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.

Important Instructions:

1. Immediately fill in the particulars on this page of the Test Booklet with only Blue/Black Ball Point Pen provided by the Board.
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.
6. Candidates will be awarded marks as stated above in instruction No. 5 for correct response of each question. 1/4 (one fourth) marks will be deducted for indicating incorrect response.
7. There is only one correct response for each question. Filling up more than one answer in any question will be treated as wrong response and marks for wrong response will be deducted accordingly.
8. For writing particulars/marking responses on Side-1 and Side-2 of the Answer Sheet use only Blue/Black Ball Point Pen provided by the Board.
9. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, 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 one page (i.e. Page 39) 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 H. 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.

Name of the Candidate (in Capital letters): UDAYSING MEENA

Roll Number: 1962784

Examination Centre Number: 196051

Name of Examination Centre: TAJPUR INTERNATIONAL SCHOOL
1. A particle performs simple harmonic motion with amplitude $A$. Its speed is trebled at the instant that it is at a distance $\frac{2A}{3}$ from equilibrium position. The new amplitude of the motion is:

1. $A\sqrt{3}$
2. $\frac{7A}{3}$
3. $\frac{A}{3}\sqrt{41}$
4. $3A$

2. For a common emitter configuration, if $a$ and $\beta$ have their usual meanings, the incorrect relationship between $a$ and $\beta$ is:

1. $a = \frac{\beta}{1 + \beta}$
2. $a = \frac{\beta^2}{1 + \beta^2}$
3. $\frac{1}{a} = \frac{1}{\beta} + 1$
4. $a = \frac{\beta}{1 - \beta}$

1. एक कण 'A' आयाम से सरल-आवर्त दोलन कर रहा है। जब यह आपने मूल-स्थान से $\frac{2A}{3}$ पर पहुँचता है तब अचानक इसकी गति तिगुनी कर दी जाती है। तब इसका नया आयाम है:

$$X = A\sin(\omega t + \phi)$$

1. $A\sqrt{3}$
2. $V = A\omega \cos(\omega t)$
3. $X = \frac{A}{3}\sin(\omega t)$
4. $V = \omega \sqrt{x^2 - \frac{(3V)^2}{x^2}}$

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3. A student measures the time period of 100 oscillations of a simple pendulum four times. The data set is 90 s, 91 s, 95 s and 92 s. If the minimum division in the measuring clock is 1 s, then the reported mean time should be:

(1) $92 \pm 1.8$ s
(2) $92 \pm 3$ s
(3) $92 \pm 2$ s
(4) $92 \pm 5.0$ s

4. If a, b, c, d are inputs to a gate and $x$ is its output, then, as per the following time graph, the gate is:

- (1) OR
- (2) NAND
- (3) NOT
- (4) AND

---

3. एक छात्र एक सरल-आवार्त-दोलक के 100 आवृतियों का समय 4 बार मापता है और उनको 90 s, 91 s, 95 s और 92 s पाता है। इस्तेमाल की गई घड़ी का न्यूनतम अंतर 1 s है। तब मापे गये माध्य समय को उसे लिखा चाहिए:

(1) $92 \pm 1.8$ s
(2) $92 \pm 3$ s
(3) $92 \pm 2$ s
(4) $92 \pm 5.0$ s

4. एक गेट में a, b, c, d इनपुट हैं और $x$ आउटपुट है। तब दिये गये टाइम-ग्राफ के अनुसार गेट है:

- (1) OR
- (2) NAND
- (3) NOT
- (4) AND

---

$H$/Page 3 SPACE FOR ROUGH WORK / एक कार्य के लिए जगह

$90s + 91s + 95s + 92s$

$90 + 91 + 95 + 92$
5. A particle of mass \( m \) is moving along the side of a square of side \( a \), with a uniform speed \( v \) in the \( x-y \) plane as shown in the figure:

Which of the following statements is false for the angular momentum \( \vec{L} \) about the origin?

(1) \( \vec{L} = mv \left[ \frac{R}{\sqrt{2}} + a \right] \hat{k} \) when the particle is moving from \( B \) to \( C \).

(2) \( \vec{L} = \frac{mv}{\sqrt{2}} R \hat{k} \) when the particle is moving from \( D \) to \( A \).

(3) \( \vec{L} = -\frac{mv}{\sqrt{2}} R \hat{k} \) when the particle is moving from \( A \) to \( B \).

(4) \( \vec{L} = mv \left[ \frac{R}{\sqrt{2}} - a \right] \hat{k} \) when the particle is moving from \( C \) to \( D \).

---

5. चित्र में भुजा 'a' का क्षेत्र x-y तल में है। \( m \) द्रव्यमान का एक कण एकसमान गति, \( v \) से इस क्षेत्र की भुजा पर चल रहा है जैसा कि चित्र में दर्शाया गया है।

वर्तमान में से कोई कथन, इस कण के मूलधारी के गिर्देद द्वारा \( \vec{L} \) के लिये, गलत है?

(1) \( \vec{L} = mv \left[ \frac{R}{\sqrt{2}} + a \right] \hat{k} \), जब कण \( B \) से चल रहा है।

(2) \( \vec{L} = \frac{mv}{\sqrt{2}} R \hat{k} \), जब कण \( D \) से \( A \) की ओर चल रहा है।

(3) \( \vec{L} = -\frac{mv}{\sqrt{2}} R \hat{k} \), जब कण \( A \) से \( B \) की ओर चल रहा है।

(4) \( \vec{L} = mv \left[ \frac{R}{\sqrt{2}} - a \right] \hat{k} \), जब कण \( C \) से \( D \) की ओर चल रहा है।
6. Choose the correct statement:
   (1) In frequency modulation the amplitude of the high frequency carrier wave is made to vary in proportion to the amplitude of the audio signal.
   (2) In frequency modulation the amplitude of the high frequency carrier wave is made to vary in proportion to the frequency of the audio signal.
   (3) In amplitude modulation the amplitude of the high frequency carrier wave is made to vary in proportion to the amplitude of the audio signal.
   (4) In amplitude modulation the frequency of the high frequency carrier wave is made to vary in proportion to the amplitude of the audio signal.

