Page 1

PAPER - 1 : MATHEMATICS, PHYSICS & CHEMISTRY

Do not open this Test Booklet until you are asked to do so.

Read carefully the Instructions on the Back Cover of this Test Booklet.

Name of the Candidate (in Capital letters) :

Roll Number in figures:

Examination Centre Number:

Name of Examination Centre (in Capital letters) :

Candidate’s Signature:

Candidate’s Admission Number:

1. Immediately fill in the particulars on this page of the Test Booklet with only Black Ball Point Pen provided.

2. The Answer Sheet is kept inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully.

3. The test is of 3 hours duration.

4. The Test Booklet consists of 90 questions. The maximum marks are 360.

5. There are three parts in the question paper A, B, C consisting of Mathematics, Physics and Chemistry having 30 questions in each part of equal weightage. Each question is allotted 4 marks for correct response.

6. Candidates will be awarded marks as stated above in instruction No. 5 for correct response of each question. ¼ (one-fourth) marks of the total marks allotted to the question (i.e. 1 mark) will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

7. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction 6 above.

8. For writing particulars/marking responses on Side-1 and Side-2 of the Answer Sheet use only Black Ball Point Pen provided in the examination hall.

9. No candidate is allowed to carry any textual material, printed or written, books of papers, paper, mobile phone, any electronic device, etc. except the Admit Card inside the examination room/hall.

10. Rough work is to be done on the space provided for this purpose in the Test Booklet only. This space is given at the bottom of each page and in four pages (Page 40-43) at the end of the booklet.

11. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.

12. The CODE for this Booklet is D. Make sure that the CODE printed on Side-2 of the Answer Sheet and also tally the serial number of the Test Booklet and Answer Sheet are the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.

13. Do not fold or make any stray mark on the Answer Sheet.

Important Instructions:

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Name of the Candidate (in Capital letters) :

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Candidate’s Signature:

Candidate’s Admission Number:

1. Invigilator’s Signature:

2. Invigilator’s Signature (in figures):
PART A — MATHEMATICS

1. If S is the set of distinct values of ‘b’ for which the following system of linear equations
   \[ \begin{align*}
   x + y + z &= 1 \\
   x + ay + z &= 1 \\
   ax + by + z &= 0
   \end{align*} \]
   has no solution, then S is:
   \( \text{(1) an empty set} \)  
   \( \text{(2) an infinite set} \)  
   \( \text{(3) a finite set containing two or more elements} \)  
   \( \text{(4) a singleton} \)

2. The following statement
   \( (p \rightarrow q) \rightarrow [\neg (p \rightarrow q) \rightarrow q] \)
   is:
   \( \text{(1) a tautology} \)  
   \( \text{(2) equivalent to } \neg p \rightarrow q \)  
   \( \text{(3) equivalent to } p \rightarrow \neg q \)  
   \( \text{(4) a fallacy} \)

3. If \( 5(\tan^2 x - \cos^2 x) = 2\cos 2x + 9 \), then the value of \( \cos 4x \) is:
   \( \text{(1) } -\frac{3}{5} \)
   \( \text{(2) } \frac{1}{3} \)
   \( \text{(3) } \frac{2}{9} \)
   \( \text{(4) } -\frac{7}{9} \)

BHASHA A — गणित

1. यदि S, ‘b’ की उन विभिन्न मानों का समुच्चय है जिनके लिए निम्न दिक्षित समीकरण निकाय
   \[ \begin{align*}
   x + y + z &= 1 \\
   x + ay + z &= 1 \\
   ax + by + z &= 0
   \end{align*} \]
   का कोई हल नहीं है, तो S :
   \( \text{(1) एक रिक्त समुच्चय है} \)  
   \( \text{(2) एक अपरिमित समुच्चय है} \)  
   \( \text{(3) एक परिमित समुच्चय है जिसमें दो या अधिक अवयव हैं} \)  
   \( \text{(4) एक ही अवयव वाला समुच्चय है} \)

2. निम्न कथन
   \( (p \rightarrow q) \rightarrow [\neg (p \rightarrow q) \rightarrow q] \):
   \( \text{(1) एक पुनर्वक्रित (tautology) है} \)  
   \( \text{(2) } \neg p \rightarrow q \text{ के समुच्चय है} \)  
   \( \text{(3) } p \rightarrow \neg q \text{ के समुच्चय है} \)  
   \( \text{(4) एक हेत्याभाव (fallacy) है} \)

3. यदि \( 5(\tan^2 x - \cos^2 x) = 2\cos 2x + 9 \), तो \( \cos 4x \) का मान है :
   \( \text{(1) } -\frac{3}{5} \)
   \( \text{(2) } \frac{1}{3} \)
   \( \text{(3) } \frac{2}{9} \)
   \( \text{(4) } -\frac{7}{9} \)
4. For three events A, B and C,
\[ P(\text{Exactly one of } A \text{ or } B \text{ occurs}) = P(\text{Exactly one of } B \text{ or } C \text{ occurs}) = P(\text{Exactly one of } C \text{ or } A \text{ occurs}) = \frac{1}{4} \text{ and } \]
\[ P(\text{All the three events occur simultaneously}) = \frac{1}{16}. \]
Then the probability that at least one of the events occurs, is:
(1) \( \frac{7}{32} \)
(2) \( \frac{7}{16} \)
(3) \( \frac{7}{64} \)
(4) \( \frac{3}{16} \)

5. Let \( \omega \) be a complex number such that
\[ 2\omega + 1 = z \text{ where } z = \sqrt{-3}. \] If
\[ \begin{vmatrix} 1 & 1 & 1 \\ 1 - \omega^2 - 1 & \omega^2 \\ 1 & \omega^2 & \omega^7 \end{vmatrix} = 3k, \]
then \( k \) is equal to:
(1) \( -z \)
(2) \( z \)
(3) \( -1 \)
(4) \( 1 \)
6. Let $k$ be an integer such that the triangle with vertices $(k, -3k), (5, k)$ and $(-k, 2)$ has area 28 sq. units. Then the orthocentre of this triangle is at the point:

1. $\left(2, -\frac{1}{2}\right)$
2. $\left(1, \frac{3}{4}\right)$
3. $\left(1, -\frac{3}{4}\right)$
4. $\left(2, \frac{1}{2}\right)$

7. Twenty meters of wire is available for fencing off a flower-bed in the form of a circular sector. Then the maximum area (in sq. m) of the flower-bed, is:

1. 12.5
2. 10
3. 25
4. 30

8. The area (in sq. units) of the region $\{(x, y) : x \geq 0, x + y \leq 3, x^2 \leq 4y$ and $y \leq 1 + \sqrt{x}\}$ is:

1. $\frac{59}{12}$
2. $\frac{3}{2}$
3. $\frac{7}{3}$
4. $\frac{5}{2}$
9. If the image of the point $P(1, -2, 3)$ in the plane, $2x + 3y - 4z + 22 = 0$ measured parallel to the line, $\frac{x}{1} = \frac{y}{4} = \frac{z}{5}$ is $Q$, then $PQ$ is equal to:

