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Time: 03.00Pm to 06.00Pm

JEE-MAIN

GTM-18/13

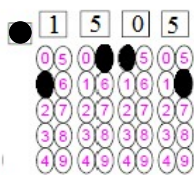
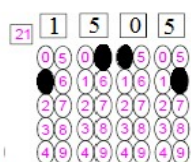
Date: 17-01-2025

Max. Marks: 300

IMPORTANT INSTRUCTION:

1. Immediately fill in the Admission number on this page of the Test Booklet with **Blue/Black Ball Point Pen** only.
2. The candidates should not write their Admission Number anywhere (except in the specified space) on the Test Booklet/ Answer Sheet.*
3. The test is of **3 hours** duration.
4. The Test Booklet consists of **75 Questions**. The maximum marks are **300**.
5. There are **three** parts in the question paper 1,2,3 consisting of **Mathematics, Physics and Chemistry** having **25 Questions** in each subject and subject having **two sections**.
(I) **Section –I** contains **20 Multiple Choice Questions** with only one correct option.
Marking scheme: +4 for correct answer, **0** if not attempt and **-1** in all other cases.
(II) **Section-II** contains **05 Numerical Value Type Questions**.
■ The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).
To cancel any attempted question bubble on the question number box.
For example: To cancel attempted Question 21. Bubble on 21 as shown below

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Question Answered for Marking

Question Cancelled for Marking

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases.

6. Use Blue / Black Point Pen only for writing particulars / marking responses on the Answer Sheet. Use of pencil is strictly prohibited.
7. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electron device etc, except the Identity Card inside the examination hall.
8. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
9. On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Hall. However, the candidate are allowed to take away this Test Booklet with them.
10. Do not fold of make any stray marks on the Answer Sheet

Name of the Candidate (in Capital): _____

Admission Number:

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Candidate's Signature: _____

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17-01-2025_Sr.S60_Elite, Target & LIIT-BTs_Jee-Main-GTM-18/13_Test Syllabus

MATHEMATICS : TOTAL SYLLABUS

PHYSICS : TOTAL SYLLABUS

CHEMISTRY : TOTAL SYLLABUS

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300RANK
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**MATHEMATICS****Max Marks: 100****SECTION-I (SINGLE CORRECT ANSWER TYPE)**

This section contains **20 Multiple Choice Questions**. Each question has 4 options (1), (2), (3) and (4) for its answer, out of which **ONLY ONE** option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and -1 in all other cases.

- The value of $\lim_{x \rightarrow \infty} \left(\frac{x+5}{x-7} \right)^x$ is
 1) 12 2) e^{-12} 3) e^{12} 4) -12
- A man has 7 relatives, 4 of them are ladies and 3 gentlemen; his wife has 7 relatives, 3 of them are ladies and 4 gentlemen. In how many different ways, can they invite a dinner party of 3 ladies and 3 gentlemen. So that there are 3 are the man's relatives and 3 are the wife's relatives is
 1) 385 2) 285 3) 485 4) 585
- Let $\vec{a} = \hat{i} - 2\hat{j} + 2\hat{k}$ and $\vec{b} = 2\hat{i} - \hat{j} - 2\hat{k}$. \vec{r} is a unit vector satisfying $\vec{r} \times \vec{a} = \vec{b} \times \vec{r}$ then the value of $\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k})$ is
 1) $\frac{1}{\sqrt{2}}$ 2) 0 3) $\frac{3}{\sqrt{2}}$ 4) $\frac{-3}{\sqrt{2}}$
- The smallest and largest values of $\tan^{-1} \left(\frac{1-x}{1+x} \right)$. $0 \leq x \leq 1$ is
 1) $0, \pi$ 2) $\frac{\pi}{4}, \frac{\pi}{2}$ 3) $\frac{-\pi}{4}, \frac{\pi}{4}$ 4) $0, \frac{\pi}{4}$
- Two lines $\frac{x-3}{1} = \frac{y+1}{3} = \frac{z-6}{-1}$ and $\frac{x+5}{7} = \frac{y-2}{-6} = \frac{z-3}{4}$ intersect at the point P. the distance of P from origin is \sqrt{k} then the sum of digits of k is
 1) 10 2) 15 3) 16 4) 13
- Let $g(x) = f(x) + f(1-x)$ and $f''(x) > 0, x \in (0,1)$, If g is decreasing in the interval $(0, \alpha)$ and increasing in the interval $(\alpha, 1)$, then α is equal to
 1) $\frac{1}{4}$ 2) $\frac{1}{2}$ 3) $\frac{3}{4}$ 4) $\frac{1}{3}$