7. Radiation of wavelength $\lambda$ is incident on a photocell. The fastest emitted electron has speed $v$. If the wavelength is changed to $\frac{3\lambda}{4}$, the speed of the fastest emitted electron will be:
   (1) $v\left(\frac{4}{3}\right)^{\frac{1}{2}}$
   (2) $v\left(\frac{3}{4}\right)^{\frac{1}{2}}$
   (3) $v\left(\frac{4}{3}\right)^{\frac{1}{2}}$
   (4) $v\left(\frac{4}{3}\right)^{\frac{1}{2}}$
8. Two identical wires $A$ and $B$, each of length $l$, carry the same current $I$. Wire $A$ is bent into a circle of radius $R$ and wire $B$ is bent to form a square of side $a$. If $B_A$ and $B_B$ are the values of magnetic field at the centres of the circle and square respectively, then the ratio $\frac{B_A}{B_B}$ is:

1. $\frac{\pi^2}{16}$

2. $\frac{\pi^2}{8\sqrt{2}}$

3. $\frac{\pi^2}{8} \times \left(\frac{\mu_0}{\pi R} L \sqrt{2}\right)$

4. $\frac{\pi^2}{16\sqrt{2}} \times \frac{2}{L} \frac{\mu_0}{\pi L}$

9. A pipe open at both ends has a fundamental frequency $f$ in air. The pipe is dipped vertically in water so that half of it is in water. The fundamental frequency of the air column is now:

1. $2f \left(\frac{2\mu_0}{\pi L} \sinh R\right) = B_B$

2. $f \cdot \frac{\mu_0}{\pi L} \sqrt{2} \frac{L}{\pi L} \frac{\mu_0}{\pi L}$

3. $\frac{f}{2} \frac{\mu_0}{\pi L} \sqrt{2} \frac{L}{\pi L} \frac{\mu_0}{\pi L}$

4. $\frac{3f}{4} \frac{\mu_0}{\pi L} \sqrt{2} \frac{L}{\pi L} \frac{\mu_0}{\pi L}$

8. दो दुसरे कार्य के लिए जमग
10. The region between two concentric spheres of radii \(a'\) and \(b'\), respectively (see figure), has volume charge density \(\rho = \frac{A}{r}\), where \(A\) is a constant and \(r\) is the distance from the centre. At the centre of the spheres is a point charge \(Q\). The value of \(A\) such that the electric field in the region between the spheres will be constant, is:

\[
\begin{align*}
(1) & \quad \frac{2Q}{\pi(a'^2 - b'^2)} \\
(2) & \quad \frac{2Q}{\pi a'^2} \\
(3) & \quad \frac{Q}{2\pi a'^2} \\
(4) & \quad \frac{Q}{2\pi (b'^2 - a'^2)}
\end{align*}
\]

11. An arc lamp requires a direct current of 10 A at 80 V to function. If it is connected to a 220 V (rms), 50 Hz AC supply, the series inductor needed for it to work is close to:

\[
\begin{align*}
(1) & \quad 0.044 \text{ H} \\
(2) & \quad 0.065 \text{ H} \\
(3) & \quad 80 \text{ H} \\
(4) & \quad 0.08 \text{ H}
\end{align*}
\]
12. 'n' moles of an ideal gas undergoes a process A→B as shown in the figure. The maximum temperature of the gas during the process will be:

\[ \frac{9 P_0 V_0}{2nR} \]

\[ \frac{9 P_0 V_0}{nR} \]

\[ \frac{9 P_0 V_0}{4nR} \]

\[ \frac{3 P_0 V_0}{2nR} \]

13. A person trying to lose weight by burning fat lifts a mass of 10 kg up to a height of 1 m 1000 times. Assume that the potential energy lost each time he lowers the mass is dissipated. How much fat will he use up considering the work done only when the weight is lifted up? Fat supplies 3.8×10^7 J of energy per kg which is converted to mechanical energy with a 20% efficiency rate. Take \( g = 9.8 \text{ m/s}^2 \):

\[ (1) \ 9.89 \times 10^{-3} \text{ kg} \]
\[ (2) \ 12.89 \times 10^{-3} \text{ kg} \]
\[ (3) \ 2.45 \times 10^{-3} \text{ kg} \]
\[ (4) \ 6.45 \times 10^{-3} \text{ kg} \]
14. A point particle of mass $m$, moves along the uniformly rough track PQR as shown in the figure. The coefficient of friction, between the particle and the rough track equals $\mu$. The particle is released, from rest, from the point P and it comes to rest at a point R. The energies, lost by the ball, over the parts, PQ and QR, of the track, are equal to each other, and no energy is lost when particle changes direction from PQ to QR.

The values of the coefficient of friction $\mu$ and the distance $x(=QR)$, are, respectively close to:

1. 0.29 and 3.5 m
2. 0.29 and 6.5 m
3. 0.2 and 6.5 m
4. 0.2 and 3.5 m
15. The temperature dependence of resistances of Cu and undoped Si in the temperature range 300-400 K, is best described by:

(1) Linear increase for Cu, exponential decrease for Si.
(2) Linear decrease for Cu, linear decrease for Si.
(3) Linear increase for Cu, linear increase for Si.
(4) Linear increase for Cu, exponential increase for Si.

16. Arrange the following electromagnetic radiations per quantum in the order of increasing energy:

A : Blue light   B : Yellow light
C : X-ray   D : Radiowave.

