-1} = \frac{b}{-3} = \frac{c}{4}$	1
The required line is $\frac{x+2}{-1} = \frac{y-1}{-3} = \frac{z+1}{4} = \mu$	½
In vector form $\vec{r} = (-2\hat{i} + \hat{j} - \hat{k}) + \mu(-\hat{i} - 3\hat{j} + 4\hat{k})$	½

Column of marks (top section): 1, 1, 1, 1, 1, 1, 1, 1

SECTION- E
(3 case-study/passage-based questions of 4 marks each)

36	I. Traffic flow is not reflexive as $(A, A) \notin R$ (or no major spot is connected with itself)	1
	II. Traffic flow is not transitive as $(A, B) \in R$ and $(B, E) \in R$, but $(A, E) \notin R$	1
	III A. $R = \{(A, B), (A, C), (A, D), (B, C), (B, E), (C, E), (D, E), (D, C)\}$	1
	Domain $= \{A, B, C, D\}$	½ +
	Range $= \{B, C, D, E\}$	½
	OR	
	III B. No, the traffic flow doesn't represent a function as A has three images.	1+1

37	I. $P(x) = R(x) - C(x) = -0.3x^2 + 20x - (0.5x^2 - 10x + 150)$	
	$= -0.8x^2 + 30x - 150$	1
	II. For critical points $P'(x) = 0 \Rightarrow -1.6x + 30 = 0$	
	$\Rightarrow x = \frac{30}{1.6} = \frac{300}{16} = 18.75$	1
	III A. Now $P''(x) = -1.6$	1
	In particular $P''(18.75) = -1.6 < 0$	
	So, critical value $x = 18.75$ corresponds to a maximum profit.	1
	OR	
	III B. As x is the number of bulbs, so practically 18 bulbs correspond to a maximum profit.	1
	Maximum profit is $P(18) = -0.8 \times 18^2 + 30 \times 18 - 150$	
	$= -259.2 + 540 - 150$	
	$= 540 - 409.2 = ₹130.80$	1

38	Let the events be	
	E_1: the student is in the first group (time spent on screen is more than 4 hours)	
	E_2: the student is in the second group (time spent on screen is 2 to 4 hours)	
	E_3: the student is in third group (time spent on screen is less than 2 hours)	
	A: the event of the student showing symptoms of anxiety and low retention	
	$P(E_1) = \frac{60}{100}$ $P(E_2) = \frac{30}{100}$ and $P(E_3) = \frac{10}{100}$	
	$P(A|E_1) = \frac{80}{100}$ $P(A|E_2) = \frac{70}{100}$ and $P(A|E_3) = \frac{30}{100}$	
	I. $P(A) = P(E_1) \times P(A|E_1) + P(E_2) \times P(A|E_2) + P(E_3) \times P(A|E_3)$	
	$= \frac{60}{100} \times \frac{80}{100} + \frac{30}{100} \times \frac{70}{100} + \frac{10}{100} \times \frac{30}{100} = \frac{72}{100} = 72\%$	2
	II. $P(E_1|A) = \frac{P(E_1 \cap A)}{P(A)}$	
	$= \frac{\left(\frac{60}{100} \times \frac{80}{100}\right)}{\left(\frac{72}{100}\right)} = \frac{48}{72} = \frac{2}{3}$	2
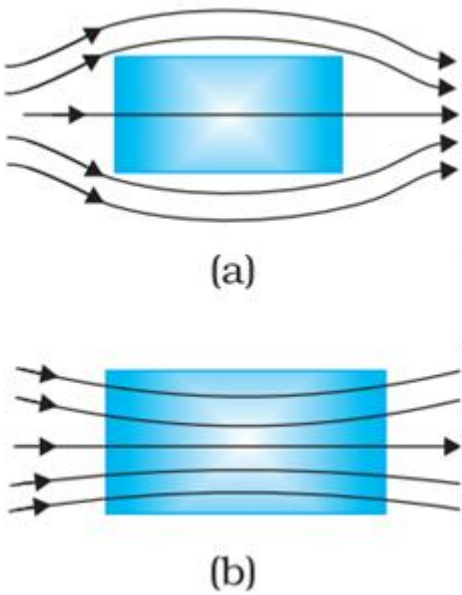
SECTION A		
Q.No	**Questions**	**Marks**
1.	**Answer: (A)** Both are having equal charges For two bodies to be in equilibrium, both should have same potential(V). As $V = \frac{C}{q}$ Where C of sphere is $4\pi\varepsilon_o r$. Which is independent of all the factors mentioned in options.	1
2.	**Answer: (A)** Diameter of copper wire d, Diameter of cylindrical iron is D No.of turns N,(D>>d) Length=N x Circumference of cylinder L= NπD $R = \frac{\rho L}{A} = \frac{\rho N \Pi D}{d^2 \frac{\Pi}{4}}$ $R = \frac{4\rho N D}{d^2}$	1
3.	**Answer: (A)** When the frequency of the AC source is increased than the impedance of the device decreases. As in phasor diagram current leads the voltage, so given appliance is capacitor.	1
4.	**Answer: (D)** The energy of radio waves is lesser than that of the gamma rays. Since the frequency of radio waves is less than gamma waves. E = hν Hence, energy of radio waves is less than gamma waves	1
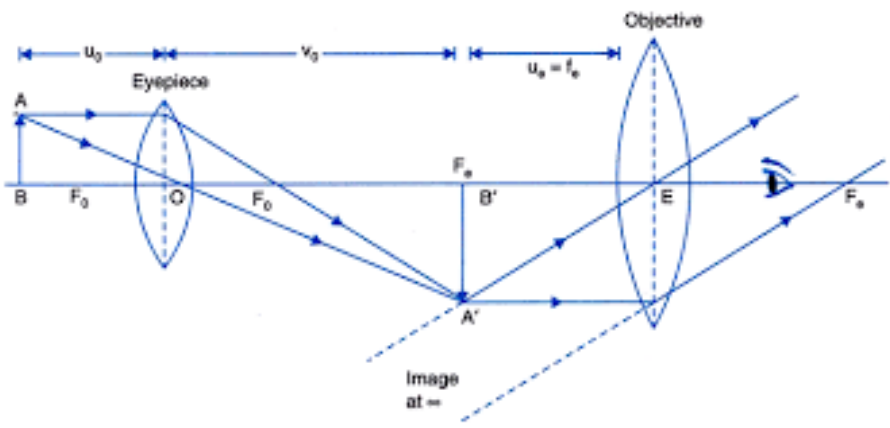
5.	**Answer: (A)** Total Internal reflection *For VI- Students* **Answer: (D)** $$\frac{v_1}{c} = \frac{Sin\theta_c}{sin\,90}$$ $cSin\theta$	1
6.	**Answer: (D)** Slit width increases hence amplitude will increase, so intensity will also increase. *For VI- Students* **Answer: (B)** Interference	1 1
7.	**Answer: (C)** IV Transition III, V, VI corresponds to absorption of energy. Maximum emitted wavelength corresponds minimum energy difference. $\Delta E_I > \Delta E_{II} > \Delta E_{IV}$ Therefore, maximum emitted wavelength corresponds to transition IV. *For VI- Students* Transition III, V, VI corresponds to absorption of energy. Maximum emitted wavelength corresponds minimum energy difference. $\Delta E_{II} > \Delta E_I > \Delta E_{IV}$ Therefore, maximum emitted wavelength corresponds to transition IV.	1
8.	**Answer: (D)** The charged particle will move with constant velocity. As charge particle is moving parallel to magnetic field, there will be no acceleration.	1

9.	**Answer: (C)** more for the magnet falling through the solenoid. Emf will be induced in solenoid due to motion of magnet through it. As per Lenz's law induced emf will oppose the motion of magnet.	1
10.	**Answer: (C)** $V = 2V_o \sin 2\omega t$ As $V = NBA\omega \sin \omega t$	1
11.	**Answer: (D)** 1:1 Nuclear density does not depend on mass number.	1
12.	**Answer: (B)** The deflection of the magnetic needle at P and Q will be in the opposite directions. As magnetic field at equator is antiparallel to magnetic field at pole.	1
13.	**Answer: (B)** both Assertion and Reason are true but Reason is not the correct explanation of Assertion.	1
14.	**Answer: (C)** Assertion is true but Reason is false.	1
15.	**Answer: (D)** both Assertion and Reason are false	1
16.	**Answer: (B)** both Assertion and Reason are true but Reason is not the correct explanation of Assertion. If three point charges are in equilibrium then forces acting on each charges should be linearly opposite.	1

SECTION B

17.	Given, $B_o = 510$ nT $= 510 \times 10^{-9}$ T $\qquad \omega = 60 \times 10^6$ rad/sec $\qquad E_o = cB_o = 153$ N/C $\qquad k = \omega/c = 20 \times 10^{-2}$ rad/m $\qquad E = E_o \sin(\omega t - kz)$ $\qquad E = 153 \sin(60 \times 10^6 t - 20 \times 10^{-2} x)$ N/C	1 1
18.	(I) E.m.f of the cell is 6V, As when load current is zero potential difference becomes equal to emf of the cell. (II) Explanation: The internal resistance of a cell can be determined as the negative slope of its voltage–current graph. First, we can determine the slope by choosing two points on the line: $$\textbf{Slope} = \frac{0-6}{12-0} = \textbf{- 0.5}$$ This means that the internal resistance must be 0.50 ohm (Ω). **For VI-Candidates** $E = V + v = IR + Ir$ (where V is potential drop in the external circuit and v is potential drop in the cell) Or, $E = I(R + r)$ Or, $I = E / (R + r)$ This is the relation.	1 1 1 1
19.	From Gauss's theorem $\varnothing = \frac{q}{\varepsilon_r \varepsilon_o}$ [Where ε_r is relative permittivity of medium inside Gaussian surface] For sphere, $\varnothing_{\text{sphere}} = \frac{q}{\varepsilon_{water}\varepsilon_o}$ ……………..(i) For cube $\varnothing_{\text{cube}} = \frac{2q}{\varepsilon_o}$ …………………(ii) Dividing (i) by (ii) $\frac{\varnothing\text{sphere}}{\varnothing\text{cube}} = \frac{1}{2\varepsilon_{water}} = \frac{1}{160}$	½ ½ 1

20. (I)	$\frac{F}{L} = \frac{\mu_0 I_1 I_2}{2\pi r}$ (I_1 is the current in first wire and I_2 is the current in second wire)	1
		1
	Thus we define ampere as the current flowing in each conductor separated by a unit distance so that one conductor applies a force of 2×10^{-7} N on a unit length of another parallel conductor.	
	Or	
20 (II)	(a)	1
	(b)	1
	For VI-Candidates	1
		1
	Gauss's law for magnetism is: The net magnetic flux through any closed surface is zero. Hence magnetic flux linked to given sphere will also be zero.	
21A.	Smaller is the impact parameter, larger is the angle at which α – particles scatters.	1
	Larger is the impact parameter, α – particles scatter less keeping its original trajectory. For head on collision, the value of impact parameter is zero.	1
	OR	

21B.	$\lambda=\dfrac{h}{mv}$ $\lambda=\dfrac{h}{\sqrt{2mqV}}$, comparing this equation with $y = mx$ slope $=\dfrac{h}{\sqrt{2mq}}$.	1 1

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SECTION C

</div>

22.	In the full wave rectifier:D_1 and D_2 are pn junction diode which allow current to pass only in forward biasing. During odd half cycle the diode D_1 will be forward biased hence potential at the Q will be more then Potential at P and during this cycle D_2 will not permit current through it. During even half cycle the diode D_2 will be forward biased hence potential at the Q will be more then Potential at P and during this cycle D1 will not permit current through it. Hence we will get DC as output as shown in diagram.	1 2
23.	(I) (A)Conservation of electric charge	1
	(B) KVL is obeys law of conservation of energy as it is supplied voltage is equal to the voltage across each component in the loop. (OR) algebraic sum of voltages equal to zero.	1
	(II) No change in balancing condition is observed.	1

24.	A fast-moving neutron collides with the nucleus of Plutonium (Pu), thereby producing Xenon (Xe) and Zirconium (Zr) along with neutrons.	
	(I) Nuclear fission reaction. $$^{239}_{94}Pu + {}^{1}_{0}n \rightarrow {}^{134}_{54}Xe + {}^{103}_{40}Zr + 3\,{}^{1}_{0}n$$	1
	(II) $\Delta m = [m\,({}^{239}_{94}Pu) + m\,({}^{1}_{0}n)] - [m\,({}^{134}_{54}Xe) + m\,({}^{103}_{40}Zr) + 3\,m\,({}^{1}_{0}n)\,]$	
	$\quad = [239.052157 + 1.00866] - [\,133.905040 + 102.926597 + 3\,X\,1.00866\,]$	1
	$\quad\quad = 240.060817 - 239.857617$	
	$\quad\quad = 0.2032$ amu	
	$\quad$ Q value $= \Delta mc^2$	1
	$\quad\quad\quad = 0.2032$ x 931.5 MeV	
	$\quad\quad\quad = 189.2808$ MeV	
25.	(I) $\dfrac{1}{v_0} = \dfrac{1}{f_0} - \dfrac{1}{u_0}$	1
	$v_0 = 8.3$ cm	
	Angular magnification $M = m_0 x m_e$	
	$M = \dfrac{v_0}{u_0}\,(\dfrac{D}{f_e}+1)$	
	$M = -\dfrac{8.3}{0.91}\,X\,(\dfrac{25}{2.9}+1)$	
	$M = -87.7$	1
	(II)	
		1
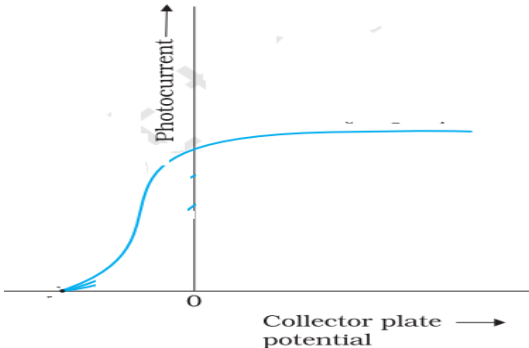
26.		1
	AB – Incident wavefront CD – Reflected wavefront XY – Reflecting surface	
	If c be the speed of light, t be the time taken by light to go from B to C or A to D or E to G through F, then $t = \dfrac{EF}{C} + \dfrac{FG}{C}$ $t = \dfrac{AF \sin i}{C} + \dfrac{FC \sin r}{C}$ $t = \dfrac{AC \sin r + AF(\sin i - \sin r)}{C}$ For rays of light from different parts on the incident wavefront, the values of AF are different. But light from different points of the incident wavefront should take the same time to reach the corresponding points on the reflected wavefront. So, t should not depend upon AF. This is possible only if sin i – sin r = 0. i.e. sin i = sin r or i = r Hence proved. **For VI candidates** (i) A wavefront is the locus of points (wavelets) having the same phase of oscillations (ii) Each point on a wavefront acts as a fresh source of disturbance of light known as wavefront. (iii) Planer.	1 1 1 1 1
27. (I)	As charge particle is moving perpendicular to magnetic field it will follow circular trajectory in clock wise direction. Magnetic force will act as centripetal force. Given: Q=1C; M=10^{-3}kg; v=2m/s & B=-0.1T$\hat{k}$	

	Radius of trajectory is given by $R=\frac{mv}{qb}=2cm$ (A) Quarter Circle (B) It will cross the X axis at 2cm. (C) As work done by B is on charge particle is zero it's kinetic energy(K) will remain same $K=\frac{1}{2}mv^2$ Or, $K=\frac{1}{2}x10^{-3}x2^2J = 2 \times 10^{-3}J$	 1 1 1	
27 (II)	Given: μ_r=200 I=1A N=200turn/m (A) H=nI Or, H=2000/m X 1A=2 X 10^3A/m (B) B= $\mu_o\mu_r$H Or, B=200 x 4π x 10^{-7}x 2 X 10^3A/m Or, B= 0.50T (C) Magnetisation is given by M=(μ_r -1)H=199 x 10^3 A/m Or, M = 1.99 x 10^5 A/m	 1 1 1	
28.	Given: No of turns of coil N_c=50 Area of coil= $\frac{5}{\pi}$ cm^2= $\frac{5}{\pi}$ x 10^{-4}m^2 For solenoid: N_s=2000, L=0.5m, n = N/L=4000turns/m, I= 5A		

	Magnetic field due to solenoid 'B'=μ_onI Or,B=4000 x 4π x 10^{-7} x 5 T Or,B= 8π x 10^{-2} T	1
	Flux linked to coil $\emptyset_B$=$N_c\vec{B}.\vec{A}$ Or, $\emptyset_B$=N_cBA cosωt	1
	Emf $\varepsilon = \dfrac{d\emptyset_B}{dt} = N_c BA\omega \sin \omega t$ Or, ε_{max} = N_cBA Or, ε_{max} = 50 x 8π x 10^{-2} T x $\dfrac{5}{\pi}$ x 10^{-4}m^2 Or, ε_{max} = 2Mv	1

SECTION - D	

29.	(I) (B) Voltage drop across diode will change from 0.3 to 0.7 V. Value of V_0 changes by 0.4 V.	1
	(II) (D) 11V, 1.96Ma $V_0 = E - V_{si} - V_{Ge} = 12.07 - 0.3 = 11V$ $\quad I_d = V_0/R = 11/5.6 \times 10^{-3} = 1.96$ Ma	1
	(III) (B) $I = \dfrac{6}{50+150+100} = \dfrac{6}{300}$ A $= 0.02$ A	1
	(IV) (C) Here the diode is in forward bias. So we replace it by a connecting wire. $V_a - V_b = \dfrac{l}{2} \times 10$ $= \dfrac{30}{15 \times 2} \times 10$ V $= 10$ V	1

30.	(I) If infrared radiation is used as incident radiation, determine the reading $W_o = h\nu_o$	1
	Threshold frequency, $\nu_o = \dfrac{Wo}{h} = \dfrac{6.35 \times 1.6 \times 10^{-19}}{6.63 \times 10^{-34}} = 1.5 \times 10^{15}$ hz Frequency of infrared radiation $<$ threshold frequency (ν_o) , hence no emmision of photoelectrons will take place, therefore reading of the microammeter $= 0$	1
	(II) Photoelectric current decreases with decrease in potential. At some stage, for a certain potential of plate A, all the emitted electrons are stopped by the plate A and the photoelectric current becomes zero.	1
	(III)	1
	(for V.I. candidates) No change in Kinetic Energy.	1
	SECTION E	
31. (I)	(A) In absence of dielectric slab, the capacitance of parallel plate capacitor is given by $\qquad$ $C = \dfrac{A\varepsilon_0}{d}$ When a dielectric slab of thickness $t(t < d)$ is introduced between the plates without touching the plates , the electric field in air $E_o = \dfrac{\sigma}{\varepsilon_0}$ $\qquad$ (σ is charge density given by $\dfrac{q}{A}$) but on account of polarisation of dielectric the electric field inside the dielectric changes to $E = \dfrac{Eo}{K}$	½
	If potential difference between the plates of capacitor be V. now , then clearly	

V= E_o(d-t) + Et;

Or, V= E_o(d-t) + $\frac{E_o}{K}$ t;

Or, V= E_o(d-t+$\frac{t}{k}$)= $\frac{\sigma}{\varepsilon_0}$ (d-t+$\frac{t}{k}$)

Or, V=$\frac{q}{A\varepsilon_0}$ (d-t+$\frac{t}{k}$)

(B) Capacitance of sphere will Increase.

Justification:

As C=$\frac{q}{V}$

& V=$\int \vec{E}.\vec{dl}$

As, electric field will decrease, due to polarization of water. Resulting in decrease in potential.