1. $3\sqrt{5}$
2. $2\sqrt{42}$
3. $\sqrt{42}$
4. $6\sqrt{5}$

10. If for $x \in \left(0, \frac{1}{4}\right)$, the derivative of $\tan^{-1}\left(\frac{6x\sqrt{x}}{1 - 9x^3}\right)$ is $\sqrt{x} \cdot g(x)$, then $g(x)$ equals:

1. $\frac{9}{1 + 9x^3}$
2. $\frac{3x\sqrt{x}}{1 - 9x^3}$
3. $\frac{3x}{1 - 9x^3}$
4. $\frac{3}{1 + 9x^3}$
11. If \((2 + \sin x) \frac{dy}{dx} + (y + 1)\cos x = 0\) and 
\(y(0) = 1,\) then \(y\left(\frac{\pi}{2}\right)\) is equal to:

\[
\begin{align*}
(1) & \quad \frac{1}{3} \\
(2) & \quad \frac{2}{3} \\
(3) & \quad \frac{1}{3} \\
(4) & \quad \frac{4}{3}
\end{align*}
\]

12. Let a vertical tower AB have its end A on the level ground. Let C be the mid-point of AB and P be a point on the ground such that \(AP = 2AB.\) If \(\angle BPC = \beta,\) then \(\tan \beta\) is equal to:

\[
\begin{align*}
(1) & \quad \frac{6}{7} \\
(2) & \quad \frac{1}{4} \\
(3) & \quad \frac{2}{9} \\
(4) & \quad \frac{4}{9}
\end{align*}
\]
### Question 13

If \( A = \begin{bmatrix} 2 & -3 \\ -4 & 1 \end{bmatrix} \), then \( \text{adj} (3A^2 + 12A) \) is equal to:

- (1) \( \begin{bmatrix} 72 & -84 \\ -63 & 51 \end{bmatrix} \)
- (2) \( \begin{bmatrix} 51 & 63 \\ 84 & 72 \end{bmatrix} \)
- (3) \( \begin{bmatrix} 51 & 84 \\ 63 & 72 \end{bmatrix} \)
- (4) \( \begin{bmatrix} 72 & -63 \\ -84 & 51 \end{bmatrix} \)

### Question 14

For any three positive real numbers \( a, b \) and \( c \),

\[
9(25a^2 + b^2) + 25(c^2 - 3ac) = 15b(3a + c).
\]

Then:

- (1) \( b, c \) and \( a \) are in G.P.
- (2) \( b, c \) and \( a \) are in A.P.
- (3) \( a, b \) and \( c \) are in A.P.
- (4) \( a, b \) and \( c \) are in G.P.
15. The distance of the point $(1, 3, -7)$ from the plane passing through the point $(1, -1, -1)$, having normal perpendicular to both the lines $\frac{x - 1}{1} = \frac{y + 2}{-2} = \frac{z - 4}{3}$ and $\frac{x - 2}{2} = \frac{y + 1}{-1} = \frac{z + 7}{-1}$, is:

(1) $\frac{20}{\sqrt{74}}$

(2) $\frac{10}{\sqrt{83}}$

(3) $\frac{5}{\sqrt{83}}$

(4) $\frac{10}{\sqrt{74}}$

16. Let $I_n = \int \tan^n x \, dx$, $(n > 1)$. If $I_4 + I_6 = a \tan^5 x + bx^5 + C$, where $C$ is a constant of integration, then the ordered pair $(a, b)$ is equal to:

(1) $\left( -\frac{1}{5}, 1 \right)$

(2) $\left( \frac{1}{5}, 0 \right)$

(3) $\left( \frac{1}{5}, -1 \right)$

(4) $\left( -\frac{1}{5}, 0 \right)$
17. The eccentricity of an ellipse whose centre is at the origin is $\frac{1}{2}$. If one of its directrices is $x = -4$, then the equation of the normal to it at $\left(1, \frac{3}{2}\right)$ is:

1. $2y - x = 2$
2. $4x - 2y = 1$
3. $4x + 2y = 7$
4. $x + 2y = 4$

18. A hyperbola passes through the point $P(\sqrt{2}, \sqrt{3})$ and has foci at $(\pm 2, 0)$. Then the tangent to this hyperbola at $P$ also passes through the point:

1. $(3\sqrt{2}, 2\sqrt{3})$
2. $(2\sqrt{2}, 3\sqrt{3})$
3. $(\sqrt{3}, \sqrt{2})$
4. $(-\sqrt{2}, -\sqrt{3})$

19. The function $f : \mathbb{R} \to \left[-\frac{1}{2}, \frac{1}{2}\right]$ defined as $f(x) = \frac{x}{1 + x^2}$, is:

1. invertible.
2. injective but not surjective.
3. surjective but not injective.
4. neither injective nor surjective.
20. \( \lim_{x \to \frac{\pi}{2}} \frac{\cot x - \cos x}{(\pi - 2x)^3} \) equals:

1. \( \frac{1}{24} \)
2. \( \frac{1}{16} \)
3. \( \frac{1}{8} \)
4. \( \frac{1}{4} \)

21. Let \( \vec{a} = 2\hat{i} + \hat{j} - 2\hat{k} \) and \( \vec{b} = \hat{i} + \hat{j} \). Let \( \vec{c} \) be a vector such that \( |\vec{c} - \vec{a}| = 3 \), \( |(\vec{a} \times \vec{b}) \times \vec{c}| = 3 \) and the angle between \( \vec{c} \) and \( \vec{a} \times \vec{b} \) be 30°. Then \( \vec{a} \cdot \vec{c} \) is equal to:

1. \( \frac{25}{8} \)
2. 2
3. 5
4. \( \frac{1}{8} \)

20. \( \lim_{x \to \frac{\pi}{2}} \frac{\cot x - \cos x}{(\pi - 2x)^3} \) बराबर है:

1. \( \frac{1}{24} \)
2. \( \frac{1}{16} \)
3. \( \frac{1}{8} \)
4. \( \frac{1}{4} \)

21. \( \vec{a} = 2\hat{i} + \hat{j} - 2\hat{k} \) तथा \( \vec{b} = \hat{i} + \hat{j} \) है। \( \vec{c} \) एक ऐसा सदिश है कि \( |\vec{c} - \vec{a}| = 3 \), \( |(\vec{a} \times \vec{b}) \times \vec{c}| = 3 \) तथा \( \vec{c} \) और \( \vec{a} \times \vec{b} \) के बीच का कोण 30° है, तो \( \vec{a} \cdot \vec{c} \) बराबर है:

1. \( \frac{25}{8} \)
2. 2
3. 5
4. \( \frac{1}{8} \)
22. The normal to the curve 
\[ y(x-2)(x-3) = x + 6 \]
at the point where the curve intersects the y-axis passes through the point:

1. \( \left( -\frac{1}{2}, -\frac{1}{2} \right) \)
2. \( \left( \frac{1}{2}, \frac{1}{2} \right) \)
3. \( \left( \frac{1}{2}, -\frac{1}{3} \right) \)
4. \( \left( \frac{1}{2}, \frac{1}{3} \right) \)

23. If two different numbers are taken from the set \( \{0, 1, 2, 3, \ldots, 10\} \); then the probability that their sum as well as absolute difference are both multiple of 4, is:

1. \( \frac{6}{55} \)
2. \( \frac{12}{55} \)
3. \( \frac{14}{45} \)
4. \( \frac{7}{55} \)

22. वक्र \( y(x-2)(x-3) = x + 6 \) के उस बिंदु पर, जहाँ वक्र \( y \)-अक्ष को काटती है, खाँचा गया अभिलंब निम्न में से किस बिंदु से होकर जाता है?