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7. Box A contains four tickets numbered 1,2,3,4 box B contains 7 tickets numbered 1,2,3,4,5,6,7. A ticket is drawn from each of the boxes. Let a_i be the number on ticket drawn from box A and let b_i be the number on the ticket drawn from box B. the probability that $a_i \times b_i$ is a multiple of 3 is
- 1) $\frac{15}{28}$ 2) $\frac{13}{28}$ 3) $\frac{2}{3}$ 4) $\frac{11}{28}$
8. Let $A = \{(x, y) : y^2 \leq 8x, 3y - 4x \geq 4\}$ the area (in square units) of the region A is
- 1) $\frac{1}{3}$ 2) $\frac{1}{6}$ 3) 1 4) 2
9. Let $y = y(x)$ be the solution of differential equation $x + y = \cos^{-1}\left(\frac{dy}{dx}\right)$, $y(0) = 0$ then $y(1)$ can be =
- 1) $\frac{\pi}{2} + 1$ 2) $1 - \frac{\pi}{2}$ 3) $\frac{\pi}{2} - 1$ 4) $\frac{\pi}{4} - 1$
10. The number of sets X such that $\{1, 2\} \subseteq X \subseteq \{1, 2, 3, 4, 5\}$ is [where $A \subseteq B$ denotes that A is subset of B]
- 1) 2 2) 8 3) 6 4) 4
11. Ortho centre of $\triangle ABC$ is $\left(3, \frac{3}{4}\right)$ where $A = (0, 0)$ $B = (3, 4)$ then $C =$ _____
- 1) (2, 0) 2) (4, 0) 3) (0, 4) 4) (3, 0)
12. $\int \frac{x + \sin x}{1 + \cos x} dx$ equals
- 1) $x \sec \frac{x}{2} + c$ 2) $x \tan \frac{x}{2} + c$ 3) $\frac{x}{2} \tan x + c$ 4) $x \left(\sec \frac{x}{2} + \tan \frac{x}{2} \right) + c$
13. $px + qy = 40$ is a chord whose mid point is (5, 15) of the circle $(x - 10)^2 + (y - 20)^2 = 729$ then $p + q =$ _____
- 1) 0 2) 1 3) 2 4) 4

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6th-12th Class**720
720**
RANK**RANK
1**



14. If $Z = \frac{1}{2}(\sqrt{3} - i)$ and $|z + i| = \alpha z + \beta(1 + i)$ then $\alpha - 2\beta =$ ____.
- 1) $\sqrt{3}$ 2) $2\sqrt{3}$ 3) 0 4) 2
15. Let R_1, R_2 be two relations defined on natural numbers N as
 $R_1 = \{(a, b) \in N \times N : a \text{ and } b \text{ have at least two common divisors}\}$
 $R_2 = \{(a, b) \in N \times N : 3a + 5b \text{ is an even number}\}$ then
- 1) R_1 is reflexive, symmetric only, R_2 is reflexive only
 2) R_1, R_2 are equivalence relations
 3) R_1 is symmetric, R_2 is equivalence
 4) R_1, R_2 are reflexive, symmetric but not transitive
16. If the term independent of x in the expansion of $\left(\sqrt{ax^2} + \frac{1}{2x^3}\right)^{10}$ is 105, then the value of a^2 is
- 1) 2 2) 4 3) 6 4) 9
17. Statement I: If $f(x) = x^3 + x^2 f'(1) \forall x \in R$ then $f(0) = -6$
 Statement II: Let $f(x) = x^3 + x^2 + 3x, g(x)$ be the inverse of $f(x)$ such that $kg'(5) = 1$ then k is 36.
- 1) Statement I is true, Statement II is false
 2) Statement I is true, Statement is True
 3) Statement I is false, Statement II is True
 4) Statement I is false, Statement II is false
18. Let $A = \begin{bmatrix} 1 & 3 \\ 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & -3 \\ -2 & 2 \end{bmatrix}$ and $C_r = \begin{bmatrix} r & 2 \\ 0 & r-1 \end{bmatrix}$ be given matrices. If $\sum_{r=1}^{50} \text{tr}((AB)^r C_r) = k$ where $\text{tr}(A)$ denotes trace of matrix A , then the value of $\frac{k}{25}$ is
- 1) 250 2) 200 3) 100 4) 150
19. Given the system of equation $a(x+y+z) = x, b(x+y+z) = y, c(x+y+z) = z$ where a, b, c are non zero real numbers have infinite number of solutions. Then the value of $(a+b+c)$ is equal to
- 1) 0 2) -1 3) 1 4) 2