Hence, capacitance of sphere will increase

(C)
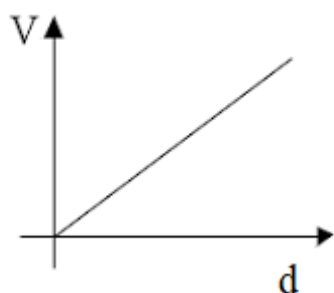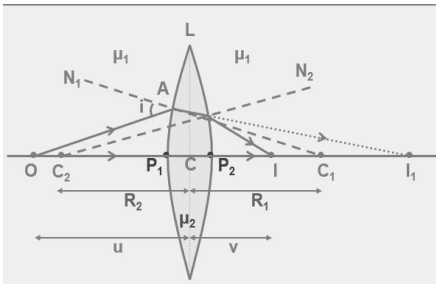
For VI Candidates
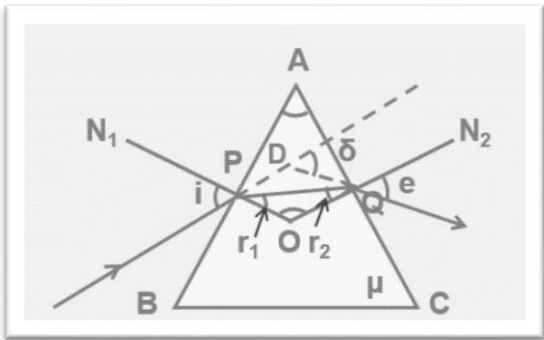
(C) energy stored in capacitor will decrease.

Justification

Energy=$\frac{Q^2}{2C}$

When separation is increased capacitance will increase and charge will remain same.

31 (II)	(A) $U=\frac{Kq_1q_2}{r_{12}}+q_1V(r_1)+q_2V(r_2)$	1
	Or, $U=\frac{Kq_1q_2}{r_{12}}+q_1(E\,r_{1-0})+q_2(E\,r_{2-0})$	1
	Or, $U=(\frac{9X10^9X10^{-6}X3X10^{-6}}{20}+0+3 \times 10^{-6} \times 40x20)$ J Or, $U=37.5 \times 10^{-4}$J	1
	(B) Work done will be same for both paths, as electric field is conservative in nature.	1
	(C) As electric field inside the conductor is zero so there will be no work needed in moving unit positive charge inside or on the surface.	1
32. (I)	(A) Lens Maker's Formula: For refraction at LP_1N, $\frac{\mu_1}{CO}+\frac{\mu_2}{CI_1}=\frac{\mu_2-\mu_1}{CC_1}$	1
	(as if the image is formed in the denser medium) For refraction at LP_2N $\frac{\mu_2}{-CI_1}+\frac{\mu_1}{CI}=\frac{\mu_2-\mu_1}{CC_2}$	1
	(as if the object is in the denser medium and the image is formed in the rarer medium) Combining the refractions at both the surfaces. $\frac{\mu_1}{CO}+\frac{\mu_2}{CI}=\mu_2-\mu_1(\frac{1}{CC_1}+\frac{1}{CC_2})$ Substituting the values with sign convections, $\frac{1}{-u}+\frac{1}{v}=\frac{\mu_2-\mu_1}{\mu_1}(\frac{1}{R_1}-\frac{1}{R_2})$ Since $\frac{\mu_2}{\mu_1}=\mu$ $\frac{1}{-u}+\frac{1}{v}=\frac{\mu_2-\mu_1}{\mu_1}(\frac{1}{R_1}-\frac{1}{R_2})$ (or)	

$$\frac{1}{-u}+\frac{1}{v}=(\mu-1)(\frac{1}{R_1}-\frac{1}{R_2})$$

When the object is kept at infinity, the image is formed at the principal focus.
i.e. u = - ∞, v = + f.

$$\frac{1}{f}=(\mu-1)(\frac{1}{R_1}-\frac{1}{R_2})$$

This equation is called 'Lens Maker's Formula'.

(B) Refractive index of glass, $\mu = 1.55$
Focal length of the convexo-concave lens, f = 10 cm
Radius of curvature of one face of the first Convex surface = R_1
Radius of curvature of the other face of the second convex surface = $-R_1$
Therefore, $R_1 = R$ and $R_2 = -R$
The value of R can be calculated from Lens – Maker formula:
$(1/f) = (\mu – 1) [(1/ R_1) – (1/ R_2)]$
$(1/10) = (1.55 -1) [(1/R) + (1/R)]$
$(1/10) = 0.55 \times (2/R)$
Therefore R = (0.55 x 2 x10)
       =11cm
Hence, the radius of curvature of the convexo-concave is 11cm

(OR)

32 (II)	(A)The **angle of deviation** represents the angle by which a light ray is deviated after passing through a prism.	1
	(B) Refraction of light through prism :	
		1
	In quadrilateral APOQ, A + O = 180° …….(1) In triangle OPQ, $r_1 + r_2 + O = 180°$ …….(2)	

1

1

1

	In triangle DPQ
	$\delta = (i - r_1) + (e - r_2)$
	$\delta = (i + e) - (r_1 + r_2)$ ....(3)
	From (1) and (2),
	$A = r_1 + r_2$
	From (3),
	$\delta = (i + e) - (A)$
	$i + e = A + \delta$
	Sum of angle of incidence and angle of emergence is equal to the sum of angle of prism and angle of deviation.
	
	(C) When angle of incidence increases, the angle of deviation decreases. At a particular value of angle of incidence the angle of deviation becomes minimum and is called 'angle of minimum deviation'.
	     At δ_m,
	  • $i = e$ and $r_1 = r_2 = r$ (say)
	  • At minimum deviation, refracted ray become parallel to incident ray.
	(Award full marks if either of condition is mentioned)
		1
		
		1
		
		1

33. (I)	(A) Torque due to current carrying coil. Modification in designing of galvanometer are (i) Poles of magnet are made spherical (ii) Iron ore is placed inside the coil. (B) Given: $R_g = 49.5\Omega$; Range=0.05A For ammeter let resistance needed be R_a. As per requirement Range x $R_g = R_a(5-0.05)$ $R_a = \frac{0.5 \times 49.5}{4.95} = 0.5 \ \Omega$ (C) R_a will be connected in series & R_v is connected in parallel. **Or**	1 ½ ½ 1 1 1
33 (II)	(A)Given: In load circuit, R=4Ω, X_c=2 Ω, X_l=6 Ω, N_p=1000,	

$N_s=100,$

$V_{in}=200Vsin100\pi t$

(i) Output voltage Across Load Circuit

$\frac{V_{out}}{V_{in}} = \frac{N_s}{N_p}=0.1$

Or, $V_{out}=0.1 \times 200Vsin100\pi t,$

Or, $V_{out}=20Vsin100\pi t.$

(ii) Current flowing through load circuit

As, $I=I_m sin(\omega t+\emptyset)$

Where,

$I_m = \frac{V_m}{Z},$

$Z=\sqrt{R^2 + (X_c^2 - X_L^2)}$

Or, $Z=4\sqrt{2}$ Ω,&

$I_m = \frac{20}{4\sqrt{2}}A = \frac{5\sqrt{2}}{2}A;$

$\emptyset = tan^{-1}\frac{X_c-X_L}{R} = tan^{-1} 1 = \frac{\pi}{4}$

$I=\frac{5\sqrt{2}}{2}Asin(100\pi t+\frac{\pi}{4})$'

(iii) Find the Power supplied to load circuit By the transformer.

$P= \frac{V_m I_m}{2}Cos\emptyset$

Where, $Cos\emptyset=cos\frac{\pi}{4} = \frac{1}{\sqrt{2}}$

$P=20V \times \frac{5\sqrt{2}}{2} A\times\frac{1}{\sqrt{2}} =50W$

(B) Ac transformer works on the principal of ' Mutual Induction'

A.C transformer can increase output potential.

As $P=V/I$

So increase in output potential results in decrease in output current, resulting in significant decrease in power loss in transmission wires between power plants and

Cities. In respective cities they are stepped down.

CHEMISTRY CODE - 043
MARKING SCHEME
CLASS XII (2025-26)
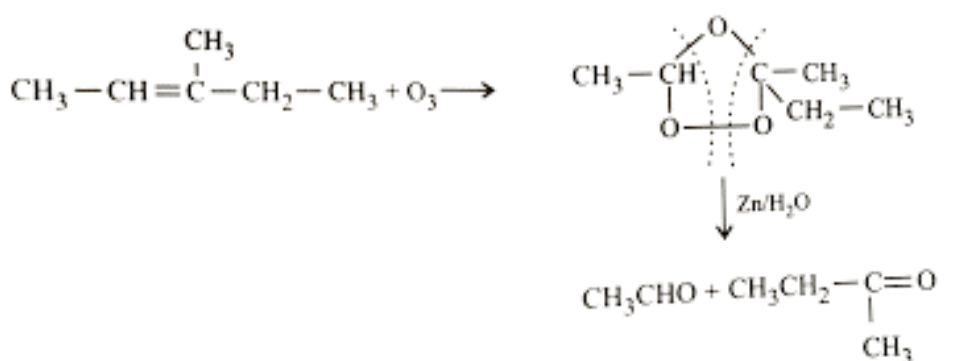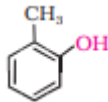
Time: 3 hours   **Max. Marks: 70**
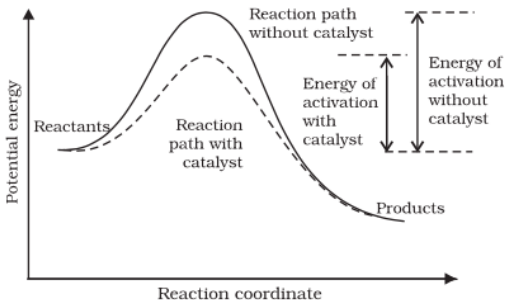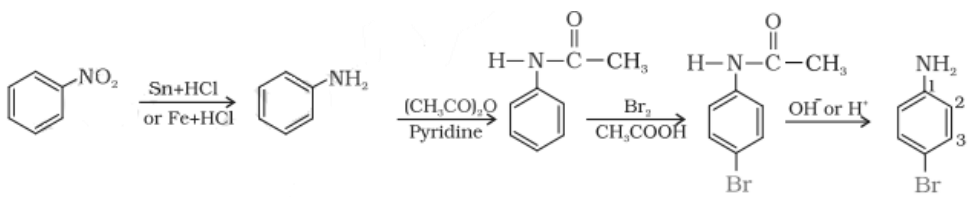
GENERAL INSTRUCTIONS:

Read the following instructions carefully.

1. There are **33** questions in this question paper with internal choice.
2. SECTION A consists of 16 multiple-choice questions carrying 1 mark each.
3. SECTION B consists of 5 short answer questions carrying 2 marks each.
4. SECTION C consists of 7 short answer questions carrying 3 marks each.
5. SECTION D consists of 2 case-based questions carrying 4 marks each.
6. SECTION E consists of 3 long answer questions carrying 5 marks each.
7. All questions are compulsory.
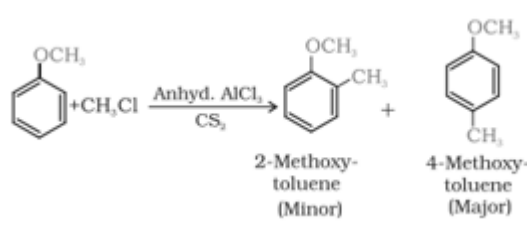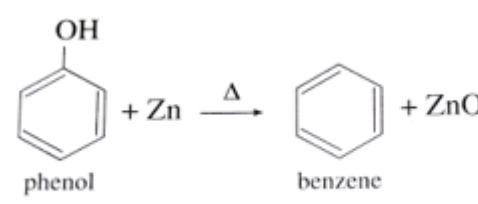8. Use of log tables and calculators is not allowed.

	Section-A	
1	C. Ozonolysis of $CH_3CH_2C(CH_3)=CHCH_3$	1
2	C. B= Butan-2-ol, C= Butanol $CH_3CH_2CH_2CH_2Cl \xrightarrow{\text{NaOH +Ethanol}} CH_3CH_2CH=CH_2$ $CH_3CH_2CH=CH_2 \xrightarrow{H_2O, H^+} CH_3CH_2CH(OH)CH_2$ $CH_3CH_2CH=CH_2 \xrightarrow[\text{(ii)}H_2O_2, OH^-]{\text{(i) }B_2H_6.} CH_3CH_2CH_2CHOH$	1
3	C. chloride	1
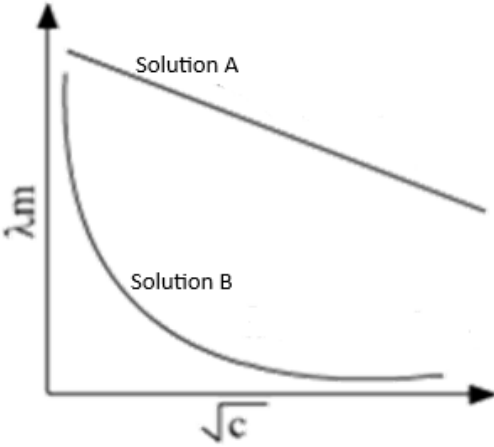
	The formula of coordination complex, the ions outside the square bracket are called counter ions.	1
4	A. A> B>C A is primary, B is secondary amine, C is tertiary amine. Primary amines are having higher boiling point as compared to secondary and tertiary amines.	1
5	C. 0.73 $m = \dfrac{m_2}{MM_2}$ x $\dfrac{1000}{m_1}$ $m = \dfrac{70}{MM_2}$ x $\dfrac{1000}{700}$ $M = \dfrac{m_2}{MM_2}$ x $\dfrac{1000}{V}$ Here, $V = \dfrac{m_1+m_2}{d}$ $= \dfrac{770}{1.5}$ $M = \dfrac{70}{MM_2}$ x $\dfrac{1000 \times 1.5}{770}$ $\dfrac{m}{M} = \dfrac{770}{700 \times 1.5} = 0.73$	1
6	D. A-(iv), B-(iii), C-(ii), D-(i)	1
7	B. sp^2 hybrid. The –OH group has replaced –H of benzene ring. All carbons of benzene are sp^2 hybrid.	1
8	C. Beta D – fructose	1
9	C. both lanthanoids and actinoids	1
10	C. Either 1 or 3 Λ^o_m CH$_3$COOH = Λ^o_mHCl + Λ^o_m CH$_3$COOK - Λ^o_mKCl	1
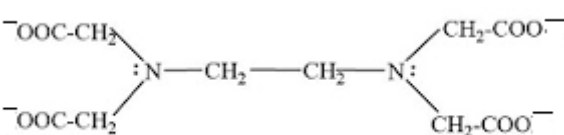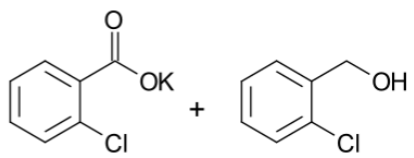
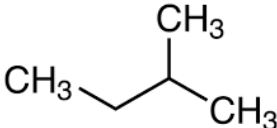|		
	Λ_m^o CH$_3$COOH = 1/2 Λ_m^oH$_2$SO$_4$ + Λ_m^o CH$_3$COONa − 1/2 Λ_m^oNa$_2$SO$_4$	
11	A. (i) and (ii) Aldehydes and ketones react with 2,4 dinitrophenylhydrazine to give a yellow/orange ppt of 2,4 dintirophenylhydrazone	1
12	B. (iv) and (ii)	1
13	D. A is false but R is true Primary aliphatic amines react with nitrous acid to form aliphatic diazonium salts which being unstable, liberate nitrogen gas	1
14	B. Both A and R are true, and R is not the correct explanation of A. If osmotic pressure of the solutions that flow in the blood stream is not same as that of the blood, exosmosis or endosmosis will take place.	1
15	A. Both A and R are true, and R is the correct explanation of A. In starch, the major component is 80-85% of amylopectin is insoluble in water. Hence starch is not completely soluble in water and form colloidal solution.	1
16	C. A is true but R is false. A primary cell becomes dead after use, it cannot be recharged.	1
17	**Option A** I. The volume will be less than 100 ml. The intermolecular forces between phenol and aniline is stronger than phenol-phenol and aniline-aniline which results in decrease in volume. II. Salt lowers the freezing point of water ie. it leads to depression in freezing point. This will delay the melting of ice. **OR** **Option B** I. Precipitate of BaSO$_4$ will not appear as osmosis involves movement of solvent molecules and not solute.	1 1 1 1

	II. Sugar being non-volatile solute, lowers the vapour pressure above the solution. This leads to elevation in boiling point.	1
18	I. Ea for backward reaction = 40 kJ/mol, ΔH= 10 kJ/mol	1
	II. Catalyst will increase the rate of reaction as the activation energy required to form intermediate activated complex between reactant and catalyst is lower than the activation energy required for forming complex without catalyst.	1
	(for visually challenged learners)	
	I. The minimum energy required to form the intermediate activated complex, is known as activation energy (Ea). Activation energy is the least possible energy required to start a chemical reaction. The activation energy doesn't change with change in temperature.	1
	II. Catalyst will increase the rate of reaction as the activation energy required to form intermediate activated complex between reactant and catalyst is lower than the activation energy required for forming complex without catalyst.	1
19	I.	1
	II. C₆H₅CH₂Cl + KCN ⟶ C₆H₅CH₂CN →(LiAlH₄) C₆H₅CH₂CH₂NH₂	1
20	I. [Ag(H₂O)₂][Ag(Cl)₂]	1
	II. [Ni(OH)₂(PPh₃)₂]	1

21	STEP 1		1
	STEP 2	No error	
	STEP 3		1

22	P_A^o = 23.8 mm of Hg	
	$m = 1$ molal, 1 mol of solute in 1000g of water	
	$n_B = 1$ mol	
	$n_A = \dfrac{1000}{18} = 55.5$ mol	
		½
	$MgCl_2 \rightarrow Mg^{2+} + 2Cl^-$	
	$\quad 1 \qquad\quad 0 \qquad 0$	
	$\quad 1-0.7 \quad\; 0.7 \quad 1.4$	
		½
	$\alpha = (i-1)/(n-1) \qquad$ n=3	
	$i = 0.7(2)+1$	
	$= 1.4 + 1 = 2.4$	½
	$$\frac{P_A^o - P_s}{P_A^o} = i\frac{n_B}{n_A + n_B}$$	½
	$\dfrac{23.8 - Ps}{23.8} = 2.4\,\dfrac{1}{56.5}$	
		½
	$23.8\left(1 - \dfrac{2.4}{56.5}\right) = Ps$	
	$22.9\,\text{mm of Hg} = Ps$	
		½

| 23 | I. $\quad E_{cell} = E_{cell}^o - \dfrac{2.303\,RT}{2F}\log\dfrac{[Ni^{2+}]}{[Cu^{2+}]}$ | 1 |

	II. $E_{cell} = E^o_{cell} - \dfrac{2.303\,RT}{6F} \log \dfrac{[Al^{3+}]^2}{[Fe^{2+}]^3}$	1
	III. $E_{cell} = E^o_{cell} - \dfrac{2.303\,RT}{2F} \log \dfrac{[Mg^{2+}]}{[Ag^+]^2}$	1
24	I. Cl_2 in presence of sunlight forms free radical as an intermediate and hence toluene undergoes free radical substitution of the alky group to form benzyl alcohol whereas Cl_2 in dark forms Cl^+, an electrophile as an intermediate, making toluene undergo electrophilic substitution and form o-chlorobenzene and p-chlororbenzene.	1
	II. NaI is soluble in dry acetone but NaCl is insoluble. NaCl precipitates out of the reaction mixture and shifts the equilibrium towards the right accoding to Le Chatelier's principle.	1
	III. The branching of the chain in neo pentylchloride is more than iso pentylchloride, which makes the molecule more compact and decreases its surface area. This decrease the magnitude of the Van der Waal's forces of attraction existing between the two molecules of neopentyl chloride. and consequently the boiling point decreases and is less than isopentyl chloride	1
25	I. Chromium and Molybdenum Cr – $[Ar]3d^54s^1$ Mo- $[Kr]4d^55s^1$ have similar electronic configuration and same number of unpaired electrons (6). Therefore, both show similar magnetic behaviour. II. Zinc and Scandium Zinc shows +2 oxidation state in its salts and Zn^{2+} – $[Ar]3d^{10}$ has no unpaired electrons as it has completely filled d subshell, so it forms white salts and Sc shows +3 oxidation state in its salts and Sc^{3+} $[Ar]$ and no unpaired electron, so it forms white salts. Nickel and Vanadium salts are coloured as their ions have unpaired electrons.	½ 1 ½ 1
26	Acidified $K_2Cr_2O_7$ A. $CH_3CH_2OH \xrightarrow{\hspace{2cm}} CH_3COOH$ B. $CH_3CH_2COOH \xrightarrow{Br_2/\,Red\,P} CH_3CHBrCOOH$ C. $(CH_3)_2CHMgCl \xrightarrow{(i)CO_2\,(ii)H^+,H_2O} (CH_3)_2CHCOOH$ D. $CH_3CH_2COOH \xrightarrow{Cl_2/\,Red\,P} CH_3CHClCOOH$ Order of acidity : $CH_3CHClCOOH > CH_3CHBrCOOH > CH_3COOH > (CH_3)_2CHCOOH$	½ ½ ½ ½

	Order of pKa values: CH₃CHClCOOH < CH₃CHBrCOOH < CH₃COOH < (CH₃)₂CHCOOH	1

Order of pKa values: $CH_3CHClCOOH < CH_3CHBrCOOH < CH_3COOH < (CH_3)_2CHCOOH$ — 1

27 **Attempt any 3**

I. $CH_3CH_2COCH_3 + CH_3CH_2MgCl \xrightarrow{dry\ ether} (CH_3CH_2)_2C(OMgCl)CH_3$

$\xrightarrow{H_2O} (CH_3CH_2)_2C(OH)CH_3$ — 1

II.