1. \( \left( -\frac{1}{2}, -\frac{1}{2} \right) \)
2. \( \left( \frac{1}{2}, \frac{1}{2} \right) \)
3. \( \left( \frac{1}{2}, -\frac{1}{3} \right) \)
4. \( \left( \frac{1}{2}, \frac{1}{3} \right) \)

23. यदि समुच्चय \( \{0, 1, 2, 3, \ldots, 10\} \) में से दो विभिन्न संख्याएँ निकाली गईं, तो उनके योगफल तथा उनके अंतर के निरपेक्ष मान, दोनों के चार के गुणक होने की प्रायिकता है:

1. \( \frac{6}{55} \)
2. \( \frac{12}{55} \)
3. \( \frac{14}{45} \)
4. \( \frac{7}{55} \)
24. A man X has 7 friends, 4 of them are ladies and 3 are men. His wife Y also has 7 friends, 3 of them are ladies and 4 are men. Assume X and Y have no common friends. Then the total number of ways in which X and Y together can throw a party inviting 3 ladies and 3 men, so that 3 friends of each of X and Y are in this party, is:

(1) 485
(2) 468
(3) 469
(4) 484

25. The value of
\[ \binom{21}{1} - \binom{10}{1} \] + 
\[ \binom{21}{2} - \binom{10}{2} \] + 
\[ \binom{21}{3} - \binom{10}{3} \] + 
\[ \binom{21}{4} - \binom{10}{4} \] + ...... + 
\[ \binom{21}{10} - \binom{10}{10} \] is:

(1) \(2^{21} - 2^{11}\)
(2) \(2^{21} - 2^{10}\)
(3) \(2^{20} - 2^9\)
(4) \(2^{20} - 2^{10}\)
26. A box contains 15 green and 10 yellow balls. If 10 balls are randomly drawn, one-by-one, with replacement, then the variance of the number of green balls drawn is:

(1) \( \frac{12}{5} \)
(2) 6
(3) 4
(4) \( \frac{6}{25} \)

27. Let \( a, b, c \in \mathbb{R} \). If \( f(x) = ax^2 + bx + c \) is such that \( a + b + c = 3 \) and

\[ f(x+y) = f(x) + f(y) + xy, \quad \forall \ x, y \in \mathbb{R}, \]

then \( \sum_{n=1}^{10} f(n) \) is equal to:

(1) 330
(2) 165
(3) 190
(4) 255

28. The radius of a circle, having minimum area, which touches the curve \( y = 4 - x^2 \) and the lines, \( y = \frac{4}{x^2} \) is:

(1) \( 2(\sqrt{2} + 1) \)
(2) \( 2(\sqrt{2} - 1) \)
(3) \( 4(\sqrt{2} - 1) \)
(4) \( 4(\sqrt{2} + 1) \)
29. If, for a positive integer \( n \), the quadratic equation,
\[
x(x + 1) + (x + 1)(x + 2) + \ldots + (x + n - 1)(x + n) = 10n
\]
has two consecutive integral solutions, then \( n \) is equal to:

- (1) 12
- (2) 9
- (3) 10
- (4) 11

30. The integral \( \int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \frac{dx}{1 + \cos x} \) is equal to:

- (1) \(-2\)
- (2) 2
- (3) 4
- (4) \(-1\)
PART B – PHYSICS

ALL THE GRAPHS/DIAGRAMS GIVEN ARE SCHEMATIC AND NOT DRAWN TO SCALE.

31. A radioactive nucleus A with a half life $T$, decays into a nucleus B. At $t=0$, there is no nucleus B. At sometime $t$, the ratio of the number of B to that of A is 0.3. Then, $t$ is given by:

1. $t = \frac{T}{\log (1.3)}$
2. $t = \frac{T}{2} \log \frac{2}{\log 1.3}$
3. $t = T \log \frac{1.3}{\log 2}$
4. $t = T \log (1.3)$

32. The following observations were taken for determining surface tension $T$ of water by capillary method:
- diameter of capillary, $D = 1.25 \times 10^{-2}$ m
- rise of water, $h = 1.45 \times 10^{-2}$ m.

Using $g = 9.80$ m/s$^2$ and the simplified relation $T = \frac{rhg}{2} \times 10^3$ N/m, the possible error in surface tension is closest to:

1. 10%
2. 0.15%
3. 1.5%
4. 2.4%
33. An electron beam is accelerated by a potential difference $V$ to hit a metallic target to produce X-rays. It produces continuous as well as characteristic X-rays. If $\lambda_{\text{min}}$ is the smallest possible wavelength of X-ray in the spectrum, the variation of $\log \lambda_{\text{min}}$ with $\log V$ is correctly represented in:

(1) $\log \lambda_{\text{min}}$ vs $\log V$

(2) $\log \lambda_{\text{min}}$ vs $\log V$

(3) $\log \lambda_{\text{min}}$ vs $\log V$

(4) $\log \lambda_{\text{min}}$ vs $\log V$
34. The moment of inertia of a uniform cylinder of length $l$ and radius $R$ about its perpendicular bisector is $I$. What is the ratio $l/R$ such that the moment of inertia is minimum?

\[
\begin{align*}
(1) & \quad \frac{3}{\sqrt{2}} \\
(2) & \quad \frac{\sqrt{3}}{\sqrt{2}} \\
(3) & \quad \frac{\sqrt{3}}{2} \\
(4) & \quad 1
\end{align*}
\]

35. A slender uniform rod of mass $M$ and length $l$ is pivoted at one end so that it can rotate in a vertical plane (see figure). There is negligible friction at the pivot. The free end is held vertically above the pivot and then released. The angular acceleration of the rod when it makes an angle $\theta$ with the vertical is:

\[
\begin{align*}
(1) & \quad \frac{2g}{3l} \cos \theta \\
(2) & \quad \frac{3g}{2l} \sin \theta \\
(3) & \quad \frac{2g}{3l} \sin \theta \\
(4) & \quad \frac{3g}{2l} \cos \theta
\end{align*}
\]
36. \( C_p \) and \( C_v \) are specific heats at constant pressure and constant volume respectively. It is observed that
\[
C_p - C_v = a \quad \text{for hydrogen gas}
\]
\[
C_p - C_v = b \quad \text{for nitrogen gas}
\]
The correct relation between \( a \) and \( b \) is:
(1) \( a = 28b \)
(2) \( a = \frac{1}{14}b \)
(3) \( a = b \)
(4) \( a = 14b \)