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20.
$$\int_{\frac{\pi}{2024}}^{\frac{1011\pi}{2024}} \log\left(\frac{3+9\tan x}{3+9\cot x}\right) dx =$$

1) $\frac{\pi}{4}$

2) $\frac{1011\pi}{2024}$

3) $\frac{\pi}{2024}$

4) 0

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions**. The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases.

21. Let a_1, a_2, a_3, \dots be a G.P. If $\frac{a_4}{a_2} = 20$ then $\frac{a_{10}}{a_6}$ is

22. If $\sum_{i=1}^5 (x_i - 10) = 5$ and $\sum_{i=1}^5 (x_i - 10)^2 = 25$, then the standard deviation of observations

$5 - 2x_1, 5 - 2x_2, 5 - 2x_3, 5 - 2x_4, 5 - 2x_5$ is

23. Let the foci of a hyperbola coincide with the foci of an ellipse $\frac{(x-1)^2}{25} + \frac{(y-1)^2}{16} = 1$ and eccentricity of the hyperbola is the reciprocal of eccentricity of ellipse, then the distance between the directrices of hyperbola is λ then $25\lambda =$ _____

24. Let $f: R \rightarrow R$ be a function defined by $f(x) = (9 - x^4)^{1/4}$ and $f^n(x) = f(f(\dots f(x)))$ (n times) then $(f^3(\sqrt{2}))^4 + (f^2(\sqrt{2}))^4$ is

25. The total number of points of non-differentiability of $f(x) = \min\left\{|\sin x|, |\cos x|, \frac{1}{4}\right\}$ in $(0, 2\pi)$ is

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**PHYSICS****Max Marks: 100****SECTION-I (SINGLE CORRECT ANSWER TYPE)**

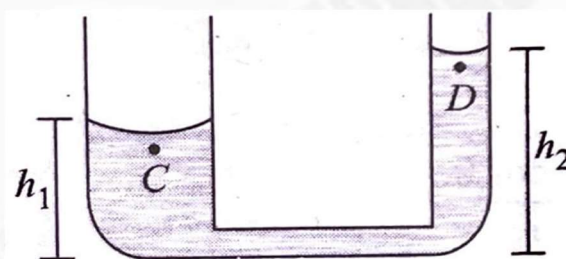
This section contains **20 Multiple Choice Questions**. Each question has 4 options (1), (2), (3) and (4) for its answer, out of which **ONLY ONE** option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and -1 in all other cases.

26. An ideal gas occupies a volume of 2 m^3 at a pressure of $3 \times 10^6 \text{ Pa}$. The energy of the gas is (degrees of freedom $f = 3$)

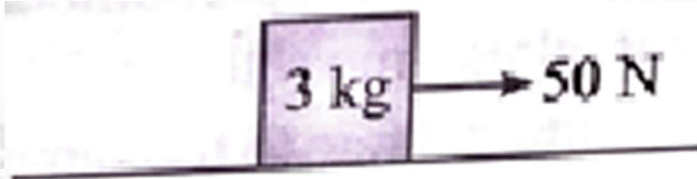
1) $3 \times 10^2 \text{ J}$ 2) 10^8 J 3) $6 \times 10^4 \text{ J}$ 4) $9 \times 10^6 \text{ J}$