2-Methoxy-toluene (Minor) + 4-Methoxy-toluene (Major) — 1

III.

phenol + Zn $\xrightarrow{\Delta}$ benzene + ZnO — 1

IV. $CH_3CH_2Cl + CH_3CH_2ONa \longrightarrow CH_3CH_2OCH_2CH_3 + NaCl$ — 1

28

I. No. Enthapy of atomisation of Zinc is 130kJ/mol because it has no unpaired electrons in d subshell so the interatomic interaction is weaker than Cu. — 1, 1

II. Sulphuric acid because hydrochloric acid is oxidised to chlorine. — 1

III. $5NO_2^- + 2MnO_4^- + 6H^+ \rightarrow 2Mn^{2+} + 5NO_3^- + 3H_2O$ — 1

29

I. No. Both are strong electrolytes so both the LEDs will glow. Red will be very bright and green will be medium in both cases. — 1

II. (a) (i) and (ii) — 1

OR

Scale	Red LED	Green LED	Conductivity
0	off	off	low or none

	III. A is strong electrolyte while B is a weak electrolyte. (marks allotted for correct curve)	1 + 1
	For Visually challenged	
	I. No. Both are strong electrolytes so both will have value of 3 or 4 on the scale	1
	II. (a) (i) and (ii)	1
	OR	
	The value will be 0.	
	III. A is a strong electrolyte and B is a weak electrolyte	1+1
30	I. EDTA is a chelating agent, it forms ringed complex with the central metal ion and makes the complex stable.	1
	OR	
	Hardness of water is estimated by simple titration with Na_2EDTA. The Ca^{2+} and Mg^{2+} ions form stable complexes with EDTA.	
	II. Yes, 40% of the population in Africa suffers from anaemia. Most of the patients in Somalia are likely to be anaemic. Iron fortified food will have increased the nutritional value. In the same amount of food product the patient will get higher amount of the micronutrient than present in natural product. This will help reduce cases of iron deficiency in Somalia. However, patients will be advised to consume the food product according to the recommended safe limits of the fortificant.	1
	OR	
	No, though 40% of the population suffers from anaemia, iron fortified food will be recommended to patients whose reports	

	suggest iron deficiency. Iron fortified food will have increased the nutritional value. In the same amount of food product the patient will get higher amount of the micronutrient than present in natural product. This fortificant can cause other ill effects to the non- anaemic population as well as could lead to higher levels of iron in the body than required.		

	III. (a)6
	     2 Nitrogen and 4 oxygen are electron donors
	     (b)
		½
		½
		
		1

For Visually challenged

I. Same as above

II. Same as above

III. (a) 6
   2 Nitrogen and 4 oxygen are electron donors.

  (b) EDTA is an electron donor.

31	**Option A** I. The structures of expected products of Cannizarro reaction of 2-chloro -benzaldehyde		1

II.   -SO_3H is electron withdrawing in nature, hence it decreases the availability of lone pair for donation, hence basic nature of aniline decrease due to the presence of sulphonic group.   **1**

III.   Following are the steps to convert acetic acid to ethanamine.   **1**

$$CH_3COOH \xrightarrow{\text{LiAlH}_4} CH_3CH_2OH \xrightarrow{\text{SOCl}_2} CH_3CH_2Cl \xrightarrow[\text{NH}_3]{\text{excess of}} CH_3CH_2NH_2$$

IV.   Benzoic acid from Benzoyl chloride: **1**

$$C_6H_5COCl \xrightarrow{\text{H}_2\text{-Pd/BaSO}_4} C_6H_5CHO \xrightarrow{\text{acidified KMnO}_4} C_6H_5COOH$$

	V. The chemical test to distinguish between propanal and propanone is Tollen test (Silver Mirror) Propanal on heating in a water bath with ammonical silver nitrate (Tollen's reagent) forms a silver mirror on the sides of the test tube. Propanone on heating in a water bath with Tollen's reagent does not show any reaction. **OR** **Option B** I. Product formed on Wolf-Kishner reduction of 2 –methylbutanal is II. The strength of benzoic acid depends on its ability to donate the proton and stability of the conjugate base formed .Sulphonic acid is an electron withdrawing group , it presence increases the ability to release proton . Hence the acidic strength will be increased . III. To convert acetic acid from ethanamine following are the steps involved : $CH_3CH_2NH_2 \xrightarrow{HNO_2} CH_3CH_2OH \xrightarrow{acidified\ KMnO_4} CH_3COOH$ IV. Aniline to benzoic acid: $C_6H_5NH_2 \xrightarrow{NaNO_2/\ HCl} C_6H_5N_2{}^+Cl^- \xrightarrow{KCN} C_6H_5CN \xrightarrow{complete\ hydrolysis} C_6H_5COOH$ V. a chemical test to distinguish between: propanal and ethanal Ethanal gives yellow precipitate on heating with iodine in the presence of sodium hydroxide (positive Iodoform test) Propanal will not give any reaction on heating with iodine in the presence of sodium hydroxide (negative Iodoform test)	1 1 1 1 1 1
32	**Option A** I. Protein present in the hair are fibrous while in egg are globular.	1

		Fibrous proteins are long fibre like and usually insoluble in water whereas globular proteins are globular and usually soluble in water.	
	II.	Glucose reduces Fehling's Reagent however sucrose cannot though both have aldehydic group because glucose contains free aldehydic group whereas sucrose is a disaccharide and does not have free aldehydic group.	1
	III.	Alpha -Amino acids behave as salts. This behaviour is due to the presence of both acidic (carboxyl group) and basic (amino group) groups in the same molecule.	1
	IV.	The chemical change takes place during curdling of milk caused due to the formation of lactic acid from the lactose sugar by the bacteria present in milk.	1
	V.	The possible disease is Osteoporosis, which can be cured by taking Vitamin D rich diet.	1
		OR	
		Option B	
	I.	Carbohydrate present in cane sugar is sucrose which is a disaccharide composed of glucose and fructose while the carbohydrate present in milk is lactose which is a disaccharide composed of glucose and galactose	1
	II.	Glucose is an aldohexose and a monosaccharide. Bromine water is a mild oxidising agent which can be used to bring about oxidation of only the aldehydic group present in glucose.	1
	III.	Amino acid P is with structural formula given as – HOOC-CH$_2$CH(NH$_2$)CH$_2$COOH The presence of two carboxylic acids shows that it is an acidic amino acid The pH will be less than 7	1
	IV.	The two major molecular shapes formed due to the folding of secondary structure of proteins are alpha helix and beta pleated sheets	1
	V.	Ashish is suffering from scurvy, which occurs due to deficiency of Vitamin C The sources of food are – Citrus fruits, amla and green leafy vegetables	1
33		**Option A**	
	I.	Here, $T_1 = 298\,K, T_2 = 318\,K$ $\frac{K_2}{K_1} = 3$	
		$\log \frac{K_2}{K_1} = \frac{E_\alpha}{2.303R}\left[\frac{1}{T_1} - \frac{1}{T_2}\right]$	½
		$\log 3 = \frac{E_\alpha}{2.303 \times 8.314}\left[\frac{1}{298} - \frac{1}{318}\right]$	½

$$0.4771 = \frac{E_a}{2.303 \times 8.314}\left[\frac{10}{298 \times 318}\right]$$

$$E_\alpha = \frac{0.4771 \times 2.303 \times 8.314 \times 298 \times 318}{10}$$

$$= 86567.87 \ \text{J}\,\text{mol}^{-1}$$

$\text{E}_a = 86.567 \ \text{KJ}\,\text{mol}^{-1}$ (½ mark for anwer anmd ½ for correct unit)

II. It is zero order reaction.

$$k = \frac{[R] - [R]_0}{t}$$

Here, k is rate constant, [R] – concentration of reactant at time t, [Ro] initial concentration of reactant.

OR

Option B

I. $SO_2Cl_2(g) \rightarrow SO_2(g) + Cl_2(g)$

$t = 0$	P_i	0	0
on completion	0	P_i	P_i
$t = 10$ sec	$P_i - x$	x	x

On completion
$P_T = P_i + P_i$
$P_T = 2P_i$
$P_i = \dfrac{300}{2}$
$= 150$ torr

After 10 seconds
$P_T = P_i - x + x + x$
$x = P_T - P_i$
$x = 200 - 150$
$x = 50$ torr

First order integrated rate equation

$$k = \frac{2.303}{t} \log \ \frac{P_i}{P_i - x}$$

$$k = \frac{2.303}{10} \log \frac{150}{150 - 50}$$

$$k = \frac{2.303}{10} \log \frac{150}{100}$$

$$k = \frac{2.303}{10} \log \frac{3}{2}$$

$$k = \frac{2.303}{10} \left(\log 3 - \log 2 \right)$$

$$k = \frac{2.303}{10} \times \left(0.4771 - 0.3010 \right)$$

$$k = \frac{2.303}{10} \times 0.1761$$

$$k = 0.040 \ s^{-1}$$

II. Rate of reaction can be expressed as

Rate = $Z_{AB} e^{-Ea/RT}$

where Z_{AB} represents the collision frequency of reactants, A and B and $e^{-Ea/RT}$ represents the fraction of molecules with energies equal to or greater than Ea.

BIOLOGY Code no. 044
MARKING SCHEME
CLASS – XII (2025–26)

Q. No.	Answer	Marks
	Section - A	
1	C. Mitotic division of nucleus of generative cell	1
2	B. A male gamete and two polar nuclei	1
3	C. FSH and LH	1
4	C. Frederick Griffith	1
5	A. Probes	1
6	C. Hardy-Weinberg principle says that phenotype frequencies in a population are stable and are constant from generation to generation.	1
7	B. 25%	1
8	D. The leg mutation might lead to reproductive isolation and speciation due to an effect on the mating call.	1
9	D. Sporozoites, Liver infection, Erythrocyte infection, Gametocytes	1
10	B AUGAGACGGACUGCAUUCCCAACCUGA	1
11	A. Lysozyme, ribonuclease, protease, chilled ethanol	1
12	C. Both I and II	1
13	C. A is true but R is false	1
14	A. Both A and R are true and R is the correct explanation of A	1
15	A. Both A and R are true and R is the correct explanation of A	1
16	C. A is true but R is false	1
	Section - B	
17	It is achieved by emasculation and bagging techniques. If the female parent bears bisexual flowers, removal of anthers from the flower bud before the anther dehisces using a pair of forceps is necessary. This step is referred to as emasculation. Emasculated flowers have to be covered with a bag of suitable size, generally made up of butter paper, to prevent contamination of its stigma with unwanted pollen. This process is called bagging. (1 x 2 = 2)	2
18	In a transcription unit, the activity of RNA polymerase at a given promoter is regulated by accessory proteins that have an ability to recognise start sites. (1) These regulatory proteins can act both positively (activators) and negatively	2

	(repressors) with the operator which is adjacent to the promoter in an operon unit. (1)	
19	A. Innate immunity/ non-specific type of defense/immunity present at the time of birth is effected. It provides different types of barriers to the entry of the foreign agents into our body/destroys microbes/ prevents microbial growth. (1) B. Cellular barrier-monocytes is with least count and it can phagocytose and destroy microbes. (1)	2
20	Anyone who can use/modify any living organism or their products using technology is considered to be a biotechnologist. (1) Thus, cheese maker can be a biotechnologist as he uses microbes like bacteria, fungi to make cheese for commercial purpose. (1)	2

21	A.
	 (i) The first (upright) pyramid of biomass corresponds to a terrestrial ecosystem. Producers have maximum biomass, decreasing with herbivores (primary consumer), secondary consumer and tertiary consumer. Second (inverted) pyramid refers to a small standing crop of phytoplankton supporting a large standing crop of zooplankton/aquatic ecosystem. (1)
	 (ii)
	
	Tertiary Consumer (2J)
	Secondary Consumer (20J)
	Primary Consumer (200J)
	Producer (2000J)
	200,000J of sunlight (1)
	- - - - - - - - - - - - - - - - - -
	
	For Visually impaired students
	
	(Answer same as (i) and (ii) above)
	
	OR
	
	B.
	
	 (i) 3000+1300+427+427+378= 5532 (1)
	
	 (ii)
	    (a) Animals are mobile and can migrate to escape harsh conditions or explore new areas.
	    (b) Animals have adapted to changing environments, developing complex nervous systems and receptors. Their responses are adaptive and ensure survival. Iii. Plants, being fixed, have fewer evolutionary adaptations for water, minerals, and sunlight. (Anyone, 1)
		2

Section – C		
22	(i) Condoms; these act by blocking the entry of microbes and sperms in the cervix.	3

	(ii) Surgical methods such as Tubectomy by her or vasectomy by her husband as these are highly effective but irreversible methods. (iii) Oral pills containing progestogens or progestogen – estrogen combination are very effective and can be repeated as long as the female derives to prevent conception. (1 x 3 =3)	
23	(i) (a) ovum is haploid (n) and (c) – blastomeres are diploid(2n). (ii) If the trophoblast (L) does not attach to the endometrium properly, it can lead to implantation failure, pregnancy loss, and other pregnancy complications. (iii) In case X, the cells of these embryos will have identical genome as they have developed from the same zygote. (1 x 3 =3) - - - - - - - - - - - - - - - - - - *For Visually impaired students* • The mitotic division called cleavage starts as the zygote moves through the isthmus of the oviduct towards the uterus and forms 2,4,8,16 daughter cells called blastomeres. The embryo with 8 to 16 cell blastomeres is called a morula. (1) • The morula transforms into blastocyst and the blastomeres in the blastocyst are arranged into an outer layer called trophoblast and an inner group of cells attached to trophoblast called the inner cell mass. (1) • The trophoblast layer then gets attached to the endometrium of the uterus and the inner cell mass gets differentiated as the embryo. After attachment, the uterine cells divide rapidly and cover the blastocyst which gets embedded in the endometrium leading to implantation. (1)	3
24	BbGg Male is crossed with BbGg female which are both heterozygous of both the characters for eye and coat colour. (1) Punnett square (1) 1/16 or 6.25 % - blue eyes and white coat (1)	3
25	A. These animals exhibit convergent evolution, structures that are not anatomically similar are evolved to perform similar functions adapted to the same habitat, the fins of Salmon and Shark, flippers of Dolphins, Seals and whales. One can say that it is the similar habitat that has resulted in selection of similar adaptive features in different groups of organisms but toward the same function: hence, analogous structures are a result of convergent evolution. (2)	3

	B. Ichthyosaurs. Some of the land reptiles went back into water to evolve into fish like reptiles probably 200 mya. (1) - - - - - - - - - - - - - - - - - *For Visually impaired students* A. Both Lamarck and Darwin believed that living things had hereditary traits, traits they could pass on to their offspring. They believed that some traits were more useful than others, and that over time the more useful trait would become more common. (1) The difference is that Lamarck believed that the changes in an organism experienced during its life could be passed on to succeeding generations/Inheritance of acquired characters. So, for instance Giraffe stretched its neck its entire life to eat leaves on tall plants, it would have longer-necked offspring (or any other example of Lamarckian theory). (1) Darwin believed that small, random and gradual genetic variations followed by natural selection lead to evolution- that some giraffes just naturally had longer necks, and these were the ones who had more children. So over time natural selection led to evolution of Giraffes with long neck were fitter than short-necked. (1)	
26	'Flocs' and 'activated sludge' in sewage treatment help to reduce the BOD. (i) Flocs: These are masses of bacteria held together by slime and fungal filaments to form mesh-like structures. These are used during the secondary sewage treatment in the aeration tank to increase the rate of decomposition. The microbes digest a lot of organic matter, converting it into microbial biomass and releasing a lot of minerals. As a result, the BOD of sewage is reduced. As the BOD of waste is reduced to 1% of raw sewage. it is passed into the settling tank. In these tanks, flocs are allowed to undergo sedimentation. (ii) Activated sludge: The sediment of the settling tank is called activated sludge. A part of it is used as an inoculum in aeration tanks. The remaining part is passed into a large tank called an anaerobic sludge digester. In these tanks, anaerobic microbes are present that digest the organic mass as well as aerobic microbes of activated sludge. The remaining sludge is used as manure or compost.	3
27	ELISA-Enzyme Linked Immunosorbent Assay. (1) ELISA is based on antigen-antibody interaction. (1) The ways to detect the presence of infection or disease by ELISA are as follows: The presence of antigens (proteins, glycoproteins, etc.) is detected. / Antibodies produced against the pathogens are detected. (1) **OR** The technology is called RNA Interference(RNAi) The principle is to block certain genes through a process called gene silencing (1) It involves silencing of a specific mRNA due to its complementary Double-stranded RNA /dsRNA molecule that binds to and prevents translation of the	3

	mRNA(silencing). (1) Example: Resistance to nematode (*Meloidogyne incognita*) in tobacco is achieved by this (or ANY OTHER RELEVANT EXAMPLE.) (1)	
28	1950 – Expanding - The population structure in 1950 exhibits a broad-based pyramid with a wider base, indicating a higher percentage of young individuals. This suggests a population with a higher birth rate. (1) 2007 – Stable - The narrowing of the pyramid towards the top signifies a lower proportion of elderly individuals. By 2007, the population was more stable with the number of pre reproductive and reproductive age nearly being the same. Bell shape indicates static population. (1) 2050– Declining - By 2050 urn shaped pyramid shows a declining population where birth rates are very less and the populations of elderly people will increase. (1) - - - - - - - - - - - - - - - - - - *For Visually impaired students* Answer same as above	3

Section – D

29	A. One embryo sac is present in each ovule and one egg is present in each embryo sac when the embryo sac is developed from a single megaspore. (1) B. (i) P exhibits polyembryony due to occurrence of more than one embryo in a seed. Embryos developed from nucellar cells by apomixis, a form of asexual reproduction, don't show genetic variation. (1) (ii) Cells of embryos developed from diploid nucellar cells are diploid (2n) as these are formed by apomixis, a form of asexual reproduction. (1) *Student to attempt either subpart C or D.* C. Q, because this fruit is developed without fertilisation and will thus be seedless. (1) **OR** D. Fruit S is a true fruit with seeds. True fruits develop from the ripened ovary after fertilisation and fertilised ovules mature into seeds. (1)	4
30	A. Passive immunity – Ready made antibodies from colostrum / less effective / transient / no memory cells involved Active Immunity – Made by host's immune system/ Lag phase/ memory based/ largely effective. (1) B. In the first weeks of life, the calf's immunity is strong because it absorbs antibodies from the cow's colostrum and milk. This passive immunity peaks at day 1 and declines as the calf ages as the antibodies are used up to develop immunity against diseases. (1) *Attempt either subpart C or D.* C. As the calf grows, its immune system starts to produce antibodies in response to bacteria or viruses in the environment and by the time it is nearly 14 days old after which active immunity takes charge. **OR**	4

	D. Active immunity. As the vaccine contains a weakened or inactivated form of the pathogen (microbe), which is harmless but still recognized by the immune system as foreign. The immune system responds by activating lymphocytes, which produce specific antibodies to fight the pathogen. This process also leads to the creation of memory cells, which provide long-term protection by "remembering" to fight this pathogen if the person is exposed again. (2) - - - - - - - - - - - - - - - - - - *For Visually impaired students* Same answers as given in parts a-d.	