37. A copper ball of mass 100 gm is at a temperature \( T \). It is dropped in a copper calorimeter of mass 100 gm, filled with 170 gm of water at room temperature. Subsequently, the temperature of the system is found to be 75°C. \( T \) is given by:
(Given: room temperature = 30°C, specific heat of copper = 0.1 cal/gm°C)
(1) 825°C
(2) 800°C
(3) 885°C
(4) 1250°C

38. In amplitude modulation, sinusoidal carrier frequency used is denoted by \( \omega_c \) and the signal frequency is denoted by \( \omega_m \). The bandwidth (\( \Delta \omega_m \)) of the signal is such that \( \Delta \omega_m << \omega_c \). Which of the following frequencies is not contained in the modulated wave?
(1) \( \omega_c - \omega_m \)
(2) \( \omega_m \)
(3) \( \omega_c \)
(4) \( \omega_m + \omega_c \)
39. The temperature of an open room of volume $30 \text{ m}^3$ increases from $17^\circ \text{C}$ to $27^\circ \text{C}$ due to the sunshine. The atmospheric pressure in the room remains $1 \times 10^5 \text{ Pa}$. If $n_i$ and $n_f$ are the number of molecules in the room before and after heating, then $n_f - n_i$ will be:

(1) $-2.5 \times 10^{25}$

(2) $-1.61 \times 10^{23}$

(3) $1.38 \times 10^{23}$

(4) $2.5 \times 10^{25}$

40. In a Young’s double slit experiment, slits are separated by $0.5 \text{ mm}$, and the screen is placed $150 \text{ cm}$ away. A beam of light consisting of two wavelengths, $650 \text{ nm}$ and $520 \text{ nm}$, is used to obtain interference fringes on the screen. The least distance from the common central maximum to the point where the bright fringes due to both the wavelengths coincide is:

(1) $15.6 \text{ mm}$

(2) $1.56 \text{ mm}$

(3) $7.8 \text{ mm}$

(4) $9.75 \text{ mm}$
41. A particle A of mass m and initial velocity \( v \) collides with a particle B of mass \( \frac{m}{2} \) which is at rest. The collision is head on, and elastic. The ratio of the de-Broglie wavelengths \( \lambda_A \) to \( \lambda_B \) after the collision is:

\[
\frac{\lambda_A}{\lambda_B} = \frac{1}{2} \\
\frac{\lambda_A}{\lambda_B} = \frac{1}{3} \\
\frac{\lambda_A}{\lambda_B} = 2 \\
\frac{\lambda_A}{\lambda_B} = \frac{2}{3}
\]

42. A magnetic needle of magnetic moment \( 6.7 \times 10^{-2} \) Am\(^2\) and moment of inertia \( 7.5 \times 10^{-6} \) kg m\(^2\) is performing simple harmonic oscillations in a magnetic field of 0.01 T. Time taken for 10 complete oscillations is:

\[
(1) \quad 8.76 \text{ s} \\
(2) \quad 6.65 \text{ s} \\
(3) \quad 8.89 \text{ s} \\
(4) \quad 6.98 \text{ s}
\]
43. An electric dipole has a fixed dipole moment \( \vec{p} \), which makes angle \( \theta \) with respect to \( x \)-axis. When subjected to an electric field \( \vec{E}_1 = E \hat{i} \), it experiences a torque \( \vec{T}_1 = \tau \hat{k} \). When subjected to another electric field \( \vec{E}_2 = \sqrt{3} E \hat{j} \) it experiences a torque \( \vec{T}_2 = -\vec{T}_1 \). The angle \( \theta \) is:

(1) 90°
(2) 30°
(3) 45°
(4) 60°

44. In a coil of resistance 100 \( \Omega \), a current is induced by changing the magnetic flux through it as shown in the figure. The magnitude of change in flux through the coil is:

(1) 275 Wb
(2) 200 Wb
(3) 225 Wb
(4) 250 Wb
45. A time dependent force $F = 6t$ acts on a particle of mass 1 kg. If the particle starts from rest, the work done by the force during the first 1 sec. will be:

(1) 18 J
(2) 4.5 J
(3) 22 J
(4) 9 J

46. Some energy levels of a molecule are shown in the figure. The ratio of the wavelengths $r = \lambda_1 / \lambda_2$, is given by:

\[ r = \frac{1}{3} \] (1)
\[ r = \frac{4}{3} \] (2)
\[ r = \frac{2}{3} \] (3)
\[ r = \frac{3}{4} \] (4)

45. 1 kg द्वितीय तर एक कण, एक समय पर निर्भर (time dependent) बल $F = 6t$ का अनुभव करता है। यदि कण विरामावस्था से चलता है तो पहले 1 s में बल द्वारा किया गया कार्य रहोगा:

(1) 18 J
(2) 4.5 J
(3) 22 J
(4) 9 J

46. एक अणु के कुछ ऊर्जा स्तरों को चित्र में दिखाया गया है। तरंगदैर्घ्यों के अनुपात $r = \lambda_1 / \lambda_2$ का मान रहोगा:

\[ r = \frac{1}{3} \] (1)
\[ r = \frac{4}{3} \] (2)
\[ r = \frac{2}{3} \] (3)
\[ r = \frac{3}{4} \] (4)
In the above circuit the current in each resistance is:

(1) 0 A
(2) 1 A
(3) 0.25 A
(4) 0.5 A

A body is thrown vertically upwards. Which one of the following graphs correctly represent the velocity vs time?

(1) 
(2) 
(3) 
(4)
49. A capacitance of 2 \( \mu F \) is required in an electrical circuit across a potential difference of 1.0 kV. A large number of 1 \( \mu F \) capacitors are available which can withstand a potential difference of not more than 300 V.

The minimum number of capacitors required to achieve this is:

(1) 32  
(2) 2  
(3) 16  
(4) 24

50. In the given circuit diagram when the current reaches steady state in the circuit, the charge on the capacitor of capacitance \( C \) will be:

![Circuit Diagram]

(1) \( \frac{CE}{r_1 + r} \)  
(2) \( CE \)  
(3) \( \frac{CE}{r_2 + r} \)  
(4) \( \frac{CE}{r + r_2} \)

51. In a common emitter amplifier circuit using an n-p-n transistor, the phase difference between the input and the output voltages will be:

(1) 180°  
(2) 45°  
(3) 90°  
(4) 135°

51. एक सिद्धांत परिपत्त में एक 2 \( \mu F \) भारिता के संधारित को 1.0 kV विभवान्त के बिन्दुओं के बीच लगाना है। 1 \( \mu F \) भारिता के बहुत सारे संधारित जो कि 300 V विभवान्त तक बाहन कर सकते हैं, उपलब्ध हैं।

उपरोक्त परिपत्त को प्राप्त करने के लिये न्यूनतम कितने संधारितों की आवश्यकता होगी?