27. An U-tube is such that the radius of the wider tube is r_1 and that of narrow tube is r_2 . The value of $(h_2 - h_1)$ is [Surface Tension is S , angle of contact $= 0^\circ$]



1) $\frac{2S(r_1 + r_2)}{\rho g r_1 r_2}$ 2) $\frac{2S(r_1 - r_2)}{\rho g r_1 r_2}$ 3) $\frac{2S r_1 r_2}{\rho g (r_1 - r_2)}$ 4) $\frac{2S r_1 r_2}{\rho g (r_1 + r_2)}$

28. The contact force between block and horizontal rough surface having coefficient of friction 0.5 is ($g = 10 \text{ m/s}^2$)



1) 30 N 2) 15 N 3) $15\sqrt{3} \text{ N}$ 4) $15\sqrt{5} \text{ N}$

29. The ratio of wavelengths for $3 \rightarrow 2$ transition in He^+ , Li^{++} and Be^{+++} is

1) 36 : 9 : 4 2) 36 : 16 : 9 3) 9 : 4 : 1 4) 3 : 2 : 1

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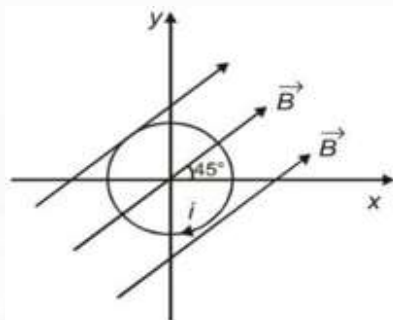
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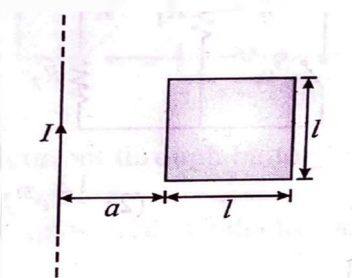
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30. A dipole of moment $\vec{p} = \alpha\hat{i} - \beta\hat{j}$ is placed in an electric field $\vec{E} = 2\beta\hat{i} + 3\alpha\hat{j}$. The torque experienced by dipole is
- 1) $(3\alpha^2 + 2\beta^2)\hat{k}$ 2) $(3\alpha^2 - 2\beta^2)\hat{k}$ 3) $(2\alpha^2 + 3\beta^2)\hat{k}$ 4) $(2\alpha^2 - 3\beta^2)\hat{k}$
31. A current carrying circular loop of radius R is placed in a uniform magnetic field B tesla in x-y plane as shown in fig. The loop carries current $i = 1$ A in the direction shown. Then torque acting on the loop in N-m is



- 1) $\frac{\pi R^2 B}{\sqrt{2}}(\hat{i} + \hat{j})$ 2) $\frac{\pi R^2 B}{\sqrt{2}}(\hat{i} - \hat{j})$ 3) $\frac{\pi R^2 B}{\sqrt{2}}(-\hat{i} - \hat{j})$ 4) $\frac{\pi R^2 B}{\sqrt{2}}(-\hat{i} + \hat{j})$
32. Which of the following has the dimensions of pressure?
- 1) $\frac{M}{L^2 T^2}$ 2) $\frac{M}{LT}$ 3) $\frac{ML}{T^2}$ 4) $\frac{M}{LT^2}$
33. The particle executing SHM has a kinetic energy $K_0 \cos^2 \omega t$. The maximum values of the potential energy and total energy are, respectively
- 1) $\frac{K_0}{2}$ and K_0 2) K_0 and $2K_0$ 3) K_0 and K_0 4) 0 and $2K_0$
34. Consider a long wire and square loop as shown in figure. The mutual inductance is

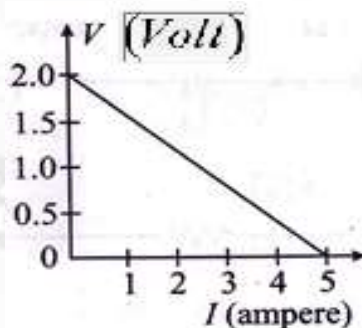


- 1) $\frac{\mu_0 l}{\pi} \ln\left(1 + \frac{l}{a}\right)$ 2) $\frac{\mu_0 l}{2\pi} \ln\left(\frac{l}{a}\right)$ 3) $\frac{2\mu_0 l}{\pi} \ln\left(\frac{l}{a}\right)$ 4) $\frac{\mu_0 l}{2\pi} \ln\left(1 + \frac{l}{a}\right)$