Section – E
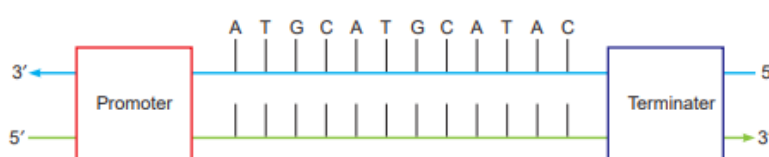
31	A. B. (2) • Transcription in eukaryotes involves one of three types of polymerases, depending on the gene being transcribed. RNA polymerase II transcribes all of the protein-coding genes, whereas RNA polymerase I transcribes rRNA genes, and RNA polymerase III transcribes rRNA, tRNA, and small nuclear RNA genes. (1) • The primary transcripts contains the coding region, exon, and non-coding region, intron, hnRNA undergoes a process where the introns are removed and exons are joined to form mRNA by the process called splicing. (1) • The hnRNA undergoes two additional processes called capping and tailing. In capping, an unusual nucleotide, methyl guanosine triphosphate, is added to the 5′-end of hnRNA. In tailing, adenylate residues (about 200–300) are added at 3′-end in a template independent manner. (1) - - - - - - - - - - - - - - - - - - *For visually impaired students* A. If both strands act as a template, they will code for RNA molecules with different sequences as complementarity does not mean the strands are identical and hence, the sequence of amino acids in the proteins would be different. Hence, one segment of the DNA would be coding for two different proteins, and this would complicate the genetic information transfer machinery. (1) The two RNA molecules if produced simultaneously would be complementary to each other, hence would form a double stranded RNA. This would prevent RNA from being translated into protein and the exercise of transcription would become a futile one. (1) B. Transcription in eukaryotes involves one of three types of polymerases, depending on the gene being transcribed. RNA polymerase II transcribes	5

	all of the protein-coding genes, whereas RNA polymerase I transcribes rRNA genes, and RNA polymerase III transcribes rRNA, tRNA, and small nuclear RNA genes. (1) The primary transcripts contain the coding region, exon, and non-coding region, intron, hnRNA undergoes a process where the introns are removed and exons are joined to form mRNA by the process called splicing. (1) The hnRNA undergoes two additional processes called capping and tailing. In capping, an unusual nucleotide, methyl guanosine triphosphate, is added to the 5′-end of hnRNA. In tailing, adenylate residues (about 200–300) are added at 3′-end in a template independent manner. (1) **OR** A. Aminoacylation is the process by which amino acids become activated by binding with its aminoacyl tRNA synthetase in the presence of ATP. If two charged tRNAs come close during translation process the formation of peptide bond between them is energetically favourable. (1) B. The cellular factory responsible for synthesising proteins is the ribosome. In its inactive state it exists as two subunits: a large subunit and a small subunit. When the small subunit encounters an mRNA the process of translation of the mRNA to protein begins. There are two sites in the large subunit for subsequent amino acids to bind to and thus be close enough to each other for the formation of a peptide bond. The ribosome also acts as a catalyst 23S rRNA in bacteria is the enzyme-ribozyme for the formation of peptide bonds. (2) C. ARGININE, THREONINE, HISTIDINE, LEUCINE, PROLINE, GLYCINE, PROLINE PROLINE, PROLINE, LEUCINE SERINE (1) Stop codon UGA/UAG/UAA (1) - - - - - - - - - - - - - - - - - - *For visually impaired students* A and B as above C. Insertion or deletion of one or two bases changes the reading frame from the point of insertion or deletion. Such mutations are referred to as frame-shift mutations. Insertion or deletion of three or multiple of three bases does not alter the frame. However, the mutation takes place. This proves that codon is a triplet and it is read in a contiguous manner. (2)	

32	A. Retrovirus in animals and *Agrobacterium tumefaciens* can transform normal cells into cancerous cells/*Agrobacterium tumefaciens* is responsible for causing crown gall disease/ it can transfer its T-DNA to transform normal plant cell into tumorous cells (1). They are used as cloning vectors to deliver desirable genes into animal/plant cells. (1)
	
	B. restriction enzyme and ligase. (1).
	
	C.
	  (i) Biolistic/ gene guns can be used. The plant cells are bombarded with high velocity micro particles of gold or tungsten coated with DNA. (1)
	  (ii) the cry gene will create Bt toxin inside the pest which will get activated in the alkaline gut of the pest and cause the gut epithelial lining to disintegrate. (1)
		5

OR

A. 5' - GGATCC - 3'.
   3'- CCTAGG-5'   (1)
B. drawing and labelling   (2)

Action of Restriction enzyme

The enzyme cuts both DNA
strands at the same site
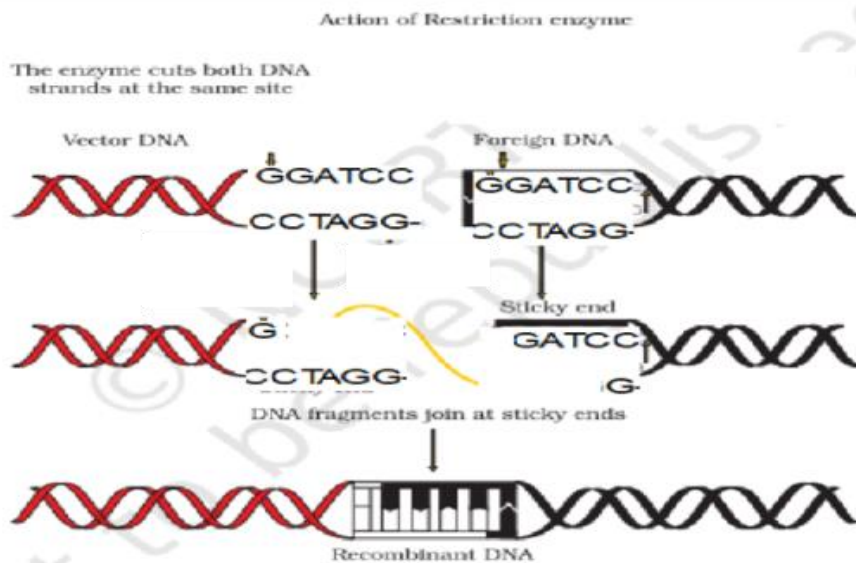
C. If ampicillin is added, the bacteria will show resistance as the gene is intact and will survive;
   if tetracycline is added, the bacteria will die as it will show insertional inactivation/ gene is not functional owing to insertion of the gene of interest in the tetracycline region of selectable marker.   (2)

| 33 | A. Totally unrelated species could also compete for the same resource. For instance, in some shallow South American lakes, visiting flamingoes and resident fishes compete for their common food, the zooplankton in the lake. (1)
 B. Resources need not be limiting for competition to occur; in interference competition, the feeding efficiency of one species might be reduced due to the interfering and inhibitory presence of the other species, even if resources (food and space) are abundant. (1)
 C. Gause and other experimental ecologists believed when resources are limited the competitively superior species will eventually eliminate the other species. The Abingdon tortoise in Galapagos Islands became extinct within a decade after goats were introduced on the island, apparently due to the greater browsing efficiency of the goats. (1)
 D. One such mechanism is 'resource partitioning'. If two species compete for the same resource, they could avoid competition by choosing, for instance, different times for feeding or different foraging patterns. MacArthur showed that five closely related species of warblers living on the same tree were able to avoid competition and co-exist due to behavioural differences in their foraging activities. (1)
 E. A species whose distribution is limited to a smaller area because of the presence of a competitively superior organism, is found to increase its range when the competing species is experimentally removed. For example, in the coasts of Scotland the superior barnacle (*Balanus*) | 5 |

dominates the intertidal region and excludes the smaller barnacle from that zone. (1)

OR

A. Food chain and the first law of thermodynamics. The solar energy trapped by the plants is transformed to chemical energy through the process of photosynthesis. When the plants are consumed by the animals, the organic matter (chemical energy) is transferred to the animal, some amount of this organic matter is lost as heat through the process of respiration. Death of the producers or consumers will result in the organic matter getting transferred to detritivores. As demonstrated, energy is not created nor destroyed but transformed from one form to another. (2)

B. Greater diversity is seen in regions closer to equator/ tropics (latitudinal range of 23.5° N to 23.5° S) harbour more species. (1)

Reasons for this greater diversity are: (Any two reason)
  ● Speciation is generally a function of time, unlike temperate regions subjected to frequent glaciations in the past, tropical latitudes have remained relatively undisturbed for millions of years and thus, had a long evolutionary time for species diversification
  ● Tropical environments, unlike temperate ones, are less seasonal, relatively more constant and predictable. Such constant environments promote niche specialisation and lead to a greater species diversity
  ● There is more solar energy available in the tropics, which contributes to higher productivity; this in turn might contribute indirectly to greater diversity. (2, any two)

****

COMPUTER SCIENCE – Code No. 083
MARKING SCHEME
Class - XII - (2025-26)

Time Allowed: 3 Hrs.   Maximum Marks: 70

General Instructions:
- This question paper contains 37 questions.
- All questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
- The paper is divided into 5 Sections- A, B, C, D and E.
- Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
- Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
- Section C consists of 3 questions (29 to 31). Each question carries 3 Marks.
- Section D consists of 4 questions (32 to 35). Each question carries 4 Marks.
- Section E consists of 2 questions (36 to 37). Each question carries 5 Marks.
- All programming questions are to be answered using Python Language only.
- In-case of MCQ, text of the correct answer should also be written.

Q No.	Section-A (21 x 1 = 21 Marks)	Marks
1	**Answer:** True **(1 mark for correct answer)**	1
2	**Answer:** c) It **(1 mark for correct answer)**	1
3	**Answer:** b) False **(1 mark for correct answer)**	1
4	**Answer:** Equi-Join or Cartesian Join **(1 mark for correct answer)**	1
5	**Answer:** a) ISf **(1 mark for correct answer)**	1
6	**Answer:** Error as unsupported operand type(s) for +: 'int' and 'str' **(1 mark for the correct answer)**	1
7	**Answer:** -59.0 **(1 mark for the correct answer)**	1

8	**Answer:** SELECT department, COUNT(*) FROM employees GROUP BY department HAVING COUNT(*) > 5; **(1 mark for correct answer)**	1
9	**Answer:** b) Some other error! **(1 mark for correct answer)**	1
10	**Answer:** d) Not Specified **(1 mark for correct answer)**	1
11	**Answer:** a) 50@70@ **(1 mark for correct answer)**	1
12	**Answer:** c) 5@@12##12 **(1 mark for correct answer)**	1
13	**Answer:** c) Both a) & b) **(1 mark for correct answer)**	1
14	**Answer:** b) ['Watersk', '', 'ng ', 's thr', 'll', 'ng!'] **(1 mark for correct answer)**	1
15	**Answer:** a) Degree: 7 **(1 mark for correct answer)**	1
16	**Answer:** b) ALTER **(1 mark for correct answer)**	1
17	**Answer:** c) POP3 **(1 mark for correct answer)**	1
18	**Answer:** a) A hub sends data to all devices in a network, while a switch sends data to the specific device **(1 mark for correct answer)**	1

19	**Answer:** b) HTML **(1 mark for correct answer)**	1
\multicolumn{3}{	l	}{Q20 and Q21 are Assertion(A) and Reason(R) based questions. Mark the correct choice as: a) Both A and R are True and R is the correct explanation for A. b) Both A and R are True and R is not the correct explanation for A. c) A is True but R is False. d) A is False but R is True.}
20	**Answer:** d) A is False but R is True **(1 mark for correct answer)**	1
21	**Answer:** a) Both A and R are true and R is the correct explanation for A **(1 mark for correct answer)**	1
Q No.	**Section-B (7 x 2=14 Marks)**	**Marks**

22	**Answer:**
	A. Implicit Conversion: Python automatically converts one data type to another.
	
	Example:
	x = 10
	y = 3.5
	result = x + y # x is implicitly converted to float
	Explicit Conversion: The user manually converts one data type to another using functions like int(), float().
	Example:
	x = "10"
	y = int(x) # Explicit conversion from string to integer
	
	(1 mark for correct difference)
	(1/2 mark for each correct example)
	 OR
	B. Break exits the loop entirely, while continue skips the current iteration and moves to the next one.
	Example of break:
	for i in range(5):
	   if i == 2:
	      break # Exits the loop
	   print(i)
	Output:
	1
	Example of continue:
	for i in range(5):
	   if i == 2:
		2

	``
        continue # Skips printing 2
    print(i)
Output:
1
3
4
5
```
**(1 mark for correct difference)**
**(1/2 mark for each correct example)** | | |
| 23 | **Answer:**
**def** remove_first_last(str):
   if len(str) < 2:
     return str
   new_str = str[1:**-1**]
   return new_str
result = remove_first_last("Hello")
**print**("Resulting string: "**,** result)

**(1⁄2 mark each for correcting 4 mistakes)** | 2 | |
| 24 | **Answer:**
A.
  I.   index = review.find("good")   **(1 mark for correct answer)**
  II.   L1.sort(reverse=True)   **(1 mark for correct answer)**

                               **OR**
B. ('Learn Python ', 'with', ' fun and practice')  **(1 mark for correct answer)**
   3                                       **(1 mark for correct answer)** | 2 | |
| 25 | **Answer:**
A.
def remove_element(L, n):
  if n in L:
    L.remove(n)
    print(L)
  else:
    print("Element not found")
                           **OR**
B.
def add_contact(phone_book, name, number):
  if name in phone_book:
    print("Contact already exists")
  else:
    phone_book[name] = number
    print("Contact added successfully")
**(1/2 mark for function definition)**
**(1½ marks for the correct/similar logic)** | 2 | |
| 26 | **Answer:**
['Arv', 'Ria']
**(2 marks for the correct output)** | 2 | |

| 27 | **Answer:** | 2 |
|---|---|---|
| | A. | |
| |     I.    Desc table_name; or describe table_name; | |
| |    II.    Create database SQP; | |
| | (1 mark for each correct answer.) | |
| | <div align="center">**OR**</div> | |
| | B.  The DELETE query removes all the records or specific records from a table, preserving the table structure. | |
| |     Example: DELETE FROM Employees WHERE EmployeeID = 5; | |
| |     The DROP query removes the entire table or database along with its data. | |
| |     Example: DROP TABLE Employees; | |
| | | |
| | **(1 mark for correct difference)** | |
| | **(1/2 mark for each correct example)** | |
| 28 | **Answer:** | 2 |
| | A. | |
| |     I.    A modem is a device that helps connect your computer or other devices to the internet. It converts digital signals from your device into analog signals that can travel through phone lines or other networks, and vice versa. | |
| |    II.    A gateway is a device that connects two different networks and helps them communicate with each other. It translates the data between different network types, allowing them to work together. | |
| | **(1 mark for each correct definition)** | |
| | <div align="center">**OR**</div> | |
| | B. | |
| |     I.    HTTP: Hypertext Transfer Protocol and FTP: File Transfer Protocol | |
| |     (1/2 mark for each correct expansion.) | |
| |    II.    A web server stores and delivers web pages to users over the internet. A web browser requests and displays these web pages on the user's device. | |
| | **(1 mark for correct point of difference)** | |

| Q No. | **Section-C ( 3 x 3 = 9 Marks)** | Marks |
|---|---|---|
| 29 | **Answer:** | 3 |
| | A. | |

```
def count_python():
    count = 0
    with open("Prog.txt", 'r') as file:
        text = file.read()
        words = text.split()
        for word in words:
            if word.lower() == "python":
                count += 1
        print("The word Python appears", count, "times.")
```

(1/2 mark for correct function header)
(1/2 mark for correctly opening the file)
(1/2 mark for correctly reading from the file)
(1/2 mark for splitting the text into words)
(1/2 mark for correct use of counter variable)

	(1/2 mark for displaying the result)	
	OR	
	B.	

	``
	def display_non_vowel_lines():
	    with open("STORIES.TXT", "r") as file:
	        print("Lines that don't start with a vowel:")
	        lines = file.readlines()
	        for line in lines:
	            if line[0].lower() not in 'aeiou':
	                print(line)
	display_non_vowel_lines()
	``	

	(1/2 mark for correct function header) **(1/2 mark for correctly opening the file)** **(1/2 mark for correctly reading from the file)** **(1 mark for correctly displaying the desired lines)** **(1/2 mark for correctly calling the function)**	

30	**Answer:**
	I.
	``
	L = [("Laptop", 90000), ("Mobile", 30000), ("Pen", 50), ("Headphones", 1500)]
	product = []
	def Push_element(L):
	    for i in L:
	        if i[1] > 50:
	            product.append(i)
	    print(product)
	``
	
	II.
	``
	def Pop_element(product):
	    while product:
	        print(product.pop())
	    else:
	        print("Stack Emply")
	``
	
	(1½ marks for each correct part)
		3

31	**Answer:** A. QP-^14 **(3 marks for the correct output)** **OR** B. ['K', 'R'] **(3 marks for the correct output)**	3
Q No.	**Section-D (4 x 4 = 16 Marks)**	**Marks**

32	**Answer:**
	A.
	   I. SELECT Product, SUM(Quantity_Sold) FROM SALES GROUP BY Product HAVING SUM(Quantity_sold) > 12;
	  II. SELECT * FROM SALES ORDER BY Product DESC;
	 III. SELECT DISTINCT Product FROM SALES;
	 IV. SELECT * from SALES where Customer_Name like "%e";
		4

(4 x 1 mark for each correct query)

<div align="center">OR</div>

B.

   I.

```
+----------+---------------+---------+---------------+-------+
| sales_id | customer_name | product | quantity_sold | price |
+----------+---------------+---------+---------------+-------+
| S003     | Michael Lee   | Tablet  |             3 | 15000 |
| S007     | Mark          | Tablet  |             5 | 34000 |
+----------+---------------+---------+---------------+-------+
```

  II.

```
+----------+---------------+
| sales_id | customer_name |
+----------+---------------+
| S002     | Jane Smith    |
| S005     | Emily Davis   |
| S006     | David         |
+----------+---------------+
```

  III.

```
+----------+
| COUNT(*) |
+----------+
|        3 |
+----------+
```

  IV.

```
+------------+
| AVG(price) |
+------------+
| 24500.0000 |
+------------+
```

(4 x 1 mark for each correct query)

| 33 | **Answer:** | 4 |
| | I. | |

```
import csv
def Accept():
    product_id = input("Enter Product ID: ")
    product_name = input("Enter Product Name: ")
    quantity_sold = int(input("Enter Quantity Sold: "))
    price_per_unit = float(input("Enter Price Per Unit: "))
    with open('Sales.csv', 'a', newline='') as file:
        writer = csv.writer(file)
        writer.writerow([product_id, product_name, quantity_sold, price_per_unit])
    print("Sales record added successfully.")
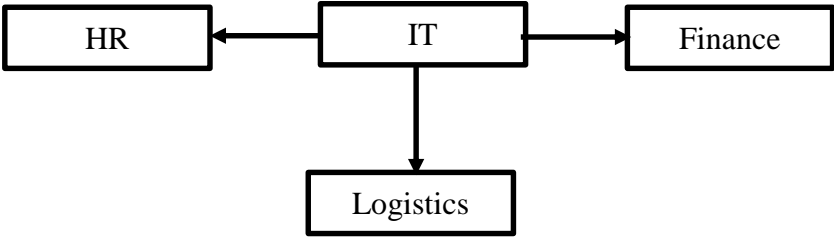```

**(½ mark for correctly taking user input)**
**(½ mark for opening the file in append mode)**
**(½ mark for correctly creating the writer object)**

**(½ mark for correctly using writerow() of writer object)**

II.
```
def CalculateTotalSales():
    total_sales = 0.0
    with open('Sales.csv', 'r') as file:
        reader = csv.reader(file)
        for row in reader:
            total_sales += int(row[2]) * float(row[3])
    print("Total Sales is:", total_sales)
```

(½ mark for opening in the file in right mode)
(½ mark for correctly creating the reader object)
(½ mark for correctly checking the condition)
(½ mark for correctly displaying the total sales)

Note (for both parts (I) and (II)):
Ignore import csv as it may be considered the part of the complete program.