(1) 32  
(2) 2  
(3) 16  
(4) 24

50. दिये गये परिपत्त में जब धारा स्थिरावस्था में पहुँच जाती है तो भारिता C के संधारित पर आवश्यक का मान होगा:

![Circuit Diagram]

(1) \( \frac{CE}{r_1 + r} \)  
(2) \( CE \)  
(3) \( \frac{CE}{r_2 + r} \)  
(4) \( \frac{CE}{r + r_2} \)

51. n-p-n ट्रांजिस्टर से बनाये हुए एक उभयनिष्ठ उत्सर्जक प्रवर्धक परिपत्त में निवेशित तथा निर्गत विभवों के बीच कलांतर का मान होगा:

(1) 180°  
(2) 45°  
(3) 90°  
(4) 135°
52. Which of the following statements is **false**?

(1) Kirchhoff’s second law represents energy conservation.

(2) Wheatstone bridge is the most sensitive when all the four resistances are of the same order of magnitude.

(3) In a balanced wheatstone bridge if the cell and the galvanometer are exchanged, the null point is disturbed.

(4) A rheostat can be used as a potential divider.

53. A particle is executing simple harmonic motion with a time period T. At time \( t = 0 \), it is at its position of equilibrium. The kinetic energy - time graph of the particle will look like:

(1) ![Graph 1](image1.png)

(2) ![Graph 2](image2.png)

(3) ![Graph 3](image3.png)

(4) ![Graph 4](image4.png)
54. An observer is moving with half the speed of light towards a stationary microwave source emitting waves at frequency 10 GHz. What is the frequency of the microwave measured by the observer?

\[ \text{speed of light} = 3 \times 10^8 \text{ ms}^{-1} \]

(1) 15.3 GHz
(2) 10.1 GHz
(3) 12.1 GHz
(4) 17.3 GHz

55. A man grows into a giant such that his linear dimensions increase by a factor of 9. Assuming that his density remains same, the stress in the leg will change by a factor of:

\[ \frac{1}{81} \]

(1) \( \frac{1}{81} \)
(2) 9
(3) \( \frac{1}{9} \)
(4) 81

56. When a current of 5 mA is passed through a galvanometer having a coil of resistance 15 Ω, it shows full scale deflection. The value of the resistance to be put in series with the galvanometer to convert it into a voltmeter of range 0 – 10 V is:

\[ 4.005 \times 10^3 \text{ Ω} \]

(1) \( 4.005 \times 10^3 \text{ Ω} \)
(2) \( 1.985 \times 10^3 \text{ Ω} \)
(3) \( 2.045 \times 10^3 \text{ Ω} \)
(4) \( 2.535 \times 10^3 \text{ Ω} \)
57. The variation of acceleration due to gravity \( g \) with distance \( d \) from centre of the earth is best represented by (\( R = \) Earth’s radius):

(1) \[
g \sim \frac{1}{d}
\]

(2) \[
g \sim \frac{1}{d^2}
\]

(3) \[
g \sim \frac{1}{d^3}
\]

(4) \[
g \sim \frac{1}{d^4}
\]

58. An external pressure \( P \) is applied on a cube at 0°C so that it is equally compressed from all sides. \( K \) is the bulk modulus of the material of the cube and \( \alpha \) is its coefficient of linear expansion. Suppose we want to bring the cube to its original size by heating. The temperature should be raised by:

(1) \[
3PK\alpha
\]

(2) \[
\frac{P}{3\alpha K}
\]

(3) \[
\frac{P}{\alpha K}
\]

(4) \[
\frac{3\alpha}{PK}
\]
59. A diverging lens with magnitude of focal length 25 cm is placed at a distance of 15 cm from a converging lens of magnitude of focal length 20 cm. A beam of parallel light falls on the diverging lens. The final image formed is:

(1) real and at a distance of 6 cm from the convergent lens.
(2) real and at a distance of 40 cm from convergent lens.
(3) virtual and at a distance of 40 cm from convergent lens.
(4) real and at a distance of 40 cm from the divergent lens.

60. A body of mass \( m = 10^{-2} \text{ kg} \) is moving in a medium and experiences a frictional force \( F = -kv^2 \). Its initial speed is \( v_0 = 10 \text{ ms}^{-1} \). If, after 10 s, its energy is \( \frac{1}{8}mv_0^2 \), the value of \( k \) will be:

(1) \( 10^{-1} \text{ kg m}^{-1} \text{s}^{-1} \)
(2) \( 10^{-3} \text{ kg m}^{-1} \)
(3) \( 10^{-3} \text{ kg s}^{-1} \)
(4) \( 10^{-4} \text{ kg m}^{-1} \)
PART C – CHEMISTRY

61. 1 gram of a carbonate (M₂CO₃) on treatment with excess HCl produces 0.01186 mole of CO₂. The molar mass of M₂CO₃ in g mol⁻¹ is:
   (1) 84.3
   (2) 118.6
   (3) 11.86
   (4) 1186

62. Given
   \[ \text{C(graphite)} + \text{O}_2(g) \rightarrow \text{CO}_2(g) ; \]
   \[ \Delta_r H^\circ = -393.5 \text{ kJ mol}^{-1} \]
   \[ \text{H}_2(g) + \frac{1}{2} \text{O}_2(g) \rightarrow \text{H}_2\text{O}(l) ; \]
   \[ \Delta_r H^\circ = -285.8 \text{ kJ mol}^{-1} \]
   \[ \text{CO}_2(g) + 2\text{H}_2\text{O}(l) \rightarrow \text{CH}_4(g) + 2\text{O}_2(g) ; \]
   \[ \Delta_r H^\circ = +890.3 \text{ kJ mol}^{-1} \]
   Based on the above thermochemical equations, the value of \( \Delta_r H^\circ \) at 298 K for the reaction
   \[ \text{C(graphite)} + 2\text{H}_2(g) \rightarrow \text{CH}_4(g) \]
   will be:
   (1) +144.0 kJ mol⁻¹
   (2) −74.8 kJ mol⁻¹
   (3) −144.0 kJ mol⁻¹
   (4) +74.8 kJ mol⁻¹