(1) C, A, B, D
(2) B, A, D, C
(3) D, B, A, C
(4) A, B, D, C

17. A galvanometer having a coil resistance of 100 Ω gives a full scale deflection, when a current of 1 mA is passed through it. The value of the resistance, which can convert this galvanometer into ammeter giving a full scale deflection for a current of 10 A, is:

(1) 0.1 Ω
(2) 3 Ω
(3) 0.01 Ω
(4) 2 Ω
18. Half-lives of two radioactive elements A and B are 20 minutes and 40 minutes, respectively. Initially, the samples have equal number of nuclei. After 80 minutes, the ratio of decayed numbers of A and B nuclei will be:

1. 1:4
2. 5:4
3. 1:16
4. 4:1

19. Identify the semiconductor devices whose characteristics are given below, in the order (a), (b), (c), (d):

(a) Solar cell, Light dependent resistance, Zener diode, Simple diode
(b) Zener diode, Solar cell, Simple diode, Light dependent resistance
(c) Simple diode, Zener diode, Solar cell, Light dependent resistance
(d) Zener diode, Simple diode, Light dependent resistance, Solar cell

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SPACE FOR ROUGH WORK / रफ कार्य के लिए जमाह
20. A combination of capacitors is set up as shown in the figure. The magnitude of the electric field, due to a point charge $Q$ (having a charge equal to the sum of the charges on the 4 $\mu$F and 9 $\mu$F capacitors), at a point distant 30 m from it, would equal:

\[ E = \frac{Q}{4\pi \varepsilon_0} \]

- (1) 420 N/C
- (2) 480 N/C
- (3) 240 N/C
- (4) 360 N/C

21. A satellite is revolving in a circular orbit at a height $h$ from the earth’s surface (radius of earth $R$; $h \ll R$). The minimum increase in its orbital velocity required, so that the satellite could escape from the earth’s gravitational field, is close to:

Neglect the effect of atmosphere.

- (1) $\sqrt{\frac{gR}{2}}$
- (2) $\sqrt{gR} (\sqrt{2} - 1)$
- (3) $2gR$
- (4) $\sqrt{8gR}$
22. A screw gauge with a pitch of 0.5 mm and a circular scale with 50 divisions is used to measure the thickness of a thin sheet of Aluminium. Before starting the measurement, it is found that when the two jaws of the screw gauge are brought in contact, the 45th division coincides with the main scale line and that the zero of the main scale is barely visible. What is the thickness of the sheet if the main scale reading is 0.5 mm and the 25th division coincides with the main scale line?

(1) 0.70 mm
(2) 0.50 mm
(3) 0.75 mm
(4) 0.80 mm

23. A roller is made by joining together two cones at their vertices O. It is kept on two rails AB and CD which are placed asymmetrically (see figure), with its axis perpendicular to CD and its centre O at the centre of line joining AB and CD (see figure). It is given a light push so that it starts rolling with its centre O moving parallel to CD in the direction shown. As it moves, the roller will tend to:

(1) go straight.
(2) turn left and right alternately.
(3) turn left.
(4) turn right.

22. एक रुक-गेज का पिच 0.5 mm है और उसके चुीय-स्केल पर 50 भाग हैं। इसके द्वारा एक पतली आच्छादनीय शीट को मोटाई मापी गई। शीट लेने के पूर्व यह पाया गया कि जब रुक-गेज के दो जोड़ी की सममता में लाई जाता है तब 45 वां भाग मुख्य स्केल लाईन के संपाती होता है और मुख्य स्केल का शून्य (0) मुक्त रूप से दिखाई देता है। मुख्य स्केल का पाद्यक यदि 0.5 mm तथा 25 वां भाग मुख्य स्केल लाईन के संपाती हो, तो शीट की मोटाई क्या होगी?

\[ \theta = \frac{48}{9} \]

(1) 0.70 mm
(2) 0.50 mm
(3) 0.75 mm
(4) 0.80 mm

23. दो शंकु को उनके शीर्ष O पर जोड़कर एक रोलर बनाया गया है और उस AB व CD रेल पर असममत रखा गया है (चित्र देखिये)। रोलर का अंत CD से लगभग है और O दोनों रेल के बीचबीच है। हल्के से धक्काने पर रोलर रेल पर इस प्रकार लुढ़कता आरम्भ करता है कि O का मोटाई CD के संपात है (चित्र देखिये)। चालित हो जाने के बाद यह रोलर:

\[ F = \frac{m}{2g} \]

(1) सीधा चलता रहेगा।
(2) बाएं तथा दाएं भ्रामण: मुड़ता रहेगा।
(3) बाएं और मुड़ता।
(4) दाएं और मुड़ता।
24. Hysteresis loops for two magnetic materials A and B are given below:

(A)  
(B)  

These materials are used to make magnets for electric generators, transformer core and electromagnet core. Then it is proper to use:

(1) A for transformers and B for electric generators.
(2) B for electromagnets and transformers.
(3) A for electric generators and transformers.
(4) A for electromagnets and B for electric generators.

25. The box of a pin hole camera, of length L, has a hole of radius a. It is assumed that when the hole is illuminated by a parallel beam of light of wavelength $\lambda$ the spread of the spot (obtained on the opposite wall of the camera) is the sum of its geometrical spread and the spread due to diffraction. The spot would then have its minimum size (say $b_{\text{min}}$) when:

(1) $a = \sqrt{\lambda L}$ and $b_{\text{min}} = \sqrt{4\lambda L}$
(2) $a = \frac{\lambda^2}{L}$ and $b_{\text{min}} = \sqrt{4\lambda L}$
(3) $a = \frac{\lambda^2}{L}$ and $b_{\text{min}} = \left(\frac{2\lambda^2}{L}\right)$
(4) $a = \sqrt{\lambda L}$ and $b_{\text{min}} = \left(\frac{2\lambda^2}{L}\right)$
16. A uniform string of length 20 m is suspended from a rigid support. A short wave pulse is introduced at its lowest end. It starts moving up the string. The time taken to reach the support is:
(take $g = 10 \text{ ms}^{-2}$)

1. $2\sqrt{2}$ s
2. $\sqrt{2}$ s
3. $2\pi \sqrt{2}$ s
4. 2 s

27. An ideal gas undergoes a quasi static, reversible process in which its molar heat capacity $C$ remains constant. If during this process the relation of pressure $P$ and volume $V$ is given by $PV^n=\text{constant}$, then $n$ is given by (Here $C_P$ and $C_V$ are molar specific heat at constant pressure and constant volume, respectively):

1. \begin{align*}
n &= \frac{C_P - C}{C - C_V} \\
 &= \frac{\Delta C_P}{\Delta C_V} \\
 &= \frac{\Delta C_P}{\Delta C_V} - \frac{\Delta C_V}{\Delta C_P}
\end{align*}

2. \begin{align*}
n &= \frac{C - C_V}{C - C_P} \\
 &= \frac{\Delta C}{\Delta C_P - \Delta C_V}
\end{align*}

3. $n = \frac{C_P}{C_V}$

4. $n = \frac{C - C_P}{C - C_V}$

28. An observer looks at a distant tree of height 10 m with a telescope of magnifying power of 20. To the observer the tree appears:

1. 20 times taller.
2. 20 times nearer.
3. 10 times taller.
4. 10 times nearer.