34	**Answer:**	4
	I. SELECT Customer_Name FROM Hotels, Bookings WHERE Hotels.H_ID = Bookings.H_ID AND City = 'Delhi';	
	II. SELECT Bookings.* FROM Hotels, Bookings WHERE Hotels.H_ID = Bookings.H_ID AND City IN ('Mumbai', 'Chennai', 'Kolkata');	
	III. DELETE FROM Bookings WHERE Check_In < '2024-12-03';	
	IV. A. SELECT * FROM Hotels, Bookings;	
	OR	
	B. SELECT Customer_Name, Hotel_Name FROM Hotels, Bookings WHERE Hotels.H_ID = Bookings.H_ID;	
	(4 x 1 mark for each correct query)	

35	**Answer:**	4
| | ```
import mysql.connector
connection = mysql.connector.connect(host='localhost',user='admin_user',password='warehouse2024',database='WarehouseDB')
cursor = connection.cursor()
update_query = "UPDATE product_inventory SET Quantity = 91 WHERE Item_code = 208"
cursor.execute(update_query)
connection.commit()
print("Data updated successfully.")
cursor.close()
connection.close()
``` | |
| | **(½ mark for correctly importing the connector object)**
(½ mark for correctly creating the connection object)
(½ mark for correctly creating the cursor object) | |

	(1 mark for correct creation of update query) (1 mark for correctly executing the query with commit) (1⁄2 mark for correctly closing the connection)	
Q No.	**Section-E (2 X 5 = 10 Marks)**	**Marks**

36	**Answer:**
	I.
	import pickle
	def append_data():
	   with open("emp.dat", 'ab') as file:
	      employee_id = int(input("Enter Employee ID: "))
	      employee_name = input("Enter Employee Name: ")
	      department = input("Enter Department: ")
	      salary = float(input("Enter Salary: "))
	      pickle.dump([employee_id, employee_name, department, salary], file)
	   print("Employee data appended successfully.")
	
	(1/2 mark for correctly defining the function header)
	(1/2 mark for correctly opening the file in append mode)
	(1/2 mark for correctly taking user input)
	(1/2 mark for using dump() method of the pickle module)
	
	II.
	def update_data():
	   updated = False
	   employees = []
	   with open("emp.dat", 'rb') as file:
	      try:
	         while True:
	            employee = pickle.load(file)
	            if employee[2] == "IT":
	               employee[3] = 200000
	               updated = True
	            employees.append(employee)
	      except EOFError:
	         pass
	   with open("emp.dat", 'wb') as file:
	      for employee in employees:
	         pickle.dump(employee, file)
	   if updated:
	      print("Salaries updated for IT department.")
	   else:
	      print("No employee found in the IT department.")
	
	(1/2 mark for correctly defining the function header)
	(1/2 mark for correctly opening the file)
	(1 mark for using load() with while loop and try-except block)
	(1 mark for checking the condition and updating the value)
		2+3

	Note: Note (for both parts (I) and (II)): (i) Ignore import pickle as it may be considered the part of the complete program.	

37	**Answer:**
	  I. Block IT should house the server as it has maximum number of computers.
	  II. a) Repeater is to be placed between Block IT to Block HR as distance between them is more than 100 metres.
	      b) Switch is to be placed in each and every building.
	  III. Draw the star topology cable layout.
	
	  IV. Optical Fibre
	  V. A. Voice over Internet Protocol (VoIP) is a technology that allows users to make phone calls and other communications over the Internet instead of a traditional phone line.
	 OR B. WAN will be formed.
	
	(5 x 1 mark for each correct part)
		5

TIME ALLOWED: 3 HRS   MAX MARKS: 70

Q No.	Answer	Marks
	SECTION A	
Q1.	B. Double league tournament	1
Q2.	A. A is true, R is false	1
Q3.	A. A-(iv), B-(iii), C-(i), D-(ii)	1
Q4.	C. Dynamic process in which consumed food is digested	1
Q5.	C. Dhanur asana	1
Q6.	C. Paschimottan asana	1
Q7.	B. Children and adults with intellectual disabilities	1
Q8.	B. Oligomenorrhea	1
Q9.	D. Iron	1
Q10.	C. 15 × 2 feet	1
Q11.	C. Muscular hypertrophy	1
Q12.	B. Dislocation	1
Q13.	B. Sliding fiction	1
Q14.	C. Buoyant force	1
Q15.	A. Internal thoughts	1
Q16.	D. Both (A) and (R) are true but R is not the correct explanation of (A).	1
Q17.	B. Interval Training	1
Q18.	A. Orientation ability	1
	SECTION B	

Q19.	Differentiate between the three types of spinal deformity.
	     Kyphosis
	 ● Outward curvature of the thoracic spine (hunchback appearance)
	 ● Head and shoulders lean forward
	 ● Common in older adults or due to poor posture
	 ● Can cause breathing issues and back pain in severe cases
	
	     Lordosis
	 ● Excessive inward curvature of the lumbar spine (swayback)
	 ● Abdomen and buttocks protrude outward
	 ● Often caused by weak abdominal muscles or obesity
	 ● May lead to lower back discomfort and postural imbalance
	
	     Scoliosis
	 ● Lateral (sideways) curvature of the spine in 'S' or 'C' shape
	 ● Uneven shoulders or hips may be visible
	 ● Can be congenital or develop during adolescence
	 ● Severe cases may affect lung and heart function
	 (any two)
		[1+1]

Q20.	What is balanced diet? Mention its importance Balanced Diet – Definition [1]	[2]

	● Contains all essential nutrients in correct proportion.	
	Importance of Balanced Diet (Any 2-3 points): ● Provides energy ● Supports growth and repay ● Boosts immunity ● Prevents deficiencies and diseases ● Maintains body functions efficiently	
Q21.	A male student performed the Harvard Step Test for 4 minutes. His pulse was recorded during the recovery periods as 58 beats in the first half-minute, 50 beats in the second, and 42 beats in the third. Using the Harvard Step Test formula, calculate his Fitness Index and state whether his score falls in the Excellent, Good, or Average category Formula: Fitness Index = (Duration of exercise in seconds × 100) ÷ (2 × Sum of pulse counts in recovery) Step 1: Duration = 4 minutes = 240 seconds Sum of pulse = 58 + 50 + 42 = 150 beats Step 2: Fitness Index = (240 × 100) ÷ (2 × 150) = 24000/300 = 80 Category - Good	[2]

Q22.	Enlist any four types of fracture.
	   i. Simple Fracture
	  ii. Compound Fracture
	 iii. Comminuted Fracture
	 iv. Greenstick Fracture
	  v. Transverse Fracture
	 vi. Oblique Fracture
	vii. Impacted Fracture
	(any four)
		[1/2*4]

Q23.	Write a short note on Self Talk. Sports psychology is a field that studies how psychological factors influence athletic performance and participation in sports, exercise, and physical activity. It examines the mental aspects of sports, including motivation, anxiety, stress, and the impact of sports on well-being. Key Areas of Focus: ● **Performance Enhancement:** Sports psychologists help athletes improve their performance by using psychological techniques like goal setting, visualization, relaxation, and self-talk. ● **Mental Health and Well-being:** They also address the impact of sports on an individual's mental health, including issues like burnout, anxiety, and depression. ● **Team Dynamics:** Sports psychology can also help improve team dynamics and communication, fostering a more positive and collaborative environment. ● **Coaching and Training:** They work with coaches to understand how to create effective training programs	[1/2*4]

	that incorporate psychological principles. • **Social and Developmental Aspects:** Sports psychologists study how sports participation affects an individual's social development and overall well-being. (any four)	

Q24.	A football player wants to improve his acceleration and quick reaction during a match. Suggest two suitable training methods and justify how each will help improve his performance.
	       1. Acceleration Sprints – Improve the player's ability to quickly reach top speed during sudden movements in a match.
	
	       2. Reaction Drills – Enhance response time to game situations like passes or opponent movements.
		[1+1]

	SECTION C	
Q25.	League tournament is a better way to judge the best team of the tournament. Comment. • Equal opportunities to all the teams • League matches minimize impact of luck or unexpected outcomes • Judged on basis of multiple matches • Ranking of basis of points earned • Less pressure on teams with compassion to knockout tournament • Scope of improvement	[3]

Q26.	Discuss the exercise guidelines for different age groups.
	
	Children (Under 5 years):
	
	    o At least 180 minutes/day of physical activity.
	
	    o Tummy time (30 mins) for infants who aren't mobile.
	
	    o Avoid being restrained for over 1 hour at a time.
	
	    o Limit or avoid screen time, depending on age.
	
	Adolescents (5–17 years)
	
	    o Minimum 60 minutes/day of moderate to vigorous activity.
	
	    o Include muscle and bone-strengthening exercises 3 days/week.
	
	    o Prefer aerobic activities like running, swimming, cycling.
	
	    o Limit screen time and reduce sedentary behavior.
	
	Senior Citizens (65+ years):
	
	    o 150–300 minutes/week of moderate aerobic activity.
	
	    o Do balance and strength exercises 2–3 days/week.
	
	    o Be physically active daily; avoid long sitting hours.
	
	    o Adapt intensity as per health conditions and ability.
		[1+1+1]

Q27.	Explain strategies to make Physical Activities Accessible for CWSN. Strategies to Make Physical Activities Accessible for CWSN: 1. **Sensory Integration** – Reduce loud music, use natural lighting, and provide	[3]

	headphones/sunglasses. 2. **Positive Behaviour Support (PBIS)** – Use picture schedules and encourage positive interactions. 3. **Team Building Activities** – Focus on creative, cooperative games over competition. 4. **Accessible Surfaces** – Use gym mats or level fields to support mobility and wheelchair use. 5. **Inclusive Classrooms** – Educate CWSN alongside others to promote acceptance. 6. **Assistive Technology** – Use tools like large balls, bells, or string-attached equipment. 7. **Adaptive Physical Education** – Modify rules and games based on individual needs. 8. **Creative Game Focus** – Use imaginative games to build confidence and reduce pressure. (4 points)	

Q28.	Discuss the importance of pre, during and post competition diet in detail.
	
	Pre-Competition Diet
	      o Provides energy, prevents early fatigue, and ensures smooth digestion before performance.
	      o Consume high-carbohydrate foods like rice, pasta, or bread for sustained energy.
	      o Prefer easily digestible, low-fat, and non-fried meals taken 3–4 hours before the event.
	
	During Competition Diet
	      o Maintains hydration, energy, and electrolyte balance to avoid fatigue and muscle cramps.
	      o Sip on glucose-rich drinks or electrolyte solutions to maintain blood sugar and sodium levels.
	      o Include small portions of quick energy foods like banana or energy gels if needed.
	
	Post-Competition Diet
	      o Supports recovery by replenishing lost fluids and restoring glycogen levels in muscles.
	      o Eat carbohydrate-rich foods such as fruits, sandwiches, or energy bars immediately after.
	      o Rehydrate with fluids like water, juice, or sports drinks to replace lost electrolytes.
		[1+1+1]

Q29.	A gymnast maintains a handstand position on the balance beam, then performs a flip. Differentiate between the types of equilibrium shown and explain how they help in performance.
	    a) Static equilibrium –
	          ● Shown during handstand;
	          ● Body is balanced and at rest.
	
	    b) Dynamic equilibrium –
	          ● Shown during flip;
	          ● Stability maintained while in motion.
	
	    o Helps maintain balance, control, and fluidity during transitions and
		[2+1]

	performance.	

Q30.	Describe personality. Explain dimensions of personality.
	
	>Personality is the combination of physical, mental, psychological, and emotional traits that make an individual unique.
	
	1. Physical Dimension
	
	   o Height and weight
	   o Body structure and posture
	   o Facial appearance and complexion
	
	2. Mental Dimension
	   o Intellect and reasoning ability
	   o Decision-making power
	   o Memory and concentration
	
	3. Psychological Dimension
	   o Emotions and mood stability
	   o Self-confidence and motivation
	   o Willpower and attitude
		[3]

Q31.	1. b) Knockout method 2. d) N - 1 3. c) Knockout tournament takes less time and is economical 4. a) Bye	[1*4=4]
Q32.	1. (c) Deaflympics 2. (d) Iris 3. (b) 1924 4. (b) Red, Blue, Green, Yellow	[1*4=4]
Q33.	1. (c) Impacted Fracture 2. (b) (b) 3. (c) Comminuted Fracture 4. (c) Transverse Fracture (FOR VISUALLY IMPAIRED) 1. b) Vitamin B 2. d) Beri Beri 3. c) D 4. c) K	[1*4=4]
Q34.	What do you mean by Asthma. Mention its symptoms. Explain the procedure, benefits and contraindications of an asana beneficial for the patient of asthma. Asthma is a chronic respiratory condition where the airways become inflamed and narrow, leading to difficulty in breathing. It often triggers coughing, wheezing, shortness of breath, and chest tightness. Symptoms of Asthma: ● Difficulty in breathing ● Wheezing (whistling sound while breathing)	[1+2+2]

	• Tightness in chest
	• Frequent coughing, especially at night or early morning
	• Fatigue during physical activity
	
	Mats asana (Fish Pose)
	
	Procedure
	      1. Lie flat on your back with legs extended and hands beside the thighs.
	      2. Place the hands underneath the hips with palms facing down.
	      3. Lift the chest upward while arching the back and tilt the head backward so that the crown touches the floor.
	      4. Hold the posture while breathing deeply and slowly.
	      5. Return to the starting position gently.
	
	Benefits:
	      ❖ Expands the chest and improves lung capacity.
	      ❖ Helps ease respiratory issues like asthma and bronchitis.
	      ❖ Stimulates the throat and opens nasal passages for easier breathing.
	      ❖ Strengthens the upper back and neck muscles.
	      ❖ Reduces anxiety and stress, which can trigger asthma.
	
	Contraindications:
	      ❖ Avoid in case of serious neck or back injury.
	      ❖ Not suitable for individuals with high blood pressure or migraines.
	      ❖ Should be performed under guidance if suffering from spinal disorder.	

Q35.	Make a table of test items listed under fitness test by SAI (Age group 9-18 yrs) Explain the Procedure and Scoring of 50 MTS Run and Partial Curl Up. AGE GROUP: 9-18+ YEARS | CLASS 4 to 12 For 1. Body Composition (BMI) 2. Strength a. Abdominal (Partial Curl-up) b. Muscular Endurance (Push Ups for Boys, Modified Push Ups for Girls) 3. Flexibility (Sit and Reach Test) 4. Cardiovascular Endurance (600 Meter Run/Walk) 5. Speed (50 mt. Dash) 50 MTR DASH (STANDING START) Procedure: A thorough warm up should be given, including some practice starts and accelerations. Start from a stationary position, with one foot in front of the other. The front foot must be on or behind the starting line. This starting position should be static (dead start). The tester should provide hints for maximizing speed (such as keeping low, driving hard with the arms and legs) and encouraged to continue running hard through the finish line.	[2.5+2.5]

	Scoring: Time taken for completion ABDOMINAL (PARTIAL CURL-UP) Procedure: The subject lies on a cushioned, flat, clean surface with knees flexed, usually at 90 degrees, with hands straight on the sides (palms facing downwards) closer to the ground, parallel to the body. The subject raises the trunk in a smooth motion, keeping the arms in position, curling up the desired amount (at least 6 inches above/along the ground towards the parallel strip). The trunk is lowered back to the floor so that the shoulder blades or upper back touch the floor. Scoring: Record the maximum number of Curl ups in a certain time period (30 seconds).	

Q36.	What do you understand by circuit training? How a coach will plan circuit training sessions with 6 stations to develop fitness of his new trainees? Explain
	
	    1. A training method where different exercises are performed in a sequence (stations) with minimal rest.
	    2. Each station targets a specific fitness component or muscle group.
	    3. Helps improve overall fitness efficiently in limited time.
	
	6 Sample Stations (Exercises):
	
	   ● 1. Push-ups
	   ● 2. Squats
	   ● 3. Skipping
	   ● 4. Sit-ups
	   ● 5. Shuttle runs
	   ● 6. Plank hold
	(Or any other suitable)
	
	Components to be Developed in New Trainees:
	
	   ● Strength
	   ● Endurance
	   ● Flexibility
	   ● Speed
	   ● Agility
	   ● Coordination
	(Explanation of each point along with a circuit)
		[1+4]

Q37.	What is a lever? Explain the types of levers with the help of example.
	    A Lever is a simple machine that provides mechanical advantage to magnify the force necessary to overcome a resistance.
	    There are three types of levers
	   ● Class 1 lever (see saw/ seated dumbbell triceps)
	   ● Class 2 lever (pushing against the block in sprint start/ calf raises)
	   ● Class 3 lever (fishing rod/ leg extensions)
		[1+3+1]

	(each type to be explain with help of examples)	

No.	Question	Marks
	Part A – Partnership and Company Accounts	
1.	**D.** Capital introduced	1
	OR	
	A. Both A and R are correct, and R is the correct explanation of A	
2.	D. A ₹ 35,000 and B ₹ 35,000	1
3.	**C.** ₹ 8,000	1
	OR	
	C ₹ 12,000	
4.	C. Goodwill ₹ 1,00,000	1
	OR	
	B. Rs. 4,20,000	
5.	**C.** Debited ₹ 10,000	1
6.	B . ₹ 3,00,000	1
7.	**B.** ₹ 1,600	1
8.	**D.** 3 : 1	1
	OR	
	A. 29 : 11	
9.	**B.** ₹ 35,000	1
10.	B ₹ 3,60,000	1
	OR	
	B. ₹ 1,00,000	
11.	**B.** ₹ 16,00,000	1
12.	**C.** ₹ 8,00,000 ; ₹ 1,00,000	1
13.	**A.** Debit ; ₹ 6,00,000	1
14.	**C.** ₹ 6,00,000 ; Non-Current Liabilities	1
15.	**C.** Realisation Loss ₹ 60,000	1
16.	**A.** ₹ 50,000 will be provided as workmen claim out of Workmen Compensation Reserve and balance ₹ 30,000 will be distributed amongst partners in old ratio.	1
17.	Let total share be 1 Chunni share = 1/5 Remaining share = 4/5 Munni share = 1/4 Remaining share = 4/5 – 1/4 = 11/20 Raju share = 11/20 x 3/4 = 33/80 Rinku share = 11/20 x 1/4 = 11/80 New Ratio = 33/80 : 11/80 : 1/4 : 1/5 = 33 : 11 : 20 : 16 Sacrificing Ratio = 3 : 1 (Raju and Rinku) Gain to Munni = 1/20	3

Journal

Date	Particulars	Debit	Credit

			Debit	Credit	
(i)	Chunni's Current A/c Dr.		64,000		
	Munni's Capital A/c Dr.		16,000		
	To Raju's Capital A/c			60,000	
	To Rinku's Capital A/c			20,000	
	(Being adjustment entry passed for goodwill)				

OR

Yashasvi's Gain/sacrifice = 5/10 – 4/9 = 5/90 - Sacrifice,

Nitish's Gain/sacrifice = 3/10 – 3/9 = (-) 3/90 - Gain and

Harshit's Gain/sacrifice = 2/10 – 2/9 = (-) 2/90 – Gain

Journal

Date	Particulars	Debit	Credit
(i)	Yashasvi's Capital A/c Dr.	2,00,000	
	Nitish's Capital A/c Dr.	1,20,000	
	Harshit's Capital A/c Dr.	80,000	
	To Goodwill A/c		4,00,000
	(Being existing goodwill written off)		
(ii)	Nitish's Capital A/c Dr.	24,000	
	Harshit's Capital A/c Dr.	16,000	
	To Yashasvi's Capital A/c		40,000
	Being adjustment entry passed for goodwill)		

18.	First: - Rs.1,00,000 paid to Creditors and Rs.50,000 paid to Ruby respectively. Second:- Rs.80,000 paid to Hemant next Third:- Capital Balances of Hemant and Pankaj Rs.1,60,000 and Rs.1,40,000 paid to partners along with Surplus of Rs.70,000 paid to partners Hemant and Pankaj as Rs.42,000 and Rs.28,000 i.e. in profit sharing ratio.	3

19.	**Journal**	3

Date	Particulars		Debit	Credit
Jan. 01 2025	Bank A/c	Dr.	38,00,000	
	To Debentures Application and Allotment A/c			38,00,000
	(Being application and allotment money received for debentures)			
Jan. 01 2025	Debentures Application and Allotment A/c	Dr.	38,00,000	
	Loss on Issue of Debentures A/c	Dr.	6,00,000	
	To 8% Debentures A/c			40,00,000
	To Premium on Redemption of Debentures A/c			4,00,000
	(Being Issued ₹ 40,00,000, 8% Debentures of ₹ 100 each at 5% discount to be redeemed at 10% premium)			

20.	**Journal**	3

Date	Particulars		Debit	Credit
A	Investment Fluctuation Reserve A/c	Dr.	4,00,000	
	To Investment A/c			2,50,000
	To Ankur's Capital A/c			90,000
	To Vikram's Capital A/c			60,000
	(Being decline in the value of Investment credited to Investment A/c and remaining reserve credited to old partners.)			
B	Investment Fluctuation Reserve A/c	Dr.	4,00,000	
	To Ankur's Capital A/c			2,40,000
	To Vikram's Capital A/c			1,60,000

		(Being reserve credited to old partners.)			
		Investment A/c Dr.	5,00,000	
		To Revaluation A/c		5,00,000
		(Being investment value increased)		
		Revaluation A/ c Dr.	5,00,000	
		To Ankur's Capital A/c		3,00,000
		To Vikram's Capital A/c		2,00,000
		(Being profit on revaluation distributed among partners)		
	C	Investment Fluctuation Reserve A/c Dr.	4,00,000	
		To Ankur's Capital A/c		2,40,000
		To Vikram's Capital A/c		1,60,000
		(Being reserve credited to old partners.)		

21. | **4**

Balance Sheet (extract)

Particulars	Note No.	Current Year	Previous Year
EQUITY AND LIABILITIES			
Shareholders' Funds			
Share Capital	1	29,52,000	----

Notes to Accounts

Note No.		
1	**Share Capital**	Amount
	Authorised Share Capital	80,00,000
	(4,00,000 Equity shares @ ₹20 each)	
	Issued Share Capital	30,00,000
	(1,50,000 Equity shares @ ₹20 each)	
	Subscribed Share Capital	
	Subscribed and Fully Paid up	
	(1,43,000 Equity shares @ ₹20 each)	28,60,000
	Subscribed but not Fully Paid up	
	5,000 shares @ ₹20 each 1,00,000	
	(-) Calls in Arrears (20,000)	80,000
	Add: Share Forfeiture A/c	12,000
		29,52,000

22. | **4**

Journal

Date	Particulars	Debit	Credit
Mar. 31 2025	Pulkit's Capital A/c Dr.	70,000	
	To Amit's Capital A/c		65,000
	To Sumit's Capital A/c		5,000
	(Being adjustment entry passed for omission)		

Working Notes

Particulars	Amit		Sumit		Pulkit		Firm	
	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
Profits wrongly shared	2,00,000		2,00,000		2,00,000			6,00,000
IOC omitted		80,000		70,000		50,000	2,00,000	
Salary omitted		1,20,000				60,000	1,80,000	

Commission				70,000			70,000	
Profits to be shared		75,000		45,000		30,000	1,50,000	
Guarantee effect	10,000			20,000	10,000			
	2,10,000	2,75,000	2,00,000	2,05,000	2,10,000	1,40,000	6,00,000	6,00,000
	65,000 (Cr.)		5,000 (Cr.)		70,000 (Dr.)			

23. 6

Journal

Date	Particulars	Debit	Credit
	Bank A/c Dr.	5,60,000	
	To Equity Share Application and Allotment A/c		5,60,000
	(Being application money including premium received))		
	Equity share application and allotment A/c Dr.	5,60,000	
	To Equity Share Capital A/c		4,00,000
	To Securities Premium A/c		1,60,000
	(Being Shares issued at premium)		
	Assets A/c Dr.	50,00,000	
	Goodwill A/c Dr.	12,00,000	
	To Liabilities A/c		20,00,000
	To Gloria ltd. A/c		42,00,000