63. The freezing point of benzene decreases by 0.45°C when 0.2 g of acetic acid is added to 20 g of benzene. If acetic acid associates to form a dimer in benzene, percentage association of acetic acid in benzene will be:
   \( K_f \) for benzene = 5.12 K kg mol⁻¹
   (1) 80.4%
   (2) 74.6%
   (3) 94.6%
   (4) 64.6%
64. The most abundant elements by mass in the body of a healthy human adult are: Oxygen (61.4%); Carbon (22.9%); Hydrogen (10.0%); and Nitrogen (2.6%). The weight which a 75 kg person would gain if all $^1$H atoms are replaced by $^2$H atoms is:
   (1) 37.5 kg  
   (2) 7.5 kg  
   (3) 10 kg  
   (4) 15 kg

65. $\Delta U$ is equal to:
   (1) Isobaric work  
   (2) Adiabatic work  
   (3) Isothermal work  
   (4) Isochoric work

66. The formation of which of the following polymers involves hydrolysis reaction?
   (1) Bakelite  
   (2) Nylon 6, 6  
   (3) Terylene  
   (4) Nylon 6

67. Given
   \[ E_{\text{Cl}_2/\text{Cl}^-}^o = 1.36 \text{ V}, \quad E_{\text{Cr}^{3+}/\text{Cr}}^o = -0.74 \text{ V} \]
   \[ E_{\text{FeCr}_2O_7/\text{Cr}^{3+}}^o = 1.33 \text{ V}, \quad E_{\text{MnO}_4^-/\text{Mn}^{2+}}^o = 1.51 \text{ V} \]
   Among the following, the strongest reducing agent is:
   (1) Mn$^{2+}$  
   (2) Cr$^{3+}$  
   (3) Cl$^-$  
   (4) Cr

64. एक स्वस्थ मनुष्य के शरीर में मात्रा की दृष्टि से बहुतायत से मिलने वाले तत्व हैं: ऑक्सीजन (61.4%); कार्बन (22.9%); हाइड्रोजन (10.0%); तथा नाइट्रोजन (2.6%). 75 kg वजन वाले एक व्यक्ति के शरीर से सभी $^1$H परमाणुओं को $^2$H परमाणुओं से बदल दिया जाय तो उसके भर में जो वृद्धि होगी, वह है:
   (1) 37.5 kg  
   (2) 7.5 kg  
   (3) 10 kg  
   (4) 15 kg

65. $\Delta U$ जिसके बराबर है, वह है:
   (1) समदायी कार्य  
   (2) स्त्रोपथ कार्य  
   (3) समतापी कार्य  
   (4) सम-आयतनिक कार्य

66. निम्न बहुलकों में से कौन से बहुलक में जल अपघटन अभिक्रिया सन्निहित है?
   (1) बेकेलाइट  
   (2) नाइट्रोन 6, 6  
   (3) टेरीलिन  
   (4) नाइट्रोन 6

67. दिया गया है,
   \[ E_{\text{Cl}_2/\text{Cl}^-}^o = 1.36 \text{ V}, \quad E_{\text{Cr}^{3+}/\text{Cr}}^o = -0.74 \text{ V} \]
   \[ E_{\text{FeCr}_2O_7/\text{Cr}^{3+}}^o = 1.33 \text{ V}, \quad E_{\text{MnO}_4^-/\text{Mn}^{2+}}^o = 1.51 \text{ V} \]
   निम्न में से प्रबलतम अपचायक है:
   (1) Mn$^{2+}$  
   (2) Cr$^{3+}$  
   (3) Cl$^-$  
   (4) Cr
68. The Tyndall effect is observed only when following conditions are satisfied:

(a) The diameter of the dispersed particles is much smaller than the wavelength of the light used.

(b) The diameter of the dispersed particle is not much smaller than the wavelength of the light used.

(c) The refractive indices of the dispersed phase and dispersion medium are almost similar in magnitude.

(d) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude.

(1) (b) and (d)
(2) (a) and (c)
(3) (b) and (c)
(4) (a) and (d)

69. In the following reactions, ZnO is respectively acting as a/an:

(a) ZnO + Na₂O → Na₂ZnO₂
(b) ZnO + CO₂ → ZnCO₃

(1) base and base
(2) acid and acid
(3) acid and base
(4) base and acid

68. टिन्डल प्रभाव तभी दिखायी पड़ेगा जब निम्न शर्तें संतुलन होती हैं:

(a) परिक्षेपित कणों का व्यास, प्रयुक्त प्रकाश के 
    तरंगदैर्घ्य की तुलना में बहुत कम हो।

(b) परिक्षेपित कणों का व्यास, प्रयुक्त प्रकाश के 
    तरंगदैर्घ्य की तुलना में बहुत कम नहीं हो।

(c) परिक्षेपित प्राक्का तथा परिक्षेपण माध्यम के 
    अपवर्तनांक परिमाण लगभग एक जैसे हों।

(d) परिक्षेपित प्राक्का तथा परिक्षेपण माध्यम के 
    अपवर्तनांक परिमाण बहुत भिन्न हों।

(1) (b) तथा (d)
(2) (a) तथा (c)
(3) (b) तथा (c)
(4) (a) तथा (d)
70. Which of the following compounds will behave as a reducing sugar in an aqueous KOH solution?

(1) HOH₂C
(2) HOH₂C
(3) HOH₂C
(4) HOH₂C

71. The major product obtained in the following reaction is:

\[ \text{Br} \quad \begin{array}{c} \text{H} \\ \text{C₆H₅} \end{array} \xrightarrow{^t\text{BuOK}} \Delta \text{C₆H₅} \]

(1) C₆H₅CH = CHC₆H₅
(2) (+)C₆H₅CH(O'Bu)CH₂C₆H₅
(3) (−)C₆H₅CH(O'Bu)CH₂C₆H₅
(4) (±)C₆H₅CH(O'Bu)CH₂C₆H₅
72. Which of the following species is not paramagnetic?
(1) CO
(2) O₂
(3) B₂
(4) NO

73. On treatment of 100 mL of 0.1 M solution of CoCl₃.6H₂O with excess AgNO₃; 1.2 × 10²² ions are precipitated. The complex is:
(1) [Co(H₂O)₃Cl₃].3H₂O
(2) [Co(H₂O)₆]Cl₃
(3) [Co(H₂O)₅Cl]Cl₂.H₂O
(4) [Co(H₂O)₄Cl₂]Cl₂H₂O

74. pKₐ of a weak acid (HA) and pKₐ of a weak base (BOH) are 3.2 and 3.4, respectively. The pH of their salt (AB) solution is:
(1) 6.9
(2) 7.0
(3) 1.0
(4) 7.2

75. The increasing order of the reactivity of the following halides for the S_N₁ reaction is:
\[ \text{CH₃CH₂CH₂Cl} \quad \text{CH₃CH₂CH₂Cl} \quad \text{p-H₃CO-C₆H₄-CH₂Cl} \]
(I) (II) (III)
(1) (II) < (I) < (III)
(2) (I) < (III) < (II)
(3) (II) < (III) < (I)
(4) (III) < (II) < (I)