26. 20 m लम्बाई की एक समान ढीली को एक दूध आधार से लटकाया गया है। इसके निचले सिरे से एक सूक्ष्म तरंग-स्फट चालित होता है। ऊपर आधार तक पहुँचने में लगी समय है:
($g = 10 \text{ ms}^{-2}$ लें)

1. $2\sqrt{2}$ s
2. $\sqrt{2}$ s
3. $2\pi \sqrt{2}$ s
4. 2 s

27. एक आदर्श गैस उक्तक्रमणीय रैखिक-काल्पनिक प्रक्रिया से गुजरती है तथा उसकी मोल-ऊर्ध्व-धारिता $C$ रहती है। यदि इस प्रक्रिया में उसके दब $P$ व आयतन $V$ के बीच संबंध $PV^n=\text{constant}$ है। ($C_P$ तथा $C_V$ क्रमागत: रैखिक दब व रैखिक आयतन पर ऊर्ध्व-धारिता है) तब ‘$n$’ के लिए समीकरण है:

\[ n = \frac{C_P - C}{C - C_V} \]

28. दूर स्थित 10 m ऊंचे पेड़ को एक 20 आवर्धन शमना प्रयोग वाले टेलिस्कोप से देखने पर क्या महसूस होगा?

\[ \frac{PV}{nRT} \]

1. पेड़ 20 गुना ऊँचा है।
2. पेड़ 20 गुना पास है।
3. पेड़ 10 गुना ऊँचा है।
4. पेड़ 10 गुना पास है।
29. In an experiment for determination of refractive index of glass of a prism by \( i - \delta \) plot, it was found that a ray incident at angle 35°, suffers a deviation of 40° and that it emerges at angle 79°. In that case which of the following is closest to the maximum possible value of the refractive index?

(1) 1.7  
(2) 1.8  
(3) 1.5  
(4) 1.6

\[ \mu = \frac{\sin 35° + 1}{\sin 79°} \]

30. A pendulum clock loses 12 s a day if the temperature is 40°C and gains 4 s a day if the temperature is 20°C. The temperature at which the clock will show correct time, and the co-efficient of linear expansion \((\alpha)\) of the metal of the pendulum shaft are respectively:

(1) 30°C; \( \alpha = 1.85 \times 10^{-3}/°C \)  
(2) 55°C; \( \alpha = 1.85 \times 10^{-2}/°C \)  
(3) 25°C; \( \alpha = 1.85 \times 10^{-5}/°C \)  
(4) 60°C; \( \alpha = 1.85 \times 10^{-4}/°C \)
PART B – MATHEMATICS

31. The area (in sq. units) of the region
\[ \{(x, y) : y^2 \geq 2x \text{ and } x^2 + y^2 \leq 4x, x \geq 0, y \geq 0\} \]
is:

(1) \( \frac{4\sqrt{2}}{3} \)
(2) \( \frac{2}{3} \)
(3) \( 0 \)
(4) \( -\frac{8}{3} \)

32. \( I \)

If \( f(x) + 2f\left(\frac{1}{x}\right) = 3x, x \neq 0 \), and
\[ S = \{ x \in R : f(x) = f(-x) \} \]; then \( S \):
(1) contains exactly two elements.
(2) contains more than two elements.
(3) is an empty set.
(4) contains exactly one element.

33. The integral \( \int \frac{2x^{12} + 5x^9}{(x^5 + x^3 + 1)^3} \, dx \) is equal to:

(1) \( \frac{x^5}{2(x^5 + x^3 + 1)^2} + C \)
(2) \( -\frac{x^{10}}{2(x^5 + x^3 + 1)^2} + C \)
(3) \( \frac{x^5}{(x^5 + x^3 + 1)^2} + C \)
(4) \( \frac{x^{10}}{2(x^5 + x^3 + 1)^2} + C \)

where \( C \) is an arbitrary constant.
34. For \( x \in \mathbb{R} \), \( f(x) = |\log_2 - \sin x| \) and \( g(x) = f'(x) \), then:

(1) \( g'(0) = -\cos(\log 2) \)
(2) \( g \) is differentiable at \( x = 0 \) and \( g'(0) = -\sin(\log 2) \)
(3) \( g \) is not differentiable at \( x = 0 \)
(4) \( g'(0) = \cos(\log 2) \)

35. The centres of those circles which touch the circle, \( x^2 + y^2 - 8x - 8y - 4 = 0 \), externally and also touch the x-axis, lie on:

(1) a hyperbola.
(2) a parabola.
(3) a circle.
(4) an ellipse which is not a circle.

36. The sum of all real values of \( x \) satisfying the equation
\[
(x^2 - 5x + 5)^2 + 4x - 60 = 1
\]
is:

(1) 6
(2) 5
(3) 3
(4) -4

34. \( x \in \mathbb{R} \) के लिए \( f(x) = |\log_2 - \sin x| \) तथा \( g(x) = f'(x) \) है, तो:

(1) \( g'(0) = -\cos(\log 2) \) है।
(2) \( x = 0 \) पर \( g \) अवकलनीय है तथा \( g'(0) = -\sin(\log 2) \) है।
(3) \( x = 0 \) पर \( g \) अवकलनीय नहीं है।
(4) \( g'(0) = \cos(\log 2) \) है।

35. उन वृत्तों के केंद्र, जो \( x^2 + y^2 - 8x - 8y - 4 = 0 \) को बाहर रूप से स्पर्श करते हैं तथा \( x \)-अक्ष को भी भूत स्पर्श करते हैं, स्थित हैं:

(1) एक अवकलनिय पर।
(2) एक परवलय पर।
(3) एक वृत्त पर।
(4) एक दीर्घवृत्त पर जो वृत्त नहीं है।

36. \( x \) के उन सभी वास्तविक मानों का योग जो समीकरण
\[
(x^2 - 5x + 5)^2 + 4x - 60 = 1
\]
को संतुप्त करते हैं, है:

(1) 6
(2) 5
(3) 3
(4) -4
If the 2nd, 5th and 9th terms of a non-constant A.P. are in G.P., then the common ratio of this G.P.
is:

(1) 1
(2) \(\frac{7}{4}\)
(3) \(\frac{8}{5}\)
(4) \(\frac{4}{3}\)

38. The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci, is:

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

39. If the number of terms in the expansion of
\[
\left(1 - \frac{2}{x} + \frac{4}{x^2}\right)^n, \quad x \neq 0,
\]
is 28, then the sum of the coefficients of all the terms in this expansion, is:

(1) 243
(2) 729
(3) 64
(4) 2187
40. The Boolean Expression \((p \land \neg q) \lor q \lor \neg (p \land q)\)
is equivalent to:

1. \(p \lor q\)
2. \(p \lor \neg q\)
3. \(\neg p \land q\)
4. \(p \land q\)

41. Consider

\[f(x) = \tan^{-1}\left(\frac{1 + \sin x}{\sqrt{1 - \sin^2 x}}\right), \quad x \in \left(0, \frac{\pi}{2}\right)\]

A normal to \(y = f(x)\) at \(x = \frac{\pi}{6}\) also passes through the point:

1. \(\left(\frac{\pi}{6}, 0\right)\)
2. \(\left(\frac{\pi}{4}, 0\right)\)
3. \((0, 0)\)
4. \(\left(0, \frac{2\pi}{3}\right)\)

42. \(\lim_{n \to \infty} \left(\frac{(n + 1)(n + 2)\ldots3n}{n^{2n}}\right)^{\frac{1}{n}}\) is equal to:

1. \(\frac{9}{e^2}\)
2. \(3 \log 3 - 2\)
3. \(\frac{18}{e^4}\)
4. \(\frac{27}{e^6}\)
43. यदि समीकरण \( x^2 + y^2 - 4x + 6y - 12 = 0 \) द्वारा प्रदत्त एक वृत्त का एक व्यास एक अन्य वृत्त \( S \), जिसका केन्द्र \((-3, 2)\) है, की जीवा है, तो वृत्त \( S \) की प्रियम्या है:

(1) \( 5 \)
(2) \( 10 \)
(3) \( 5\sqrt{2} \)
(4) \( 5\sqrt{3} \)

44. माना दो अभिभावक छ: फलकीय पासे \( A \) तथा \( B \) एक साथ उछाले गये। माना \( E_1 \) पासे \( A \) पर चार आना दर्शाती है, \( E_2 \) पासे \( B \) पर 2 आना दर्शाती है तथा \( E_3 \) दोनों पासों पर अन्यान्य संख्याओं का सम्मिलन दर्शाती है, तो निम्न में से कौन-सा कथन सत्य नहीं है?

(1) \( E_1 \) तथा \( E_3 \) स्वतंत्र हैं।
(2) \( E_1 \), \( E_2 \) तथा \( E_3 \) स्वतंत्र हैं।
(3) \( E_1 \) तथा \( E_2 \) स्वतंत्र हैं।
(4) \( E_2 \) तथा \( E_3 \) स्वतंत्र हैं।

45. यदि समीकरण \( x^2 + y^2 - 4x + 6y - 12 = 0 \) द्वारा प्रदत्त एक वृत्त का एक व्यास एक अन्य वृत्त \( S \), जिसका केन्द्र \((-3, 2)\) है, की जीवा है, तो वृत्त \( S \) की प्रियम्या है:

(1) \( 5 \)
(2) \( 10 \)
(3) \( 5\sqrt{2} \)
(4) \( 5\sqrt{3} \)

44. माना दो अभिभावक छ: फलकीय पासे \( A \) तथा \( B \) एक साथ उछाले गये। माना \( E_1 \) पासे \( A \) पर चार आना दर्शाती है, \( E_2 \) पासे \( B \) पर 2 आना दर्शाती है तथा \( E_3 \) दोनों पासों पर अन्यान्य संख्याओं का सम्मिलन दर्शाती है, तो निम्न में से कौन-सा कथन सत्य नहीं है?

(1) \( E_1 \) तथा \( E_3 \) स्वतंत्र हैं।
(2) \( E_1 \), \( E_2 \) तथा \( E_3 \) स्वतंत्र हैं।
(3) \( E_1 \) तथा \( E_2 \) स्वतंत्र हैं।
(4) \( E_2 \) तथा \( E_3 \) स्वतंत्र हैं।

45. \( \theta \) का यह एक मान जिसके लिए \( \frac{2 + 3i \sin \theta}{1 - 2i \sin \theta} \) पूर्णत: काल्पनिक है, है:

(1) \( \sin^{-1}\left(\frac{\sqrt{3}}{4}\right) \)
(2) \( \sin^{-1}\left(\frac{1}{\sqrt{3}}\right) \)
(3) \( \frac{\pi}{3} \)
(4) \( \frac{\pi}{6} \)
46. If the sum of the first ten terms of the series
\((\frac{3}{5})^2 + (\frac{2}{5})^2 + (\frac{1}{5})^2 + 4^2 + (\frac{4}{5})^2 + \ldots \ldots \),
is \(16\) \(m\), then \(m\) is equal to:

(1) 100  
(2) 99  
(3) 102  
(4) 101

47. The system of linear equations
\[
\begin{align*}
&x + \lambda y - z = 0 \\
&\lambda x - y - z = 0 \\
&x + y - \lambda z = 0
\end{align*}
\]
has a non-trivial solution for:

(1) exactly two values of \(\lambda\).  
(2) exactly three values of \(\lambda\).  
(3) infinitely many values of \(\lambda\).  
(4) exactly one value of \(\lambda\).