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35. If the electric flux entering and leaving an enclosed surface respectively is ϕ_1 and ϕ_2 , the electric charge inside the surface will be
- 1) $(\phi_2 - \phi_1)\epsilon_0$ 2) $\frac{(\phi_1 - \phi_2)}{\epsilon_0}$ 3) $\frac{(\phi_2 - \phi_1)}{\epsilon_0}$ 4) $(\phi_1 - \phi_2)\epsilon_0$
36. Two identical metal wires of thermal conductivities K_1 and K_2 respectively are connected in series. The effective thermal conductivity of the combination is:
- 1) $\frac{2K_1K_2}{K_1 + K_2}$ 2) $\frac{K_1 + K_2}{2K_1K_2}$ 3) $\frac{K_1 + K_2}{K_1K_2}$ 4) $\frac{K_1K_2}{K_1 + K_2}$
37. Find the torque of a force $7\hat{i} + 3\hat{j} - 5\hat{k}$ about the origin. The force is acting on a particle whose position vector is $\hat{i} - \hat{j} + \hat{k}$.
- 1) $\hat{i} + 12\hat{j} + 10\hat{k}$ 2) $2\hat{i} + 12\hat{j} + 10\hat{k}$ 3) $\hat{i} + \hat{j} + \hat{k}$ 4) $\hat{i} + \hat{j} + 10\hat{k}$
38. The angular momentum of planet of mass M moving around the sun in an elliptical orbit is \vec{L} . The torque acting on the planet w. r. to position of sun is
- 1) 1N-m 2) 0 3) 5N-m 4) 10N-m
39. For a cell, the graph between the potential difference (V) across the terminals of the cell and the current (I) drawn from the cell is shown in the figure. The emf and the internal resistance of the cell are



- 1) 2 V, 0.5 Ω 2) 2 V, 0.4 Ω 3) > 2 V, 0.5 Ω 4) > 2 V, 0.4 Ω

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40. In RLC series circuit, let ω_0 be the resonant frequency, then match the columns.

	Column - A		Column - B
A)	$\omega < \omega_0$	i)	Voltage leads the current
B)	$\omega = \omega_0$	ii)	Voltage and current are in same phase
C)	$\omega > \omega_0$	iii)	Current leads the voltage
D)	$\omega = \sqrt{2}\omega_0$	iv)	$X_L = 2X_C$

1) A-(ii) ; B- (i) ; C- (iii) ;D- (iv) 2) A-(iii) ; B-(ii) ; C- (i) ; D- (iv)

3) A-(iii); B-(i) ; C- (iv) ; D- (ii) 4) A-(i); B-(ii); C- (iii); D- (iv)

41. Given below are two statements. One is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A : If dQ and dW represent the heat supplied to the system and the work done on the system respectively. Then according to the first law of thermodynamics $dQ = dU - dW$.

Reason R : First law of thermodynamics is based on law of conservation of energy.

In the light of the above statements, choose the correct answer from the option given below:

1) A is correct but R is not correct.

2) A is not correct but R is correct.

3) Both A and R are correct and R is the correct explanation of A.

4) Both A and R are correct but R is not the correct explanation of A.

42. **Statement-1:** If the resistance $R = V / i$, where $V = (100 \pm 5) \text{ Volt}$ and $i = (10 \pm 0.2) \text{ ampere}$. Then the total percentage error in R is 5.2%.

Statement-2 : A liquid drop of density ρ , radius r and surface tension σ oscillates with time

period T. Then $T^2 = \frac{\rho r^2}{\sigma}$.