	(Being business taken over and goodwill recorded)		
	Gloria ltd. A/c Dr.	42,00,000	
	To Equity Share Capital A/c		33,60,000
	To Securities Premium A/c		8,40,000
	(Being Purchase consideration paid to Gloria ltd.)		

Dr.   **Equity Share Capital A/c**   **Cr.**

Date	Particulars	Amount	Date	Particulars	Amount
				By Balance b/d	2,00,00,000
				By Equity share application and allotment A/c	4,00,000
	To Balance C/d	2,37,60,000		By Gloria Ltd. A/c	33,60,000
		2,37,60,000			2,37,60,000

Dr.   **Securities Premium A/c**   **Cr.**

Date	Particulars	Amount	Date	Particulars	Amount
				By Balance b/d	10,00,000
				By Equity share application and allotment A/c	1,60,000
	To Balance C/d	20,00,000		By Gloria Ltd. A/c	8,40,000
		20,00,000			20,00,000

24. 6

Journal

Date	Particulars	Debit	Credit
March 31, 2025	Deepak's Capital A/c Dr.	6,40,000	
	To Furniture A/c		40,000
	To Deepak's Loan A/c		6,00,000
	(Being Deepak's Capital account settled)		

Dr.   Deepak's Loan A/c   **Cr.**

Date	Particulars	Amount	Date	Particulars	Amount
Mar. 31 2026	Bank A/c	2,36,000	Apr.01, 2025	Deepak's Capital A/c	6,00,000
	Balance c/d	4,00,000	Mar. 31, 2026	Interest A/c	36,000
		6,36,000			**6,36,000**
Mar. 31 2027	Bank A/c	2,24,000	Apr.01, 2026	Balance b/d	4,00,000
	Balance c/d	2,00,000	Mar. 31, 2027	Interest A/c	24,000
		4,24,000			**4,24,000**
Mar. 31 2028	Bank A/c	2,12,000	Apr.01, 2027	Balance b/d	2,00,000
			Mar. 31, 2028	Interest A/c	12,000
		2,12,000			**2,12,000**

25.

Dr.   Revaluation Account   **Cr.**   **6**

Particulars	Amount	Particulars	Amount
Prov. For Doubtful Debts	4,500	Revaluation (Loss)	
Accrued Income	5,500	Dhwani's Capital	36,000
Building	50,000	Iknoor's Capital	24,000
	60,000		**60,000**

Dr.   Partner Capital Account   **Cr.**

Particulars	Dhwani	Iknoor	Ishaya	Particulars	Dhwani	Iknoor	Ishaya
Rev. Loss	36,000	24,000		Balance b/d	2,40,000	2,60,000	
P&L	60,000	40,000		Inv. Fluct. Res.	18,000	12,000	
				Gen. Res.	36,000	24,000	
				Cash A/c			2,50,000
				Prem. for goodwill	24,000	16,000	
Balance c/d	2,28,000	2,52,000	2,50,000	Ishaya's Current	6,000	4,000	
	3,24,000	**3,16,000**	**2,50,000**		**3,24,000**	**3,16,000**	**2,50,000**
				Balance b/d	2,28,000	2,52,000	2,50,000
Balance c/d	4,50,000	3,00,000	2,50,000	Dhwani's Current	2,22,000		
				Iknoor's Current		48,000	
	4,50,000	**3,00,000**	**2,50,000**		**4,50,000**	**3,00,000**	**2,50,000**

OR

Dr.   Revaluation Account   **Cr.**

Particulars	Amount	Particulars	Amount
Furniture	10,000	Building	20,000
Prepaid Expenses	20.000	Stock	15,000
Prov. For doubtful debts	5,000	Creditors	5,000
Outstanding Expenses	5,000		
	40,000		**40,000**

Dr.   Partner's Capital Account   **Cr.**

Particulars	Aman	Barman	Raman	Particulars	Aman	Barman	Raman
Def. Rev. Exp.	10,000	6,000	4,000	Balance b/d	80,000	70,000	50,000
Goodwill	15,000	9,000	6,000	WCR	25,000	15,000	10,000
Barman's Cap.	12,000	--	12,000	Profit and Loss	20,000	12,000	8,000
Cash		20,000		Aman's Capital		12,000	
Barman's Loan		86,000		Raman's Capital		12,000	
Bal c/d	1,00,000		54,000	Cash	12,000		8,000

			1,37,000	1,21,000	76,000		1,37,000	1,21,000	76,000		

26.

<div align="center">Journal</div>

6

Date	Particulars		Debit	Credit
I.	Bank A/c Dr.		4,40,000	
	To Share Application A/c			4,40,000
	(Being application amount received for 1,10,000 shares)			
II.	Share Application A/c Dr.		4,40,000	
	To Share Capital A/c			3,20,000
	To Share Allotment A/c			80,000
	To Bank A/c			40,000
	(Being application money adjusted and surplus money refunded)			
III.	Share Allotment A/c Dr.		5,60,000	
	To Share Capital A/c			4,80,000
	To Securities Premium A/c			80,000
	(Being allotment amount due)			
IV.	Bank A/c Dr.		4,44,000	
	Calls in Arrears A/c Dr.		36,000	
	To Share Allotment A/c			4,80,000
	(Being allotment money received and unpaid amount transferred to Call in arrears)			
V.	Share Capital A/c Dr.		60,000	
	Securities Premium A/c Dr.		6,000	
	To Share Forfeited A/c			30,000
	To Calls in Arrears A/c			36,000
	(Being shares forfeited)			
VI.	Bank A/c Dr.		32,000	
	Share Forfeited A/c Dr.		8,000	
	To Share Capital A/c			40,000
	(Being shares reissued)			
VII.	Share Forfeited A/c Dr.		12,000	
	To Capital Reserve A/c			12,000
	(Being gain on reissue transferred to Capital Reserve)			

<div align="center">OR</div>

Journal

Date	Particulars		Debit	Credit
I.	Bank A/c Dr.		9,00,000	
	To Share Application A/c			9,00,000
	(Being application amount received for 3,00,000 shares)			
II.	Share Application A/c Dr.		9,00,000	
	To Share Capital A/c			6,00,000
	To Share Allotment A/c			1,20,000
	To Bank A/c			1,80,000
	(Being application money adjusted and surplus money refunded)			
III.	Share Allotment A/c Dr.		10,00,000	
	To Share Capital A/c			8,00,000
	To Securities Premium A/c			2,00,000

		(Being allotment amount due)			
	IV.	Bank A/c Dr.	8,60,000	
		Calls in Arrears A/c Dr.	44,000	
		To Share Allotment A/c		8,80,000
		To Calls in advance A/c		24,000
		(Being allotment money received with calls in advance and unpaid amount transferred to Call advance and calls in arrears A/c)		
	V.	Share First Call A/c Dr.	6,00,000	
		To Share Capital A/c		6,00,000
		(Being Call money due)		
	VI.	Bank A/c Dr.	5,46,000	
		Calls in Advance A/c Dr.	24,000	
		Calls in Arrears A/c Dr.	30,000	
		To Share First Call A/c		6,00,000
		(Being Call money received except on 10,000 shares and advance adjusted)		
	VII.	Bank A/c Dr.	74,000	
		To Calls in Arrears A/c		74,000
		(Being Calls in arrears received)		

Part B – Analysis of Financial Statements

Option – I

27.	**C.**	₹ (10,000)	1
28.	**C.**	₹ 1,00,000	1
		OR	
	D.	A is incorrect but R is correct	
29.	**D.**	Proposed Dividend added in Net Profit after tax will be ₹ 1,80,000 and outflow of Dividend paid in financing activities will be ₹ 1,70,000.	1
		OR	
	D.	₹ 2,70,000	
30.	**B.**	Dividend received	1
31.		Comparative Balance Sheet as at March 31, 2024 and Match 31, 2025	3

PARTICULARS	31st March 2024	31st March, 2025	Absolute Change	Percentage Change
Shareholders' Funds	6,00,000	**9,00,000**	3.00.000	**50**
Non-current Liabilities	3,00,000	**3,00,000**	NIL	**--**
Current Liabilities	**1,00,000**	3,00,000	2,00,000	**200**
TOTAL	**10,00,000**	**15,00,000**	**5,00,000**	**50**
Non-current Assets	7,00,000	**10,50,000**	**3,50,000**	50
Current Assets	**3,00,000**	**4,50,000**	**1,50,000**	**50**
TOTAL	**10,00,000**	**15,00,000**	**5,00,000**	**50**

OR

Common Size Statement of Profit and Loss for the year ended March 31, 2025

PARTICULARS	**31st March, 2025**	**Percentage of RFO**	

	Revenue from Operations	40,00,000	100	
	Other Income	6,00,000	15	
	Total Income	**46,00,000**	115	
	Purchases of Stock in Trade	10,00,000	25	
	Change in Inventory	(2,00,000)	(5)	
	Employee Benefit Expenses	8,00,000	20	
	Other Expenses	4,00,000	10	
	Total Expenses	**20,00,000**	50	
	Profit Before Tax	26,00,000	65	
	Less :- Tax	13,00,000	32.5	
	Profit after Tax	13,00,000	32.5	

32.	(i) Loose Tools, Stores and Spares. (ii) Finance Cost (iii) Cost of Material Consumed.	3
33.	a) Ratio will decrease Current Liabilities (Trade Payables) will increase b) Ratio will decrease as both Quick Assets (Cash) and Current Liabilities (Outstanding Expenses) will decrease. c) Ratio will increase as Current Assets (Cash and Cash Equivalents) will increase. d) No change as no impact on Quick Assets and Current Liabilities. **OR** **Trade Receivables Turnover Ratio = Credit Revenue from Operations / Average Trade Receivables** **= 6,00,000/1,50,000 = 4 times** Revenue From Operations Cost of Revenue from Operations + Gross Profit = 6,00,000 + 1,50,000 = 7,50,000 Cash Revenue from Operations = 20% of Revenue From Operations = 20% of 7,50,000 = 1,50,000 Credit Revenue from Operations = Revenue from operations – Cash Revenue from operations = 7,50,000 – 1,50,000 = 6,00,000 Average Trade Receivables = (Opening Trade Rec. + Closing Trade Rec.) / 2 = (1,00,000 + 2,00,000)/2 = 1,50,000	4
34.	**Cash Flow from Operating activities** 	6

Cash Flow from Operating activities (Question 34)

Particulars	Amount
Net Profit before tax	**3,75,000**
Non-Operating and non-cash items	
Add: Premium on redemption on preference Shares (5%of 1,00,000)	5,000
Interest on debentures	36,000
Discount on issue of debentures written off	5,000
Operating profit before changes in working Capital	**4,21,000**

Working notes :

Calculation of net profit before tax

Profit & Loss account balance as at 31st Marc 2025	8,00,000	
Less Profit and loss account balance as at 31st Marc 2024	(6,00,000)	
	2,00,000	
Add Dividend paid on preference shares (10% of 4,00,000)	40,000	
Interim dividend on equity shares (15% of 9,00,000)	1,35,000	
	3,75,000	

Cash flow from Financing activities

Particulars	Amount
Proceeds from issue of equity shares	3,00,000
Redemption of preference shares(1,00,000+5,000)	(1,05,000)
Proceeds from issue of debentures (1,00,000-5,000)	95,000
Increase in Bank overdraft	25,000
Increase in cash Credit	1,50,000
Dividend paid on preference shares	(40,000)
Interim dividend on equity shares	(1,35,000)
Interest on debentures (36,000-3,000)	(33,000)
Net cash from Financing activities	**2,57,000**

Part B – Computerised Accounting
Option – II

27.	(D) Anywhere OR (D) The encryption of data	1
28.	(A) More	1
29.	(C) Faster obsolescence of technology	1
30.	(B) Numbers and letters are assigned in consecutive order OR (B) Costing sub-system	1

31.	Encryption is a way to protect data by scrambling it into a code that can only be unlocked with a unique key. It's a vital component of cybersecurity and data privacy protection, and is used to keep sensitive information out of the hands of unauthorized users. Encryption can be used to protect data in a number of ways, including: • At rest: Protecting data on computers or in the cloud • In transit: Protecting data while it's being sent between computers • While being processed: Protecting data while it's being processed	3
32.	**1.System failure** The system may crash due to hardware failure, which can disrupt work. This is especially true if there is no backup. **2.High cost of training** New versions of hardware and software require training for staff, which can be costly. **3.Security risks** Computerized accounting systems store sensitive financial data, which can be vulnerable to cyber-attacks, data breaches, and theft.	3

33.	Following are the steps prepare a chart:
	
	Step – 1: Enter data in a worksheet with proper column and row titles.
	Step – 2: Create a basic chart using the pattern from the panel available on top of worksheet in Chart groups' option.
	Step – 3: Change the layout or style of chart. Apply a predefined chart layout. Apply a predefined chart style. Change the layout of chart elements. Change the format of chart elements.
	Step – 4: Add or remove titles or data labels. Add (Remove) a chart title. Add (Remove) axis titles. Link a title to a worksheet cell. Add (Remove) data labels.
	Step – 5: Show or hide a legend.
	Step – 6: Display or hide chart axes or gridlines. Display (hide) primary axes Display (hide) secondary axes Display (hide) gridlines
	Step – 7: Move (resize) a chart
	Step – 8: Save a chart
	
	 OR
	
	This tab enables :
	(a) To display the error alert after invalid data is entered in the box.
	(b) Enter message allows to type the desired message for user and title for reference purpose.
	(c) In Style drop-down menu select Information, Warning or Stop as per the severity and accuracy requirement for data where.
	    (i) Information: displays a message but will prevent entry of invalid data.
	    (ii) Warning: displays a warning message but will not prevent entry of invalid data.
	    (iii) Stop: will prevent invalid entry of data.
		4

34.	**Merging a range of Cells:** Merged cells are a single cell that is created by combining two or more selected cells. The cell reference for a merged cell is the upper-left cell in the original selected range. When two or more adjacent horizontal or vertical cells are merged, the cells become one large cell and displayed across multiple columns or rows. The contents of one appear in the centre of the merged cell. **Steps:**	6

1. Select two or more adjacent cells that we want to merge.
2. On the Home tab, in the Alignment group, click Merge and Centre.

Steps to split a merged cell:

1. Select the merged cell.
2. When we select a merged cell, the Merge and Centre button also appears selected in the Alignment group on the Home tab.
3. To split the merged cell, click Merge and Centre. The contents of the merged cell will appear in the upper-left cell of the range of split cells.

	BUSINESS STUDIES (054) CLASS XII (2025-26) MARKING SCHEME	Marks
1	b) Management is a continuous process	1
2	d) Formed by practice and experimentation	1
3	d) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of the Assertion.	1
4	d) Statement II is true, Statement I is false	1
5	c) Time based pay plus incentives	1
6	d) 2,3,4	1
7	c) product	1
8	b) Deviations should be analysed to find out the causes.	1
9	c) Such employees are not likely to be good employees as their background is not sufficiently known.	1
10	b) iii,ii,vii,i,iv,v,vi	1
11	c) Depository is like a bank and keeps securities in electronic form on behalf of investors.	1
12	b) Customer value	1

13	c) Aiv, B iii,Ci ,Dii	1
14	b) Planning does not work in a dynamic environment.	1
15	c) Training and development	1
16	a) Long term investment decision	1
17	c) Risk consideration	1
18	c) Capital Market	1
19	d) Contractual constraints	1
20	b) Both the statements are false.	1

21	A) (i) **Develops initiative among subordinates:** Decentralisation Helps to promote self-reliance and confidence amongst the subordinates. This is because when lower managerial levels are given freedom to make their own decisions they learn to depend on their own judgement. (ii) **Develops managerial talent for the future:** Decentralisation gives them a chance to prove their abilities and creates a reservoir of qualified manpower who can be considered to fill up more challenging positions through promotions. (iii) **Quick decision making:** In a decentralised organisation,since decisions are taken at levels which are nearest to the points of action and there is no requirement for approval from many levels, the process is much faster. There are also less chances of information getting distorted because it doesn't have to go through long channels. (iv) **Relief to top management:**Decentralisation diminishes the amount of direct supervision exercised by a superior over the activities of a subordinate because they are given the freedom to act and decide albeit within the limits set by the superior.Decentralisation also leaves the top management with more time which they can devote to important policy decisions rather than occupying their time with both policy as well as operational decisions (v) **Facilitates growth:** Decentralisation awards greater autonomy to the lower levels of management as well as divisional or departmental heads. With each department doing its best in a bid to outdo the other, the productivity levels increase and the organisation is able to generate more returns which can be used for expansion purposes. (vi) **Better control:** Decentralisation makes it possible to evaluate performance at each level and the departments can be individually accountable for their results. OR B) (a) The formal communication may lead to procedural delays as the established chain of command has to be followed which increases the time taken for decision making. (b) Poor organisational practices may not provide adequate recognition to creative talent, since it does not allow any deviations from rigidly laid down policies. (c) It is difficult to understand all human relationships in an enterprise as it places more emphasis on structure and work. Hence, the formal organisation does not provide a complete picture of how an organisation works.	1X3=3 any 3 1×3=3

22	a) The Marketing Management philosophy followed by Anabel Creation is the Selling concept..	
	This business philosophy assumes that the customers would not buy, or not buy enough, unless they are adequately convinced and motivated to do so.Therefore, firms must undertake aggressive selling and promotional efforts to make customers buy their products. The use of promotional techniques such as advertising, personal selling and sales promotion are considered essential for selling of products.	1+2=3 (any 2)
	b)The Production Concept- The focus of business activities is on production of goods. It is believed that profits can be maximised by producing at large scale, thereby reducing the average cost of production.Consumers would favour those products which are widely available at an affordable price. Thus, availability and affordability of the products are considered to be the key to the success of a firm.	
	The Product Concept- products. The focus of business activity is on bringing continuous improvement in the quality, incorporating new features etc. Thus, product improvement became the key to profit maximisation of a firm, under the concept of product orientation.	
	The Marketing Concept- It assumes that in the long run an organisation can achieve its objective of maximisation of profit by identifying the needs of its present and prospective buyers and satisfying them in an effective way. All the decisions in a firm are taken from the point of view of the customers.Customer's satisfaction becomes the focal point of all decision making in the organisation.	
	The Societal Marketing Concept- The business orientation should not be short-sighted to serve only consumers' needs. It should also consider large issues of long-term social welfare.The societal marketing concept holds that the task of any organisation is to identify the needs and wants of the target market and deliver the desired satisfaction in an effective and efficient manner so that the long-term well-being of the consumers and the society is taken care of.	

| 23 | (i) **Participants:** The participants in the capital market are financial institutions, banks, corporate entities, foreign investors and ordinary retail investors from members of the public. Participation in the money market is by and large undertaken by institutional participants such as the RBI, banks, financial institutions and finance companies.

(ii) **Instruments:** The main instruments traded in the capital market are – equity shares, debentures, bonds, preference shares etc. The main instruments traded in the money market are short term debt instruments such as T-bills, trade bills reports, commercial paper and certificates of deposit.

(iii) **Investment Outlay:** Investment in the capital market i.e. securities does not necessarily require a huge financial outlay. The value of units of securities is generally low i.e. Rs 10, Rs 100 and so is the case with a minimum trading lot of shares which is kept small i.e. 5, 50, 100 or so. This helps individuals with small savings to subscribe to these securities. In the money market, transactions entail huge sums of money as the instruments are quite expensive.

(iv) **Duration:** The capital market deals in medium and long term securities such as equity shares and debentures. Money market instruments have a maximum tenure of one year, and may even be issued for a single day.

(v) **Liquidity:** Capital market securities are considered liquid investments because they are marketable on the stock exchanges. However, a share may not be actively traded, i.e. it may not easily find a buyer. Money market instruments on the other hand, enjoy a higher degree of liquidity as there is formal arrangement for this. The Discount Finance House of India (DFHI) has been established for the specific objective of providing a ready market for money market instruments.

(vi) **Safety:** Capital market instruments are riskier both with respect to returns and principal repayment. But the money market is generally much safer with a minimum risk of default. This is due to the shorter duration of investing and also to financial soundness of the issuers, which primarily are the government, banks and highly rated companies.

(vii) **Expected return:** The investment in capital markets generally yield a higher return for investors than the money markets. The possibility of earnings is higher if the securities are held for a longer duration.

<center>OR</center>

B)Protective functions performed by Securities and Exchange Board of India: | 1X3=3

(Any3)

1×3=3

Any 3 |

	1. Prohibition of fraudulent and unfair trade practices like making mis- leading statements, manipulations, price rigging etc. 2. Controlling insider trading and imposing penalties for such practices. 3. Undertaking steps for investor protection. 4. Promotion of fair practices and code of conduct in the securities market.	
24	The level at which necessary workforce would be appointed for implementing and controlling the plans and strategies is Middle Level. He is required to do the following to carry out the main task at the Middle Level :(any two) (i) interpret the policies framed by top management, (ii) ensure that their department has the necessary personnel, (iii) assign necessary duties and responsibilities to them, (iv) motivate them to achieve desired objectives (v) co- operate with other departments for smooth functioning of the organisation. At the same time they are responsible for all the activities of first line managers.	a)1 mark for identification b)1x2=2 (Any2)