48. If the line, \(\frac{x-3}{2} = \frac{y+2}{-1} = \frac{z+4}{3}\) lies in the plane, \(lx + my - z = 9\), then \(l^2 + m^2\) is equal to:

(1) 5  
(2) 2  
(3) 26  
(4) 18

46. यदि श्रेणी
\((\frac{3}{5})^2 + (\frac{2}{5})^2 + (\frac{1}{5})^2 + 4^2 + (\frac{4}{5})^2 + \ldots \ldots\)
के प्रथम दस पदों का योग \(16\) \(m\) है, तो \(m\) बराबर है:

(1) 100  
(2) 99  
(3) 102  
(4) 101

47. रेखाकार समीकरण निकाय
\[
\begin{align*}
&x + \lambda y - z = 0 \\
&\lambda x - y - z = 0 \\
&x + y - \lambda z = 0
\end{align*}
\]
का एक अतुल्य हल होने के लिए:

(1) \(\lambda\) के तथ्य: दो मान हैं।  
(2) \(\lambda\) के तथ्य: तीन मान हैं।  
(3) \(\lambda\) के अनेक मान हैं।  
(4) \(\lambda\) का तथ्य: एक मान हैं।

48. यदि रेखा \(\frac{x-3}{2} = \frac{y+2}{-1} = \frac{z+4}{3}\), समतल \(lx + my - z = 9\) में स्थित है, तो \(l^2 + m^2\) बराबर है:

(1) 5  
(2) 2  
(3) 26  
(4) 18

\[l = -2\left(\frac{s}{9}\right) = \frac{s}{9}\]
\[m = -\frac{k}{9} = -6m - 2m = 9\]
49. If all the words (with or without meaning) having five letters, formed using the letters of the word SMALL and arranged as in a dictionary; then the position of the word SMALL is:

(1) 52nd
(2) 58th
(3) 46th
(4) 59th

50. If the standard deviation of the numbers 2, 3, a and 11 is 3.5, then which of the following is true?

(1) \(3a^2 - 34a + 91 = 0\)
(2) \(3a^2 - 23a + 44 = 0\)
(3) \(3a^2 - 26a + 55 = 0\)
(4) \(3a^2 - 32a + 84 = 0\)

51. A wire of length 2 units is cut into two parts which are bent respectively to form a square of side = x units and a circle of radius = r units. If the sum of the areas of the square and the circle so formed is minimum, then:

(1) \(x = 2r\)
(2) \(2x = r\)
(3) \(2x = (\pi + 4)r\)
(4) \((4 - \pi)x = mr\)
52. Let \( p = \lim_{x \to 0^+} (1 + \tan^2 \sqrt{x})^{\frac{1}{2}} \) then \( \log p \) is equal to:

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

53. Let \( P \) be the point on the parabola, \( y^2 = 8x \) which is at a minimum distance from the centre \( C \) of the circle, \( x^2 + (y + 6)^2 = 1 \). Then the equation of the circle, passing through \( C \) and having its centre at \( P \) is:

1. \( x^2 + y^2 - \frac{x}{4} + 2y - 24 = 0 \)
2. \( x^2 + y^2 - 4x + 9y + 18 = 0 \)
3. \( x^2 + y^2 - 4x + 8y + 12 = 0 \)
4. \( x^2 + y^2 - x + 4y - 12 = 0 \)
54. If a curve \( y = f(x) \) passes through the point \((1, -1)\) and satisfies the differential equation, \( y(1 + xy) \, dx = x \, dy \), then \( f\left(-\frac{1}{2}\right) \) is equal to:

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55. Let \( \vec{a} \), \( \vec{b} \) and \( \vec{c} \) be three unit vectors such that \( \vec{a} \times \left( \vec{b} \times \vec{c} \right) = \frac{\sqrt{3}}{2} \left( \vec{b} + \vec{c} \right) \). If \( \vec{b} \) is not parallel to \( \vec{c} \), then the angle between \( \vec{a} \) and \( \vec{b} \) is:

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<td>(4)</td>
<td>( \frac{\pi}{2} )</td>
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56. If \( A = \begin{bmatrix} 5a & -b \\ 3 & 2 \end{bmatrix} \) and \( A \text{ adj } A = A A^T \), then

\[
5a + b \text{ is equal to :}
\]

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<td>(2)</td>
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<td>(3)</td>
<td>-1</td>
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<td>(4)</td>
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57. A man is walking towards a vertical pillar in a straight path, at a uniform speed. At a certain point \( A \) on the path, he observes that the angle of elevation of the top of the pillar is 30°. After walking for 10 minutes from \( A \) in the same direction, at a point \( B \), he observes that the angle of elevation of the top of the pillar is 60°. Then the time taken (in minutes) by him, from \( B \) to reach the pillar, is :

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58. The distance of the point \((1, -5, 9)\) from the plane \(x - y + z = 5\) measured along the line \(x = y = z\) is :

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<td>(1)</td>
<td>(\frac{10}{\sqrt{3}})</td>
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<tr>
<td>(2)</td>
<td>(\frac{20}{3})</td>
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<tr>
<td>(3)</td>
<td>(3\sqrt{10})</td>
</tr>
<tr>
<td>(4)</td>
<td>(10\sqrt{3})</td>
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39. Two sides of a rhombus are along the lines, $x - y + 1 = 0$ and $7x - y - 5 = 0$. If its diagonals intersect at $(-1, -2)$, then which one of the following is a vertex of this rhombus?

1. $\left( \frac{1}{3}, -\frac{8}{3} \right)$
2. $\left( -\frac{10}{3}, -\frac{7}{3} \right)$
3. $(-3, -9)$
4. $(-3, -8)$

59. यदि एक समचतुर्भुज की दो भुजाएँ, रेखाओं $x - y + 1 = 0$ तथा $7x - y - 5 = 0$ की दिशा में हैं तथा इसके विकर्ण बिन्दु $(-1, -2)$ पर प्रतिच्छेद करते हैं, तो इस समचतुर्भुज का निम्न में से कौन-सा शीर्ष है?

1. $\left( \frac{1}{3}, -\frac{8}{3} \right)$
2. $\left( -\frac{10}{3}, -\frac{7}{3} \right)$
3. $(-3, -9)$
4. $(-3, -8)$

60. If $0 \leq x < 2\pi$, then the number of real values of $x$, which satisfy the equation $\cos x + \cos 2x + \cos 3x + \cos 4x = 0$, is:

1. 7
2. 9
3. 3
4. 5
PART C – CHEMISTRY

61. Two closed bulbs of equal volume \(V\) containing an ideal gas initially at pressure \(p_i\) and temperature \(T_1\) are connected through a narrow tube of negligible volume as shown in the figure below. The temperature of one of the bulbs is then raised to \(T_2\). The final pressure \(p_f\) is:

\[
\begin{align*}
(1) \quad 2p_i \left( \frac{T_2}{T_1 + T_2} \right) \\
(2) \quad 2p_i \left( \frac{T_1 T_2}{T_1 + T_2} \right) \\
(3) \quad p_i \left( \frac{T_1 T_2}{T_1 + T_2} \right) \\
(4) \quad 2p_i \left( \frac{T_1}{T_1 + T_2} \right)
\end{align*}
\]

62. Which one of the following statements about water is FALSE?

(1) There is extensive intramolecular hydrogen bonding in the condensed phase.