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- 1) Statement-1 is True, Statement-2 is True;
 2) Statement-I is False, Statement-2 is False;
 3) Statement-1. is True, Statement-2 is False.
 4) Statement-1 is False, Statement-2 is True.
43. 5% of the power of 100W bulb is converted to visible radiation. Average intensity of visible radiation at a distance of 10m from the bulb is

- 1) $\frac{5}{2\pi(10)^2} \text{ watt / m}^2$ 2) $\frac{5}{4\pi(10)^2} \text{ watt / m}^2$
 3) $\frac{5}{\pi(10)^2} \text{ watt / m}^2$ 4) $\frac{5}{8\pi(10)^2} \text{ watt / m}^2$

44. This question has statement-I and statement-2. Of the four choices given after the statements, choose the one that best describes the two statements.

Statement-I: A point particle of mass m moving with speed v collides with stationary point particle of mass M . If the maximum energy loss possible is given as

$$f\left(\frac{1}{2}mv^2\right) \text{ then } f = \left(\frac{m}{M+m}\right).$$

Statement-2: Maximum energy loss occurs when the particles get stuck together as a result of the collision.

- 1) Statement-1 is true, statement-2 is true,
 2) Statement-1 is False, statement-2 is False,
 3) Statement-1 is true, statement-2 is false.
 4) Statement-1 is false, statement-2 is true.

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45. **Assertion:** Work done by a force in a certain interval of time may not depend on initial velocity

Reason: Work done by a force is frame-dependent

- 1) A is correct but R is not correct.
- 2) A is not correct but R is correct.
- 3) Both A and R are correct and R is the correct explanation of A.
- 4) Both A and R are correct but R is not the correct explanation of A.

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions**. The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

46. In a Young's double slit experiment 15 fringes are observed on a small portion of the screen when light of wavelength 500 nm is used. Ten fringes are observed on the same section of the screen when another light source of wavelength λ is used. Then the value of λ is (in nm) _____.
47. The magnetic field in travelling EM wave has a peak value of 20 nT. The peak value of electric field strength is (in V/m)
48. The x and y coordinate of a particle at any time t are given by $x = 2t + 4t^2$ and $y = 3t^2$, where x and y are in meters and t in seconds. Acceleration of the particle at $t = 3$ s is (in (m/s^2))
49. When radiation of wavelength λ is used to illuminate a metallic surface, the stopping potential is V . When the same surface is illuminated with radiation of wavelength 3λ , the stopping potential is $\frac{V}{4}$. If the threshold wavelength for the metallic surface is $n\lambda$ then value of n will be _____.
50. A transverse wave described by $y = 2\sin(100\pi t - 2\pi x)$ cm, where x is in m and t in seconds propagates on a stretched string of mass 20 g and length 50 cm. The tension in the string is 50λ N, where λ is _____.



**CHEMISTRY****Max Marks: 100****SECTION-I (SINGLE CORRECT ANSWER TYPE)**

This section contains **20 Multiple Choice Questions**. Each question has 4 options (1), (2), (3) and (4) for its answer, out of which **ONLY ONE** option can be correct.

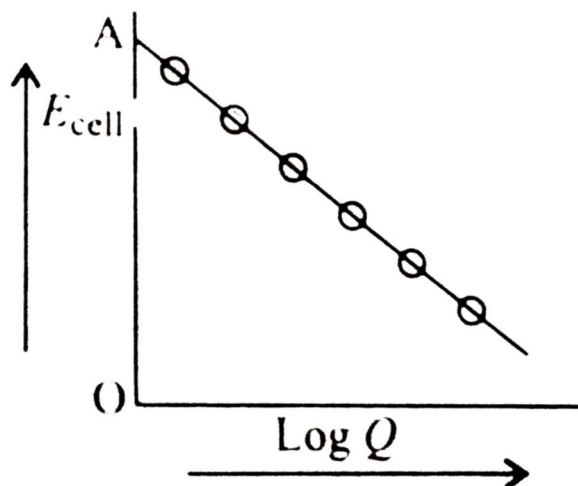
Marking scheme: +4 for correct answer, 0 if not attempted and -1 in all other cases.

51. Wrong statement among the following is

- 1) A Bohr's orbit is a well defined path in which position and velocity of the electron are exactly known
- 2) Heisenberg uncertainty principle is significant only for motion of microscopic particles
- 3) The wavelengths associated with large mass objects will be large.
- 4) Emission spectrum of an atom is a line spectrum.