73. निम्न में से कौन सी स्पीशिज़ अनुचारकीय नहीं है?
(1) CO
(2) O₂
(3) B₂
(4) NO

73. CoCl₃.6H₂O के 0.1 M विलयन के 100 mL को AgNO₃ के आधिक्य में अभिक्रूत करने पर 1.2×10²² आयन अवशेषित होते हैं। संकुल हैः :
(1) [Co(H₂O)₃Cl₃].3H₂O
(2) [Co(H₂O)₆]Cl₃
(3) [Co(H₂O)₅Cl]Cl₂.H₂O
(4) [Co(H₂O)₄Cl₂]Cl₂H₂O

74. एक उर्वरक अम्ल (HA) का pKₐ तथा एक उर्वरक श्वारक (BOH) का pKₐ क्रमशः 3.2 तथा 3.4 है। उनके लब्ध (AB) के विलयन का pH होगा :
(1) 6.9
(2) 7.0
(3) 1.0
(4) 7.2

75. S_N₁ अभिक्रिया के लिए निम्न हैलाइडों की अभिक्रियात्मकता का बढ़ता क्रम हैः:
\[ \text{CH₃CH₂CH₂CH₃} \quad \text{CH₃CH₂CH₂Cl} \quad \text{p-H₃CO-C₆H₄-CH₂Cl} \]
(I) (II) (III)
(1) (II) < (I) < (III)
(2) (I) < (III) < (II)
(3) (II) < (III) < (I)
(4) (III) < (II) < (I)
76. Both lithium and magnesium display several similar properties due to the diagonal relationship; however, the one which is incorrect, is:
(1) both form soluble bicarbonates
(2) both form nitrides
(3) nitrates of both Li and Mg yield NO₂ and O₂ on heating
(4) both form basic carbonates

77. The correct sequence of reagents for the following conversion will be:

![Chemical Diagram]

(1) \(\text{CH}_3\text{MgBr}, \ H^+/\text{CH}_3\text{OH}, \ [\text{Ag(NH}_3\text{)}_2]^+\text{OH}^-\)
(2) \(\text{CH}_3\text{MgBr}, \ [\text{Ag(NH}_3\text{)}_2]^+\text{OH}^-, \ H^+/\text{CH}_3\text{OH}\)
(3) \([\text{Ag(NH}_3\text{)}_2]^+\text{OH}^-, \ \text{CH}_3\text{MgBr}, \ H^+/\text{CH}_3\text{OH}\)
(4) \([\text{Ag(NH}_3\text{)}_2]^+\text{OH}^-, \ H^+/\text{CH}_3\text{OH}, \ \text{CH}_3\text{MgBr}\)

78. The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are:
(1) \(\text{ClO}_2^-\) and \(\text{ClO}_3^-\)
(2) \(\text{Cl}^-\) and \(\text{ClO}^-\)
(3) \(\text{Cl}^-\) and \(\text{ClO}_2^-\)
(4) \(\text{ClO}^-\) and \(\text{ClO}_3^-\)
79. Which of the following compounds will form significant amount of meta product during mono-nitration reaction?

- (1) 
- (2) 
- (3) 
- (4) 

80. 3-Methyl-pent-2-ene on reaction with HBr in presence of peroxide forms an addition product. The number of possible stereoisomers for the product is:

- (1) Zero
- (2) Two
- (3) Four
- (4) Six

81. Two reactions $R_1$ and $R_2$ have identical pre-exponential factors. Activation energy of $R_1$ exceeds that of $R_2$ by 10 kJ mol$^{-1}$. If $k_1$ and $k_2$ are rate constants for reactions $R_1$ and $R_2$ respectively at 300 K, then $\ln(k_2/k_1)$ is equal to:

$$R = 8.314 \text{ J mol}^{-1}\text{K}^{-1}$$

- (1) 12
- (2) 6
- (3) 4
- (4) 8
82. Which of the following molecules is least resonance stabilized?

(1) ![Image 1](_attachment)
(2) ![Image 2](_attachment)
(3) ![Image 3](_attachment)
(4) ![Image 4](_attachment)

83. The group having isoelectronic species is:

(1) $O^-, F^-, Na, Mg^+$
(2) $O^2-, F^-, Na, Mg^{2+}$
(3) $O^-, F^-, Na^+, Mg^{2+}$
(4) $O^2-, F^-, Na^+, Mg^{2+}$

84. The radius of the second Bohr orbit for hydrogen atom is:

(Planck's Const. $h = 6.6262 \times 10^{-34}$ Js; mass of electron $= 9.1091 \times 10^{-31}$ kg; charge of electron $e = 1.60210 \times 10^{-19}$ C; permittivity of vacuum $\epsilon_0 = 8.854185 \times 10^{-12}$ kg$^{-1}$m$^{-3}$A$^2$)

(1) 4.76 Å
(2) 0.529 Å
(3) 2.12 Å
(4) 1.65 Å
85. The major product obtained in the following reaction is:

86. Which of the following reactions is an example of a redox reaction?

(1) XeF₂ + PF₅ → [XeF]⁺ PF₆⁻
(2) XeF₆ + H₂O → XeOF₄ + 2HF
(3) XeF₆ + 2H₂O → XeO₂F₂ + 4HF
(4) XeF₄ + O₂F₂ → XeF₆ + O₂
87. A metal crystallises in a face centred cubic structure. If the edge length of its unit cell is ‘a’, the closest approach between two atoms in metallic crystal will be:

1. \(2\sqrt{2} a\)
2. \(\sqrt{2} a\)
3. \(\frac{a}{\sqrt{2}}\)
4. \(2a\)

88. Sodium salt of an organic acid ‘X’ produces effervescence with conc. \(\text{H}_2\text{SO}_4\). ‘X’ reacts with the acidified aqueous \(\text{CaCl}_2\) solution to give a white precipitate which decolourises acidic solution of \(\text{KMnO}_4\).

‘X’ is:

1. \(\text{HCOONa}\)
2. \(\text{CH}_3\text{COONa}\)
3. \(\text{Na}_2\text{C}_2\text{O}_4\)
4. \(\text{C}_6\text{H}_5\text{COONa}\)

89. A water sample has ppm level concentration of following anions:
\[\text{F}^- = 10; \quad \text{SO}_4^{2-} = 100; \quad \text{NO}_3^- = 50\]

The anion/anions that make/makes the water sample unsuitable for drinking is/are:

1. both \(\text{SO}_4^{2-}\) and \(\text{NO}_3^-\)
2. only \(\text{F}^-\)
3. only \(\text{SO}_4^{2-}\)
4. only \(\text{NO}_3^-\)
90. Which of the following, upon treatment with tert-BuONa followed by addition of bromine water, fails to decolourize the colour of bromine?

(1) \[\text{Ph} - 
\]

(2) \[\text{Ph} - \text{O} - 
\]

(3) \[\text{CH}_2\text{CH}_2\text{CH}_2\text{Br} - 
\]

(4) \[\text{CH}_2\text{CH}_2\text{CH}_2\text{Br} - 
\]

90. निम्न में से कौन, tert-BuONa के साथ अभिक्रिया करने तथा ब्रोमीन जल के मिलने पर, ब्रोमीन के रंग को रंगाहीन करने में असमर्थ होता है?