(2) Ice formed by heavy water sinks in normal water.

(3) Water is oxidized to oxygen during photosynthesis.

(4) Water can act both as an acid and as a base.
In the Hofmann bromamide degradation reaction, the number of moles of NaOH and Br₂ used per mole of amine produced are:

1. Two moles of NaOH and two moles of Br₂.
2. Four moles of NaOH and one mole of Br₂.
3. One mole of NaOH and one mole of Br₂.
4. Four moles of NaOH and two moles of Br₂.

64. Which of the following atoms has the highest first ionization energy?

1. K
2. Sc
3. Rb
4. Na

65. The concentration of fluoride, lead, nitrate and iron in a water sample from an underground lake was found to be 1000 ppb, 40 ppb, 100 ppm and 0.2 ppm, respectively. This water is unsuitable for drinking due to high concentration of:

1. Nitrate
2. Iron
3. Fluoride
4. Lead

63. फाफ्मान श्रीमानाधिकरण अभिक्रिया में, NaOH तथा Br₂ के प्रत्येक मोलों की संख्या प्रतिमोल अमीन के बनने में होगी:

1. दो मोल NaOH तथा दो मोल Br₂।
2. चार मोल NaOH तथा एक मोल Br₂।
3. एक मोल NaOH तथा एक मोल Br₂।
4. चार मोल NaOH तथा दो मोल Br₂।

64. निम्न परमाणुओं में किसकी प्रथम आयन ऊर्जा उच्चतम है?

(1) K
(2) Sc
(3) Rb
(4) Na

65. भूमिगत झील से प्राप्त जल प्रतिरूप में फ्लोराइड, लैड, नाइट्रेट तथा आयरन की सांद्रता क्रमशः 1000 ppb, 40 ppb, 100 ppm तथा 0.2 ppm पाई गई। यह जल निम्न में से किसकी उच्च सांद्रता से पीने योग्य नहीं है?

(1) नाइट्रेट
(2) आयरन
(3) फ्लोराइड
(4) लैड
66. The heats of combustion of carbon and carbon monoxide are $-393.5$ and $-283.5$ kJ mol$^{-1}$, respectively. The heat of formation (in kJ) of carbon monoxide per mole is:

- $-393.5$
- $-283.5$
- $110.5$
- $676.5$

67. The equilibrium constant at 298 K for a reaction $A + B \rightleftharpoons C + D$ is 100. If the initial concentration of all the four species were 1 M each, then equilibrium concentration of D (in mol L$^{-1}$) will be:

- $1.818$
- $1.182$
- $0.182$
- $0.818$

68. The absolute configuration of CO$_2$H

\[
\begin{align*}
\text{H} & \quad \text{OH} \\
\text{H} & \quad \text{Cl} \\
\text{CH}_3 & \\
\end{align*}
\]

is:

- $(2S, 3S)$
- $(2R, 3R)$
- $(2R, 3S)$
- $(2S, 3R)$
69. For a linear plot of \( \log (x/m) \) versus \( \log p \) in a Freundlich adsorption isotherm, which of the following statements is correct? \((k\) and \(n\) are constants)
   (1) Only \(1/n\) appears as the slope.
   (2) \(\log (1/n)\) appears as the intercept.
   (3) Both \(k\) and \(1/n\) appear in the slope term.
   (4) \(1/n\) appears as the intercept.

70. The distillation technique most suited for separating glycerol from spent-lye in the soap industry is:
   (1) Steam distillation
   (2) Distillation under reduced pressure
   (3) Simple distillation
   (4) Fractional distillation

71. Which of the following is an anionic detergent?
   (1) Cetyltrimethyl ammonium bromide
   (2) Glyceryl oleate
   (3) Sodium stearate
   (4) Sodium lauryl sulphate

72. The species in which the \(N\) atom is in a state of \(sp\) hybridization is:
   (1) \(NO_3^-\)
   (2) \(NO_2^-\)
   (3) \(NO_2^+\)
   (4) \(NO_2^-\)
73. The thiol group is present in:
   (1) Cysteine
   (2) Methionine
   (3) Cytosine
   (4) Cystine

74. Which one of the following ores is best concentrated by froth flotation method?
   (1) Galena
   (2) Malachite
   (3) Magnetite
   (4) Siderite

75. Which of the following statements about low density polythene is FALSE?
   (1) Its synthesis requires dioxygen or a peroxide initiator as a catalyst.
   (2) It is used in the manufacture of buckets, dust-bins etc.
   (3) Its synthesis requires high pressure.
   (4) It is a poor conductor of electricity.

76. Which of the following compounds is metallic and ferromagnetic?
   (1) \( \text{VO}_2 \)
   (2) \( \text{MnO}_2 \)
   (3) \( \text{TiO}_2 \)
   (4) \( \text{CrO}_2 \)
77. The product of the reaction given below is:

1. NBS/\(hv\)
2. \(H_2O/K_2CO_3\)

1. \begin{array}{c}
\text{Carboxylic acid}
\end{array}
2. \begin{array}{c}
\text{Carboxylic acid}
\end{array}
3. \begin{array}{c}
\text{Cyclohexene}
\end{array}
4. \begin{array}{c}
\text{Cyclohexanol}
\end{array}

77. नीचे दी गई अभिक्रिया के लिए उत्पाद होगा:

1. NBS/\(hv\)
2. \(H_2O/K_2CO_3\)

1. \begin{array}{c}
\text{Carboxylic acid}
\end{array}
2. \begin{array}{c}
\text{Carboxylic acid}
\end{array}
3. \begin{array}{c}
\text{Cyclohexene}
\end{array}
4. \begin{array}{c}
\text{Cyclohexanol}
\end{array}