25	A) a) Customer support services- Customer support services such as after sales services, handling customer complaints and adjustments, procuring credit services, maintenance services, technical services and consumer information aim at providing maximum satisfaction to the customers, which is the key to marketing success. They are very effective in bringing repeat sales from the customers and developing brand loyalty for a product. b) Packaging refers to designing and developing the package for the products. Labelling refers to designing and developing the label to be put on the package. The label may vary from a simple tag to complex graphics. Packaging and labelling have become so important in modern day marketing that these are considered as the pillars of marketing. Packaging is important not only for protection of the products but also serves as a promotional tool. OR B) a) Personal selling- Features (i) Personal Form: In personal selling a direct face-to-face dialogue takes place that involves an interactive relationship between the seller and the buyer. (ii) Development of Relationship: Personal selling allows a salesperson to develop personal relationships with the prospective customers, which may become important in making sales. b) Advertising- Features (any two) (i) Paid Form: Advertising is a paid form of communication. That is, the sponsor has to bear the cost of communicating with the prospects. (ii) Impersonality: There is no direct face-to-face contact between the prospect and the advertiser. It is therefore referred to as an impersonal method of promotion. Advertising creates a monologue and not a dialogue. (iii) Identified Sponsor: Advertising is undertaken by some identified individual or company, who makes the advertising efforts and also bears the cost of it.	2×2=4 2×2=4	

26	A)a) Planning is pervasive: Planning is required at all levels of management as well as in all departments of the organisation. It is not an exclusive function of top management nor of any particular department. But the scope of planning differs at different levels and among different departments. For example, the top management undertakes planning for the organisation as a whole. Middle management does the departmental planning. At the lowest level, day-to-day operational planning is done. b) Planning is futuristic: Planning essentially involves looking ahead and preparing for the future. The purpose of planning is to meet future events effectively to the best advantage of an organisation. It implies peeping into the future, analysing it and predicting it.Through forecasting, future events and conditions are anticipated and plans are drawn accordingly. OR B) a) Strategy A strategy provides the broad contours of an organisation's business. It will also refer to future decisions defining the organization's direction and scope in the long run. A strategy is a comprehensive plan for accomplishing an organisation objectives. This comprehensive plan will include three dimensions, (i) determining long term objectives, (ii) adopting a particular course of action, and (iii) allocating resources necessary to achieve the objective. Whenever a strategy is formulated, the business environment needs to be taken into consideration. b) Procedure Procedures are routine steps on how to carry out activities. They detail the exact manner in which any work is to be performed. They are specified in a chronological order.Procedures are specified steps to be followed in particular circumstances. They are generally meant for insiders to follow.	2X2 =4 2×2=4

| 27 | a) The feature of the business environment highlighted is Inter relatedness. Different elements or parts of the business environment are closely inter- related. For example, increased life expectancy of people and increased awareness for health care have increased the demand for many health products and services like soft drinks, fat-free cooking oil, and health resorts. New health products and services have, in turn, changed people's lifestyles.

b) Any two other features :

(i) Totality of external forces:

Business environment is the sum total of all things external to business firms and, as such, is aggregative in nature.

(ii) Specific and general forces: Business environment includes both specific and general forces. Specific forces (such as investors,customers, competitors and suppliers) affect individual enterprises directly and immediately in their day-to-day working. General forces (such as social, political, legal and technological conditions) have an impact on all business enterprises and thus may affect an individual firm indirectly.

(iii) Relativity: Business environment is a relative concept since it differs from country to country and even region to region. Political conditions in the USA, for instance, differ from those in China or Pakistan. Similarly, demand for sarees may be fairly high in India whereas it may be almost non-existent in France.

(iv) Dynamic nature: Business environment is dynamic in that it keeps on changing whether in terms of technological improvement, shifts in consumer preferences or entry of new competition in the market.

(v) Uncertainty: Business environment is largely uncertain as it is very difficult to predict future happenings, especially when environment changes are taking place too frequently as in the case of information technology or fashion industries.

(vi) Complexity: Since a business environment consists of numerous interrelated and dynamic conditions or forces which arise from different sources, it becomes difficult to comprehend at once what exactly constitutes a given environment. It is a complex phenomenon that is relatively easier to understand in parts but difficult to grasp in its totality. | a) 1 mark for identification +1 mark for stating

+

b)1 mark each for explanation

Any 2 |

28	A good control system helps the organisation in the following ways:	
	(i) Accomplishing organisational goals: The controlling function measures progress towards the organisational goals and brings to light the deviations, if any, and indicates corrective action. It, thus, guides the organisation and keeps it on the right track sothat organisational goals might be achieved.	
	(ii) Judging accuracy of standards: A good control system enables management to verify whether the standards set are accurate and objective. An efficient control system keeps a careful check on the changes taking place in the organisation and in the environment and helps to review and revise the standards in light of such changes.	1x4=4 (Any4)
	(iii) Making efficient use of resources: By exercising control, a manager seeks to reduce wastage and spoilage of resources. Each activity is performed in accordance with predetermined standards and norms. This ensures that resources are used in the most effective and efficient manner.	
	(iv) Improving employee motivation:A good control system ensures that employees know well in advance what they are expected to do and what are the standards of performance on the basis of which they will be appraised. It, thus, motivates them and helps them to give better performance.	
	(v) Ensuring order and discipline: Controlling creates an atmosphere of order and discipline in the organisation. It helps to minimise dishonest behaviour on the part of the employees by keeping a close check on their activities.	
	(vi) Facilitating coordination in action: Controlling provides direction to all activities and efforts for achieving organisational goals. Each department and employee is governed by pre-determined standards which are well coordinated with one another. This ensures that overall organisational objectives are accomplished.	

| 29 | Functional Foremanship: Taylor advocates separation of planning and execution functions. This concept is extended to the lowest level of the shop floor. Under the factory manager there is a planning incharge and a production incharge. Under planning incharge four personnel namely instruction card clerk, route clerk, time and cost clerk and a disciplinarian work. These four personnel would draft instructions for the workers, specify the route of production, prepare time and cost sheet and ensure discipline respectively. Under Production incharge, personnel who work are speed boss, gang boss, repair boss, and inspector. These respectively are responsible for timely and accurate completion of jobs, keeping machines and tools etc., ready for operation by workers, ensure proper working condition of machines and tools and check the quality of work.Each worker has to take orders from these eight foremen. | 1+3=4 |

| 30 | The remaining steps in selection process are:

(i)Selection Decision: The final decision has to be made from among the candidates who pass the tests, interviews and reference checks. The views of the concerned manager will be generally considered in the final selection because it is he/she who is responsible for the performance of the new employee.

(ii) Medical Examination: After the selection decision and before the job offer is made, the candidate is required to undergo a medical fitness test. The job offer is given to the candidate being declared fit after the medical examination.

(iii) Job Offer: The next step in the selection process is job offer to those applicants who have passed all the previous hurdles. Job offer is made through a letter of appointment/confirm his acceptance. The appointee must be given reasonable time for reporting.

(iv)Contract of Employment: After the job offer has been made and the candidate accepts the offer, certain documents need to be executed by the employer and the candidate like the attestation form. This form contains certain vital details about the candidate, which are authenticated and attested by him or her. Attestation form will be a valid record for future reference. Basic information that should be included in a written contract of employment are: Job Title, Duties, Responsibilities, Date when continuous employment starts and the basis for calculating service, rates of pay, allowances, hours of work, leave rules, sickness, grievance procedure, disciplinary procedure, work rules, termination of employment. | 1x4=4 |
| --- | --- | --- |

31	a)The concept of Financial Management discussed is Working Capital Decision. Working capital decisions are concerned with the decisions about the levels of cash, inventory and receivables. These decisions affect the day-to-day working of a business. b) The factors that will affect the choice of Working capital are: 1.Credit Allowed: Different firms allow different credit terms to their customers. These depend upon the level of competition that a firm faces as well as the credit worthiness of their clientele. A liberal credit policy results in a higher amount of debtors, increasing the requirement of working capital. 2. Availability of Raw Material: if the raw materials and other required materials are available freely and continuously, lower stock levels may suffice. The time lag between the placement of order and the actual receipt of the materials (also called lead time) is also relevant. Larger the lead time, larger the quantity of material to be stored and larger shall be the amount of working capital required.	a)1 mark for identification+1 mark for stating + b)2x2=4 =6
31		

32	a) Leadership- Leadership is the process of influencing the behaviour of people by making them strive voluntarily towards achievement of organisational goals. b) Any four features: (i) Leadership indicates the ability of an individual to influence others. (ii) Leadership tries to bring change in the behaviour of others. (iii)Leadership indicates interpersonal relations between leaders and followers. (iv) Leadership is exercised to achieve common goals of the organisation. (v) Leadership is a continuous process.	(1+1=2) + (1x4=4) =6

33	a) The types of framework highlighted are Functional Structure and Divisional Structure. a. Distinction between Functional Structure and Divisional Structure:	(1+1=2) + (1x4=4) =6

(any four)

Basis	Functional Structure	Divisional Structure
Formation	Formation is based on functions	Formation is based on product lines and is supported by functions.
Specialisation	Functional specialisation.	Product specialisation.
Responsibility	Difficult to fix on a department.	Easy to fix responsibility for performance.
Managerial Development	Difficult, as each functional manager has to report to the top management	Easier, autonomy as well as the chance to perform multiple functions helps in managerial development.

	Cost	Functions are not duplicated hence economical.	Duplication of resources in various departments, hence costly.	
	Coordination	Difficult for a multi-product company.	Easy, because all functions related to a particular product are integrated in one department.	1X6=6

34.

A) Reliefs available to a consumer under Consumer Protection Act, 2019(any six):

(i) To remove the defect in goods or deficiency in service.

(ii) To replace the defective product with a new one, free from any defect.

(iii) To refund the price paid for the product, or the charges paid for

the service.

(iv) To pay a reasonable amount of compensation for any loss or injury suffered by the consumer due to the negligence of the opposite party.

(v) To pay punitive damages in appropriate circumstances.

(vi) To discontinue the unfair/ restrictive trade practice and not

to repeat it in the future.

(vii) Not to offer hazardous goods for sale.

(viii) To withdraw the hazardous goods from sale.

(ix) To cease manufacture of hazardous goods and to desist from offering hazardous services.

(x) To pay any amount (not less than 5% of the value of the defective

goods or deficient services provided), to be credited to the

Consumer Welfare Fund or any other organisation/person, to be utilised in the prescribed manner.

1x6=6

(xi) To issue corrective advertisement to neutralise the effect of a misleading advertisement. (xii) To pay adequate costs to the appropriate party. OR B)1. Right to Safety: The consumer has a right to be protected against goods and services which are hazardous to life and health. For instance, electrical appliances which are manufactured with substandard products or do not conform to the safety norms might cause serious injury. Thus, consumers are educated that they should use electrical appliances which are ISI marked as this would be an assurance of such products meeting quality specifications. 2. Right to be Informed: The consumer has a right to have complete information about the product he intends to buy including its ingredients, date of manufacture, price, quantity, directions for use, etc. 3. Right to Choose: The consumer has the freedom to choose from a variety of products at competitive prices. This implies that the marketers should offer a wide variety of products in terms of quality, brand, prices, size, etc. and allow the consumer to make a choice from amongst these. 4. Right to be Heard: The consumer has a right to file a complaint and to be heard in case of dissatisfaction with a good or a service. It is because of this reason that many enlightened business firms have set up their own consumer service and grievance cells. Many consumer organisations are also working towards this direction and helping consumers in redressal of their grievances. 5. Right to seek Redressal: The consumer has a right to get relief in case the product or service falls short of his expectations. The Consumer Protection Act provides a number of reliefs to the consumers including replacement of the product, removal of defect in the product, compensation paid for any loss or injury suffered by the consumer, etc. 6. Right to Consumer Education: The consumer has a right to acquire knowledge and to be a well informed consumer throughout life. He should be aware about his rights and the reliefs available to him in case of a product or service.	1x6=6

MARKING SCHEME (2025-26)

ECONOMICS (030)   CLASS 12

S.NO.	SECTION A – MACRO ECONOMICS	MARKS
1	D. Average Propensity to Consume = 1	1
	Note: The following answer is for the Visually Impaired Candidates only, in lieu of Ans.1	
	D. Average Propensity to Consume = 1	1
2	C. 169.92	1
3	A. Store of Value	1
4	B. Statement 1 is false and Statement 2 is true.	1
5	A. Factor	1
	Note: The following answer is for the Visually Impaired Candidates only, in lieu of Ans.5	
	A. Factor	
6	B. ex-post Aggregate Demand	1
7	C. Both Statements 1 and 2 are true.	1
8	A. 580	1
9	D. Assertion (A) is false, but Reason (R) is true.	1
10	B. 1935	1
11	Gross Value Added of Firm B = (i) – (iv)	½
	= 1,000 – 250 = ₹ 750 crore	½
	Gross Value Added of Firm A = Gross Value Added of Firm B = ₹ 750 crore	
	Domestic Sales of Firm A = Gross Value Added of Firm A – (iii) – (v) + (ii)	1
	= 750 – 200 – 150 + 300	½
	= ₹ 700 crore	½
12 (A)	Reserve Ratio is the percentage of deposits that every commercial bank must keep as reserves and rest of the deposits can be used to give loans. Reserve Ratio is fixed by the Central Bank to avoid 'over lending' by commercial banks. This is legally binding to all commercial banks. Hence, the statutory requirement of the Reserve Ratio acts as a limit to the amount of credit that banks can create.	3
	OR	
12 (B)	Yes. The Reserve Bank of India (RBI) serves as the Government's banker, managing its accounts, receiving deposits, and processing payments. Exchanges, remittances and various banking operations are facilitated by the RBI on behalf of the government. In addition to this, during any financial crisis, RBI provides credit to the government to ensure its smooth functioning and to support the state in managing its obligations effectively.	3
13 (A)	The income earned by Ms. Sarika in the form of rent and interest can be classified as factor income, as it is the income earned by the factors of production for rendering their services. Whereas;	2
	Cash transfers received by Ms. Sarika from her family members abroad can be classified as transfer income as it is the income received without rendering any productive service in return.	2

13 (B)	**OR** The final expenditure incurred by the sectors of an economy can be: **Private Final Consumption Expenditure:** It is the expenditure incurred by households and non-profit institutions serving households on final consumption of goods and services. **Net Exports**: It refers to the excess of value of exports of goods and services over the value of imports of goods and services, during an accounting year.	**2** **2**	
14	No. The loan taken by Mr. Spector, can be classified as an autonomous transaction. Such international economic transactions are independent of the state of Balance of Payments (BoP) and generally take place with an economic motive. However, loan taken by the Government in this case can be classified as an accommodating transaction. Such transactions are those international economic transactions which are undertaken (by competent authorities) to cover the surplus or deficit in BoP and are independent of any economic motive.	**2** **2**	
15	To deal with the situation of highlighted macroeconomic issue i.e. inflation, the Central Bank may use the following measures: **Repo Rate:** A rise in repo rate will force the commercial banks to increase the lending rates, making the credit dearer for the general public, discouraging the borrowings. Consequently, Aggregate Demand will fall thus correcting the problem of inflation in the economy. **Open Market Operations:** The Central Bank can sell government securities in the open market, thereby, reducing the availability of funds with the commercial banks for lending. Consequently, Aggregate Demand will fall thus correcting the problem of inflation in the economy. **Note: The following answer is for the Visually Impaired Candidates only, in lieu of Ans.15** To deal with the situation of inflation, the Central Bank may use the following measures: **Repo Rate:** A rise in repo rate will force the commercial banks to increase the lending rates making the credit dearer for the general public, discouraging the borrowings. Consequently, Aggregate Demand will fall thus correcting the problem of inflation in the economy. **Open Market Operations:** The Central Bank can sell government securities in the open market, thereby, reducing the availability of funds with the commercial banks for lending. Consequently, Aggregate Demand will fall thus correcting the problem of inflation in the economy.	**2** **2** ½ + 1 ½ ½ + 1 ½	
16 (A) (I)	(a) Investment Multiplier (k) = $\frac{1}{1-MPC}$ $= \frac{1}{1-0.8} = 5$ (b) **(i)** Change in Income (ΔY) = k x ΔI = 5 x 1,000 = ₹ 5,000 crore **(ii)** Change in Consumption (ΔC) = MPC x ΔY = 0.8 x 5,000 = ₹ 4,000 crore	½ ½ ½ ½ ½ ½	

(II)	Income is either consumed or saved, i.e.; $Y = C + S$ -------- (i) Dividing both sides of the equation (i) by Y $\frac{Y}{Y} = \frac{C}{Y} + \frac{S}{Y}$ $1 = APC + APS$ Thus, sum of the Average Propensity to Consume (APC) and Average Propensity to Save (APS) is always equal to one. **OR**		**3**
16 (B) (I)	Given, Marginal Propensity to Save (MPS) = 20% = 0.2 Ex-Ante Investments (I) = ₹ 100 Equilibrium level of Income (Y)= ₹ 700 As we know, at Equilibrium level of Income; S = I $-\bar{C} + (MPS)\, Y = I$ $-\bar{C} + (0.2)\, 700 = 100$ $-\bar{C} = -40$ Thus, dissavings at zero level of income = ₹ 40		½ ½ ½ ½
(II)	Effective Demand refers to that level of Aggregate Demand, which can be met by the corresponding Aggregate Supply in the economy. If ex-ante Aggregate Demand is more than ex-ante Aggregate Supply, it means that the households and firms are planning to consume more than what the firms intend to produce. Thus, the inventories will fall below the desired level. To restore the desired level of inventories, producers may increase output and employment in the economy. This mechanism will continue till the equilibrium is reinstated and effective demand can be restored.		**1** **3**
17 (I)	**Tax revenue** receipts refer to the receipts of the government through taxes. These are the compulsory transfer payments imposed by the government on individuals, corporations, and other entities. Whereas; **Non-tax revenue** receipts refers to those revenue receipts of the government from sources other than taxes. These mainly consist of interest, dividends, fees etc.		**1 ½** **1 ½**
(II)	The fiscal deficit declined due to robust growth in direct and indirect taxes, driven by resilient economic activities and improved tax compliance. Furthermore, higher-than-anticipated non-tax revenue, particularly dividends from the RBI, boosted overall revenue receipts. In addition to this, controlled revenue expenditure also contributed to the reduction in the fiscal deficit.		**3**
colspan	**SECTION B - INDIAN ECONOMIC DEVELOPMENT**		
18	B. Financial		**1**
19	C. Britain		**1**
20	D. (i), (ii) and (iii)		**1**
21	A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).		**1**
22	B. International Labour Organisation		**1**
23	B. (i) and (ii)		**1**
24	A. reversal of supply-demand relationship of environmental resources		**1**

25	C. (c)-iii	1