(1) \[\text{Ph} - 
\]

(2) \[\text{Ph} - \text{O} - 
\]

(3) \[\text{CH}_2\text{CH}_2\text{CH}_2\text{Br} - 
\]

(4) \[\text{CH}_2\text{CH}_2\text{CH}_2\text{Br} - 
\]
### Read the following instructions carefully:

1. The candidates should fill in the required particulars on the Test Booklet and Answer Sheet (Side-1) with Black Ball Point Pen.
2. For writing/marking particulars on Side-2 of the Answer Sheet, use Black Ball Point Pen only.
3. The candidates should not write their Roll Numbers anywhere else (except in the specified space) on the Test Booklet/Answer Sheet.
4. Out of the four options given for each question, only one option is the correct answer.
5. For each incorrect response, ¼ (one-fourth) marks of the total marks allotted to the question (i.e. 1 mark) will be deducted from the total score. No deduction from the total score, however, will be made if no response is indicated for an item in the Answer Sheet.
6. Handle the Test Booklet and Answer Sheet with care, as under no circumstances (except for discrepancy in Test Booklet Code and Answer Sheet Code), another set will be provided.
7. The candidates are not allowed to do any rough work or writing work on the Answer Sheet. All calculations/writing work are to be done in the space provided for this purpose in the Test Booklet itself, marked ‘Space for Rough Work’. This space is given at the bottom of each page and in four pages (Page 40-43) at the end of the booklet.
8. On completion of the test, the candidates must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. **However, the candidates are allowed to take away this Test Booklet with them.**
9. Each candidate must show on demand his/her Admit Card to the Invigilator.
10. No candidate, without special permission of the Superintendent or Invigilator, should leave his/her seat.
11. The candidates should not leave the Examination Hall without handing over their Test Sheet to the Invigilator on duty and sign the Attendance Sheet again. Cases where a candidate has not signed the Attendance Sheet second time will be deemed not to have handed over the Answer Sheet and dealt with as an unfair means case. The candidates are also required to put their left hand THUMB impression in the space provided in the Attendance Sheet.
12. Use of Electronic/Manual Calculator and any Electronic device like mobile phone, pager etc. is prohibited.
13. The candidates are governed by all Rules and Regulations of the Examination body with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Examination body.
14. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
15. Candidates are not allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, electronic device or any other material except the Admit Card inside the examination room/hall.

### निम्नलिखित निर्देश ध्यान से पढ़ें:

1. अभ्यासियों की परीक्षा पुस्तिका और उत्तर पत (पुस्तिका को पाने वाले) पर वाचित विवरण कार्य करें, जिसे वाले विचार बनाने से हो भरा हो।
2. उत्तर पत के पुस्तिका पर विवरण लिखने/अंकित करने के लिए, केवल कार्य वाले विचार बनाने से हो भरा हो।
3. परीक्षा पुस्तिका/उत्तर पत पर निर्धारित ध्यान के अलावा अभ्यासी अपनी आनंदमयता को अक्सर नहीं दिखाएँ।
4. प्रश्न के लिए दिए गए चार विकल्पों में से केवल एक विकल्प सही है।
5. प्रश्न के अंक तक लगे जिले के लिए निर्धारित कुल अंकों में से ¼ (एक-चौथाई) भाग (अथवा 1 अंक) कुल प्रश्न में से काट लाना आवश्यक है। यदि उत्तर पत में किसी प्रश्न का कोई उत्तर ना ही मिला जाए, तो कुल प्रश्न में से कोई अंक नहीं काटे जाएँ।
6. परीक्षा पुस्तिका और उत्तर पत का ध्यानपूर्वक प्रश्नों को कृतिक तरीके से पीर परिणाम में भिन्नता की स्थिति को कोटाकर (कोटाकर), दूसरी परीक्षा पुस्तिका अपनी उत्तर नहीं हासिल करेंगे।
7. उत्तर पत पर कोई भी रोचक बांटा या लिखा का काम करने को अनुमति नहीं है। सबसे गणणा एवं लिखा का काम, परीक्षा पुस्तिका में निर्धारित घोष जो कि ‘रोचक काम’ के लिए जारी है। परीक्षा सरकार के संकेत में भिन्नता की स्थिति को कोटाकर (कोटाकर), दूसरी परीक्षा पुस्तिका अपनी उत्तर नहीं हासिल करेंगे।
8. परीक्षा पूरा होने पर, अभ्यासी की कई हो सकती है। परीक्षा का अवयव सूत्र हैं। अभ्यासी अपने साथ इस परीक्षा पुस्तिका को ले जा सकते हैं।
9. माने जाने पर प्रश्नों को निर्दिष्ट विषय को अपना उपयोग करें।
10. अभ्यासी या निरीक्षक की विशेष अनुमति के बिना कोई अभ्यासी अपनी ध्यान न छोड़ें।
11. कार्यत निरीक्षक को अपना उत्तर पत्र दिखाने वाले उपस्थित तक पर दुराअवलाला विषय विवरण को पाने वाले को आनंदमयता की अनुमति नहीं दी जाएँ। यदि किसी अभ्यासी ने दूसरी कार्य करने के लिए दिखाने वाले उपस्थित तक पर दुराअवलाला विषय विवरण को पाने वाले को आनंदमयता की अनुमति नहीं दी जाएँ तो वह परीक्षा करने के लिए दिखाने वाले उपस्थित तक विवरण को पाने वाले अभ्यासी अपने ध्यान के अंतर्गत का विषय उपयोग करें।
12. इलेक्ट्रॉनिक/हस्ताक्षरित परिक्षा एवं मोबाइल फोन, फ्लैश डिस्क जैसे किसी इलेक्ट्रॉनिक उपकरण का प्रयोग विर्तमान है।
13. साभार कार्य के लिए अभ्यासी परीक्षा निकाय के सभी निर्णयों एवं विनियमों द्वारा निरंतर होने। अनुपस्थित साभार कार्य के सभी मामलों के लिए परीक्षा निकाय के निर्णयों एवं विनियमों के अनुरूप होने।
14. किसी भी तरीके से परीक्षा पुस्तिका तथा उत्तर पत्र का कोई भी भारत अंतर्गत विनियम नहीं किया जाएँ।
15. अभ्यासी द्वारा परीक्षा कार्य/हॉल में प्रवेश किये वास्तविक अभ्यासी अपना ध्यान पादय सामग्री, पृथक्क पहले वाले या हस्ताक्षरित, कार्य को परीक्षा, पेश, मोबाइल फोन या किसी भी प्रकार के इलेक्ट्रॉनिक उपकरण के लिए अनुपस्थित या किसी अन्य उपकर का सामग्री को सेन जाने या उपयोग करने की अनुमति नहीं है।