78. The hottest region of Bunsen flame shown in the figure below is:

(1) region 3
(2) region 4
(3) region 1
(4) region 2

78. नीचे दी गई फिगर में बुन्सन प्लेम का सर्वाधिक गर्म भाग है:

(1) रीजन 3
(2) रीजन 4
(3) रीजन 1
(4) रीजन 2
79. At 300 K and 1 atm, 15 mL of a gaseous hydrocarbon requires 375 mL air containing 20% O₂ by volume for complete combustion. After combustion the gases occupy 330 mL. Assuming that the water formed is in liquid form and the volumes were measured at the same temperature and pressure, the formula of the hydrocarbon is:

(1) C₄H₈
(2) C₄H₁₀
(3) C₃H₆
(4) C₃H₈

80. The pair in which phosphorous atoms have a formal oxidation state of +3 is:

(1) Orthophosphorous and hypophosphoric acids
(2) Pyrophosphorous and pyrophosphoric acids
(3) Orthophosphorous and pyrophosphorous acids
(4) Pyrophosphorous and hypophosphoric acids

79. 300 K तथा 1 atm दबान पर, 15 mL गैसीय हाइड्रोकार्बन के पूर्ण दहन के लिये 375 mL वायू जिसमें आयुक्त के आधार पर 20% ऑक्सीजन है, की आवश्यकता होती है। दहन के बाद गैसें 330 mL चीती है। यह मानते हुए कि बना हुआ जल द्रव से है तथा उसी तापमान एवं दबाव पर आयुक्तों की मात्र की गई है तो हाइड्रोकार्बन का फार्मुला है:

(1) C₄H₈
(2) C₄H₁₀
(3) C₃H₆
(4) C₃H₈

80. वह युग्म जिनमें फॉफोरस परमाणुओं की फार्मूला ऑक्सीड्रॉन आवश्यक करती है, +3 है, है:

(1) ओर्थोफ़ोफोरस तथा हाइपोफॉफोरसिक एसिड
(2) पायरोफ़ोफोरस तथा पायरोफ़ोफोरसिक एसिड
(3) ओर्थोफ़ोफोरस तथा पायरोफ़ोफोरसिक एसिड
(4) पायरोफ़ोफोरस तथा हाइपोफॉफोरसिक एसिड
81. The reaction of propene with HOCl (Cl₂ + H₂O) proceeds through the intermediate:

(1) CH₃−CH(OH)−CH₂⁺
(2) CH₃−CHCl−CH₂⁺
(3) CH₃−CH⁺−CH₂−OH
(4) CH₃−CH⁺−CH₂−Cl

82. 2-chloro-2-methylpentane on reaction with sodium methoxide in methanol yields:

(a) CH₃CH₂CH₂C−OCH₃
(b) CH₃CH₂CH₂C=CH₂
(c) CH₃CH=C−CH₃

(1) (c) only
(2) (a) and (b)
(3) All of these
(4) (a) and (c)
83. Which one of the following complexes shows optical isomerism?

(1) \textit{trans}[\text{Co}(en)_2\text{Cl}_2]\text{Cl}

(2) [\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}

(3) [\text{Co}(\text{NH}_3)_3\text{Cl}_3]

(4) \textit{cis}[\text{Co}(en)_2\text{Cl}_2]\text{Cl}

(en = ethylenediamine)

84. The main oxides formed on combustion of Li, Na and K in excess of air are, respectively:

(1) \text{Li}_2\text{O}_2, \text{Na}_2\text{O}_2 and \text{KO}_2

(2) \text{Li}_2\text{O}, \text{Na}_2\text{O}_2 and \text{KO}_2

(3) \text{Li}_2\text{O}, \text{Na}_2\text{O} and \text{KO}_2

(4) \text{LiO}_2, \text{Na}_2\text{O}_2 and \text{K}_2\text{O}

85. 18 g glucose (C$_6$H$_{12}$O$_6$) is added to 178.2 g water. The vapor pressure of water (in torr) for this aqueous solution is:

(1) 752.4

(2) 759.0

(3) 7.6

(4) 76.0
The reaction of zinc with dilute and concentrated nitric acid, respectively, produces:

(1) NO and N₂O
(2) NO₂ and N₂O
(3) N₂O and NO₂
(4) NO₂ and NO

Decomposition of H₂O₂ follows a first order reaction. In fifty minutes the concentration of H₂O₂ decreases from 0.5 to 0.125 M in one such decomposition. When the concentration of H₂O₂ reaches 0.05 M, the rate of formation of O₂ will be:

(1) 2.66 L min⁻¹ at STP
(2) 1.34 × 10⁻² mol min⁻¹
(3) 6.93 × 10⁻² mol min⁻¹
(4) 6.93 × 10⁻⁴ mol min⁻¹

The pair having the same magnetic moment is:

[At. No.: Cr = 24, Mn = 25, Fe = 26, Co = 27]
(1) [Mn(H₂O)₆]²⁺ and [Cr(H₂O)₆]²⁺
(2) [CoCl₄]²⁻ and [Fe(H₂O)₆]²⁺
(3) [Cr(H₂O)₆]²⁺ and [CoCl₄]²⁻
(4) [Cr(H₂O)₆]²⁺ and [Fe(H₂O)₆]²⁺
89. Galvanization is applying a coating of:

(1) Cu
(2) Zn
(3) Pb
(4) Cr

90. A stream of electrons from a heated filament was passed between two charged plates kept at a potential difference $V$ esu. If $e$ and $m$ are charge and mass of an electron, respectively, then the value of $h/\lambda$ (where $\lambda$ is wavelength associated with electron wave) is given by:

(1) \[ \sqrt{meV} \]
(2) \[ \sqrt{2\,meV} \]
(3) \[ meV \]
(4) \[ 2meV \]
1. The candidates should fill in the required particulars on the Test Booklet and Answer Sheet (Side-1) with Blue/Black Ball Point Pen.

2. For writing/marking particulars on Side-2 of the Answer Sheet, use Blue/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, one-fourth (1/4) of the total marks allotted to the question would 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 one page (i.e. Page 39) 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.

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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 Answer 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.

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