26	D. Regulation of markets	1
27	A. Statement 1 is true and Statement 2 is false.	1
28	Yes. Pakistan maintained healthy growth rate till 1990s owing to the introduction of various policies such as Green Revolution and import substitution-based industrialisation. However, later it faced slowdown to the magnitude of 5.3 % between 2015-17, due to several interconnected factors such as agricultural growth and food supply which were largely dependent on favourable harvest rather than a systematic process of technological advancement. Moreover, political instability, excessive reliance on remittances, and dependence on foreign aid, significantly hindered Pakistan's economic progress.	3
29 (A)	Sustainable Development, seeks to meet the basic needs of the present generation without compromising the needs of the future generations. As per Edward Barbier, it must be used to increase the standard of living of the poor through measurable increase in income, educational and health services, sanitation, etc. The aim of Sustainable Development should be to reduce absolute poverty by creating livelihoods while minimizing resource depletion, environmental harm, cultural disruption, and social instability. **OR**	3
29 (B)	People, who own and operate an enterprise to earn their livelihood are known as self-employed workers. For example, a cement shop owner. Whereas; A hired worker is someone who is employed by another person/organization and receives compensation in the form of a salary/wage. For example, an employee working as a graphic designer at a marketing agency.	1 + ½ 1 + ½
30 (A)	The introduction of railways affected the structure of the Indian economy in two important ways: - It enabled people to undertake long distance travel and thereby breaking geographical and cultural barriers. - It fostered commercialisation of Indian agriculture which adversely affected the self-sufficiency of the village economies in India. **OR**	2 2
30 (B)(I)	The demographic indicator given in the table is Life Expectancy. Life Expectancy refers to the average number of years a person is expected to live.	1 1
(II)	Two demographic indicators are: - Infant Mortality Rate - Literacy Rate	½ ½
(III)	India entered the second stage of demographic transition in 1921.	1
31 (I)	Regional and global economic groupings like G-20, SAARC, BRICS etc., play a vital role for developing nations like India as they help them to understand the developmental processes pursued by their neighbouring nations to better comprehend their own strengths and weaknesses vis-à-vis their neighbours.	3

	Moreover, in the unfolding process of globalisation, as developing nations face competition not only from developed nations but also amongst themselves such groupings help them to flourish well in a shared environment.		
(II)	Special Economic Zone is a geographical region that has economic laws different from a country's typical economic laws.	**1**
32 (I)	The type of farming indicated in Panel A is Conventional Farming, whereas, the type of farming in Panel B is Organic Farming.	**½ + ½**
(II)	Advantage of Organic Farming over Conventional Farming: • Organic farming is the system of farming that relies upon the use of organic inputs for cultivation such as organic manures and composts. Its chemical free nature helps in soil conservation. Disadvantage of Organic Farming over Conventional Farming: • Yields from organic farming are lesser than the conventional farming. Therefore, small and marginal farmers may find it difficult to adapt to large scale production. **Note: The following answer is for the Visually Impaired Candidates only, in lieu of Ans.32** Advantage of Organic Farming over Conventional Farming: • Organic farming is the system of farming that relies upon the use of organic inputs for cultivation such as organic manures and composts. Its chemical free nature helps in soil conservation. Disadvantage of Organic Farming over Conventional Farming: • Yields from organic farming are lesser than the conventional farming. Therefore, small and marginal farmers may find it difficult to adapt to large scale production.	**1 ½** **1 ½** **2** **2**
33 (A) (I)	The industries were classified under three heads as per Industrial Policy Resolution 1956: • The **first category**, comprised industries which would be exclusively owned by the government. • The **second category**, private sector could supplement the efforts of the public sector, with the government taking the sole responsibility for starting new units. • The **third category** consisted of the remaining industries which were left in the hands of private sector.	**1** **1** **1**
(II)	Yes. A few former Zamindars, used legislative loopholes to continue to own large areas of land. Tenants were evicted and the landowners claimed to be self-cultivators. The big landlords delayed its implementation; by challenging it in the courts. They used this delay to register their lands in the name of close relatives, thereby escaping from the legislation. Consequently, creating hindrances in the successful implementation of land ceiling reforms.	**3**
	OR	
33 (B) (I)	Yes, the process of globalisation has yielded both positive, as well as, negative results for India. It is argued that globalization serves as an opportunity for	**4**

	developing countries like India to access the capital and technology of the global markets. However, some critics argue that globalisation primarily benefits developed nations, and undermines the welfare of people in underdeveloped countries thereby exacerbating economic disparities. In the context of India, the reforms of the 1990's mainly benefited high-income groups and select service sectors instead of crucial areas like agriculture and industry.	
(II)	Two reasons behind the introduction of Economic Reforms of 1991 were: • High rate of inflation • Huge Balance of Payments Deficit	1 1
34 (I)	The education is fundamental for achieving full human potential providing universal access to quality education and leadership on the global stage in terms of economic growth, social justice and equality. Thus, it presents the best way forward for developing and optimising India's resources.	2
(II)	To create a high-quality and equitable public education system essential for India's future development and growth, it is imperative to boost the public investment in education sector to 6% of GDP at the earliest.	2
(III)	Two main initiatives which will be implemented to tackle school dropouts and avert additional students from leaving school are to provide: • effective and sufficient infrastructure, so that all students have access to safe and engaging school education at all levels from pre-primary school to Grade 12. • regular trained teachers at each stage, special care shall be taken to ensure that no school remains deficient on infrastructure support.	1 1

GEOGRAPHY CODE - 029
MARKING SCHEME
CLASS: XII (2025- 26)

Time allowed: 3 Hours   **Maximum marks: 70**

General Instructions:

1. This question paper contains **30** questions. **All** questions are **compulsory**.
2. This question paper is divided into **five** sections. **Sections-A, B, C, D and E.**
3. **Section A** - Question number **1 to 17** are Multiple Choice type questions carrying 1 mark each.
4. **Section B-** Question number **18 and 19** are Source based questions carrying 3 marks each.
5. **Section C**- Question number **20 to 23** are Short Answer type questions carrying 3 marks each. Answer to these questions shall be written in 80 to 100 words.
6. **Section D** Question number **24 to 28** are Long Answer type questions carrying 5 marks each. Answer to these questions shall be written in 120 to 150 words.
7. **Section E** Question number **29 and 30** are Map based questions.

1.	B 400 Million	1
2.	C. Stage III: Low Fluctuating	1
3.	D. Strengthening policies on environmental sustainability and social equity	1
4.	B. Both (A) and (R) are true, but (R) is not the correct explanation of (A).	1
5.	D. scientist developing genetically modified crops in a research lab	1
6.	B. 1-B, 2-A, 3-D, 4-C	1
7.	B. To encourage trade between countries with geographical proximity and similar or complementary trading items while reducing trade restrictions in the developing world.	1
8.	C. There was no significant change in exports between 2013-14 and 2016-17.	1
9.	D. Promote balanced population growth through family planning and education initiatives.	1

10.	C. Economic strain on the working-age population	1
11.	D. Introduction of high-yielding seed varieties of wheat (Mexico) and rice (the Philippines) in the 1960s and 1970s.	1
12.	A. The percentage of culturable waste land as part of the reporting area decreased from 8.0% to 4.0%.	1
13.	B. 2, 3, and 4 only	1
14.	A Atal Bhujal Yojana (Atal Jal)	1
15.	A. Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).	1
16.	A. a-3, b-4, c-1, d-2	1
17.	A. To encourage airlines to operate flights on regional and remote routes through enabling policies and extending incentives.	1
18.	i. Griffith Taylor ii. Human beings can conquer nature by obeying it. They have to respond to the red signals and can proceed in their pursuits of development when nature permits the modifications. It means that possibilities can be created within the limits which do not damage the environment and there is no free run without accidents. The neo-determinism conceptually attempts to bring a balance nullifying the 'either' 'or' dichotomy. iii. The free run which the developed economies attempted to take has already resulted in the green house effect, ozone layer depletion, global warming, receding glaciers and degrading lands.	1+1+1=3
19.	i. The HDI measures a country's **Gross National Income per capita**, **education**, and **life expectancy**. ii. The report highlighted that **half of the world's poorest nations** continued to remain below their pre-COVID crisis levels. iii. The three highest-ranked countries in the **2023 HDI** were **Switzerland, Norway, and Iceland**.	1+1+1=3

20.	• **Impact on Outsourcing Countries:** Outsourcing has led to job creation in countries like India, China, and the Philippines, offering cheaper labor and skilled workers. However, it has also faced resistance from job-seeking youths in these countries. • **Comparative Advantage:** The low cost and availability of skilled labor in outsourcing countries provide a comparative advantage, making outsourcing a viable business option. • **Migration Trends:** Outsourcing has reduced the outmigration from countries where jobs are available, as new opportunities lower the need for people to seek work abroad. • **Emergence of KPO:** Knowledge Process Outsourcing (KPO) involves highly skilled workers and has become a new trend in outsourcing. It focuses on research, e-learning, legal services, and other high-skill areas, creating additional business opportunities. (Any 3 points or any other relevant point)	3

21.	Elaborate any six points
	    1) **Adopting Smart Urban Planning**
	    2) **Enhancing Public Transportation**
	    3) **Implementing Green Infrastructure**
	    4) **Promoting Renewable Energy and Energy Efficiency**
	    5) **Managing Resources Sustainably**
	    6) **Addressing Pollution**
	    7) **Community Engagement and Education**
	
	OR
	
	1) The objective of the Smart Cities Mission is to promote cities that provide core infrastructure, a clean and sustainable environment and give a decent quality of life to its citizens.
	2) One of the features of Smart Cities is to apply smart solutions to infrastructure and services in order to make them better.
	3) For example, making areas less vulnerable to disasters, using fewer resources and providing cheaper services.
	4) The focus is on sustainble and inclusive development and the idea is to look at compact areas, create a replicable model, which will act like a lighthouse to other aspiring cities.
		3

22.	1. **Improved Public Bus Service**: By providing more efficient and reliable public transportation, cities can encourage people to choose buses over personal vehicles, reducing congestion and pollution. 2. **Expressways**: Building expressways with separate traffic lanes, bridges, and flyovers can help ensure smoother traffic flow and reduce congestion in cities.	3

	3. **Mass Rapid Transit (MRT)**: Implementing MRT systems can provide high-capacity, efficient transportation like electric trains, underground tunnels, metros and elevated railways within cities, reducing dependence on cars or other personal vehicles and reduce congestion and pollution. 4. **Higher Parking Fees:** Increasing parking fees can discourage the use of personal vehicles for commuting, encouraging people to utilize public transport or other alternatives. Any three points or any other relevant point	
23.	The decades 1951-1981 are referred to as the period of "population explosion" in India, which was caused by- ● A rapid fall in the mortality rate but a high fertility rate of population in the country. The average annual growth rate was as high as 2.2 per cent. ● It is in this period, after the Independence, that developmental activities were introduced through a centralised planning process and economy started showing up ensuring the improvement of living condition of people at large. Thus, there was a high natural increase and higher growth rate. ● Besides, increased international migration bringing in Tibetans, Bangladeshis, Nepalies and even people from Pakistan contributed to the high growth rate. **OR** Adolescents i.e., up to the age group of 10-19 years consists of about 20.9 per cent (2011). Adolescents form a significant portion of the population, contributing to the workforce and economy in the future. The adolescent population, though, regarded as the youthful population having high potentials, but at the same time they are quite vulnerable if not guided and channelised properly. There are many challenges for the society as far as these adolescents are concerned, some of which are lower age at marriage, illiteracy – particularly female illiteracy, school dropouts, low intake of nutrients, high rate of maternal mortality of adolescent mothers, high rate of HIV and AIDS infections, physical and mental disability or retardedness, drug abuse and alcoholism, juvenile delinquency and commitence of crimes, etc.	3
24.	Pastoral nomadism or Nomadic herding is a primitive subsistence activity, in which the herders rely on animals for food, clothing, shelter, tools and transport. They move from one place to another along with their livestock, depending on the amount and quality of pastures and water. Each nomadic community occupies a well-identified territory as a matter of tradition. A wide variety of animals is kept in different regions. In tropical Africa, cattle are the most important livestock, while in Sahara and Asiatic deserts, sheep, goats and camel are reared. In the	3+2= 5

	mountainous areas of Tibet and Andes, yak and llamas and in the Arctic and sub Arctic areas, reindeer are the most important animals.
	
	The process of migration from plain areas to pastures on mountains during summers and again from mountain pastures to plain areas during winters is known as transhumance. In mountain regions, such as Himalayas, Gujjars, Bakarwals, Gaddis and Bhotiyas migrate from plains to the mountains in summers and to the plains from the high altitude pastures in winters. Similarly, in the tundra regions, the nomadic herders move from south to north in summers and from north to south in winters.
	
	 OR Factors Affecting Mining Activity:
	  i. Physical factors include the size, grade and the mode of occurrence of the deposits.
	  ii. Economic factors such as the demand for the mineral, technology available and used, capital to develop infrastructure and the labour and transport costs.
	
	The developed economies are retreating from mining, processing and refining stages of production due to high labour costs, while the developing countries with large labour force and striving for higher standard of living are becoming more important. Several countries of Africa and few of south America and Asia have over fifty per cent of the earnings from minerals alone.	

25.	Employment opportunities Better Standard of Living Increased Purchasing Power 1. **Job creation and increased employment:** Small-scale industries are labour-intensive, creating numerous jobs and providing employment opportunities to a larger portion of the population. 2. **Reduced poverty and improved livelihoods:** By offering more employment options, small- scale industries help reduce poverty and raise the living standards of individuals in both urban and rural areas. 3. **Equitable income distribution and improved local purchasing power:** Small-scale industries support a more balanced income distribution, raising the local purchasing power of the individuals, and encouraging economic growth at the grassroots level. 4. **Regional development:** Small-scale manufacturing often utilizes local raw materials and resources, promoting the economic development of resource-rich regions. 5. **Skill development:** Small-scale industries provide opportunities for the workforce to develop valuable skills, enhancing their productivity and earning possibilities.	3+2=5

	High-tech industries which are regionally concentrated, self-sustained and highly specialised are called technopolies. They are characterised by the use of robotics on the assembly line, computer-aided design (CAD) and manufacturing, electronic controls of smelting and refining processes. Neatly spaced, low, modern, dispersed, office-plant-lab buildings rather than massive assembly structures, factories and storage areas mark the high-tech industrial landscape. Planned business parks for high-tech start-ups have become part of regional and local development schemes. New chemical and pharmaceutical products are notable examples of a high-tech industry. The Silicon Valley near San Francisco and Manufacturing contributes significantly to Silicon Forest near Seattle are examples of the world economy. Iron and steel, textiles, technopolies.	

26.	Urban centres in India are more differentiated in terms of the socio-economic, politico-cultural and other indicators of development. On one hand there are bunglows, high-rise apartments etc. and on the other, there are slums, jhuggi-jhopari clusters and colonies of shanty structures.
	    i. Slums are inhabited by those people who were forced to migrate from the rural areas to these urban centres in search of livelihood but could not afford proper housing due to high rent and high costs of land.
	    ii. They occupy environmentally incompatible and degraded areas. Slums are residential areas of the least choice, dilapidated houses, poor hygienic conditions, poor ventilation, lack of basic amenities, like drinking water, light and toilet facilities, etc.
	    iii. Open defecation, unregulated drainage system and overcrowded narrow street patterns are serious health and socio environmental hazards.
	Most of the slum population works in low-paid, high risk-prone, unorganised sectors of the urban economy. These conditions make their lives harder.
	    i. Consequently, they are the undernourished, prone to different types of diseases and illness and cannot afford to give proper education to their children.
	    ii. The poverty makes them vulnerable to drug abuse, alcoholism, crime, vandalism, escapism, apathy and ultimately social exclusion.
		3+2=5

27.	i. The composition of commodities in India's international trade has been undergoing a change over the years. In export the	5

	share of agriculture and allied products and manufactured goods have decreased. ii. Share from crude petroleum and products and other commodities have increased. iii. The share of ore and minerals have largely remained constant over the years from 2015-16 to 2021-22. iv. The decline in traditional items is largely due to the tough international competition. v. Amongst the agriculture products, there is a decline in the export of traditional item, such as cashew, etc., though an increase has been registered in floricultural products, fresh fruits, marine products and sugar, etc.	
28.	Bharmaur tribal region has harsh climate conditions, low resource base and fragile environment. These factors have influenced the society and economy of the region. It is one of the most (economically and socially) backward areas of Himachal Pradesh. The Gaddis have experienced geographical and political isolation and socio-economic deprivation. To improve the quality of life of the Gaddi tribe and bridge the development gap between Bharmaur and other areas of Himachal Pradesh **Focus areas** i. **Agriculture and Allied Activities**: Modernization of Agriculture Promote Horticulture and livestock Improvement, adapt agricultural practices and infrastructure development, considering factors like to the region's harsh climate, snowfall and limited growing seasons. ii. **Education and Skill Development**: Access to Quality Education Vocational Training, Adult Literacy Programs, Address issues of poverty, unemployment, and historical isolation through targeted programs and skill development. iii. **Livelihood Opportunities:** Promote eco-friendly tourism, Support Handicrafts, Improve Connectivity, Address issues of poverty, unemployment, and historical isolation through targeted programs and skill development iv. **Community Participation:** Ensure active involvement of the Gaddi community in planning and implementation to address their specific needs and priorities. v. **Government Support:** Secure funding and policy support from the government for infrastructure development, education, and skill-building programs. **Elaborate the points**	5
29.	A Hamberg B Capetown C Panama Canal	1X5=5

	D Amazon Basin E Santiago F Vladivostok G Downs **For Visually challenged** A Hamberg/London/North Cape B Capetown C Rhine waterway D Amazon Basin E Santiago/ /Buenos Airies F Vladivostok/ St Petersburg G Downs	
30.	A. Mayurbhanj B. Tuticorin C. Jamnagar D. Bihar E. Assam F. Bengaluru G. Raniganj For Visually impaired students. A. Mayurbhanj	1X5=5

Q-30

30 D
30 E
30 C
30 G
30 A
30 F
30 B

km 100 0 100 300 500 km

	B. Tuticorin C. Jamnagar D. Bihar E. Gujarat F. Bengaluru G. Raniganj	