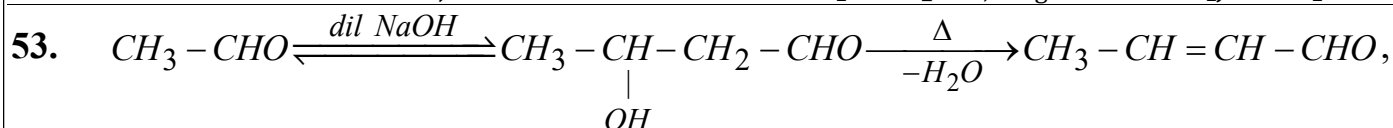
52. $Zn + Cu^{2+}(aq) \rightleftharpoons Cu + Zn^{2+}(aq)$, for this reaction quotient is $Q = \frac{[Zn^{2+}]}{[Cu^{2+}]}$. Variation of emf of

cell E_{cell} with $\log Q$ as per given graph with $OA = 1.10$ V. E_{cell} will be 1.1591 V when



- 1) $[Cu^{2+}]/[Zn^{2+}] = 0.01$
- 2) $[Zn^{2+}]/[Cu^{2+}] = 0.01$
- 3) $[Zn^{2+}]/[Cu^{2+}] = 0.1$
- 4) $[Zn^{2+}]/[Cu^{2+}] = 1$

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Then the name of the reaction is

- 1) Aldol condensation 2) Cannizzaro reaction
3) Gattermann- Koch reaction 4) Stephen reaction

54. The reaction $A + 2B \rightarrow \text{products}$, has been studied under the following initial conditions.

Exp.No	$[A]_0 \text{ (mol.lit}^{-1}\text{)}$	$[B]_0 \text{ (mol.lit}^{-1}\text{)}$	$R_0 \text{ (mol.lit}^{-1}\text{.min}^{-1}\text{)}$
1.	0.01	0.01	2×10^{-3}
2.	0.02	0.02	8×10^{-3}
3.	0.03	0.01	18×10^{-3}

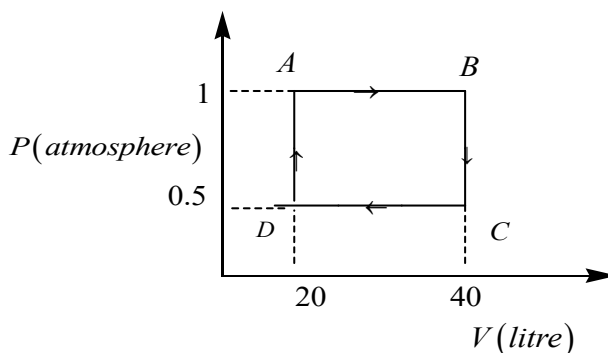
The rate constant of the reaction will have units

- 1) $\text{mol.lit}^{-1}\text{.min}^{-1}$ 2) min^{-1} 3) $\text{lit.mol}^{-1}\text{.min}^{-1}$ 4) $\text{lit}^2.\text{mol}^{-2}\text{.min}^{-1}$

55. Which of the following molecule has maximum dipole moment?

- 1) BF_3 2) H_2O 3) SO_3 4) CCl_4

56. On the basis of the following graph (P-V graph) for an ideal gas; the magnitude of work done in the cyclic process ABCD is

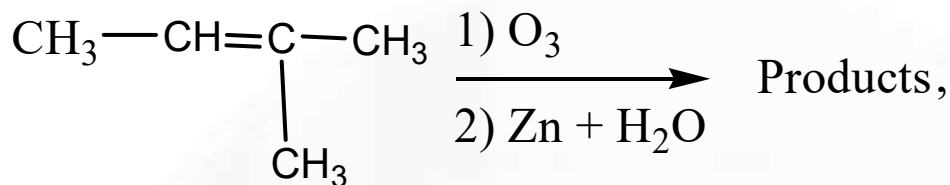


- 1) 20 lit.atm 2) 10 lit.atm 3) 40 lit.atm 4) 5 lit.atm

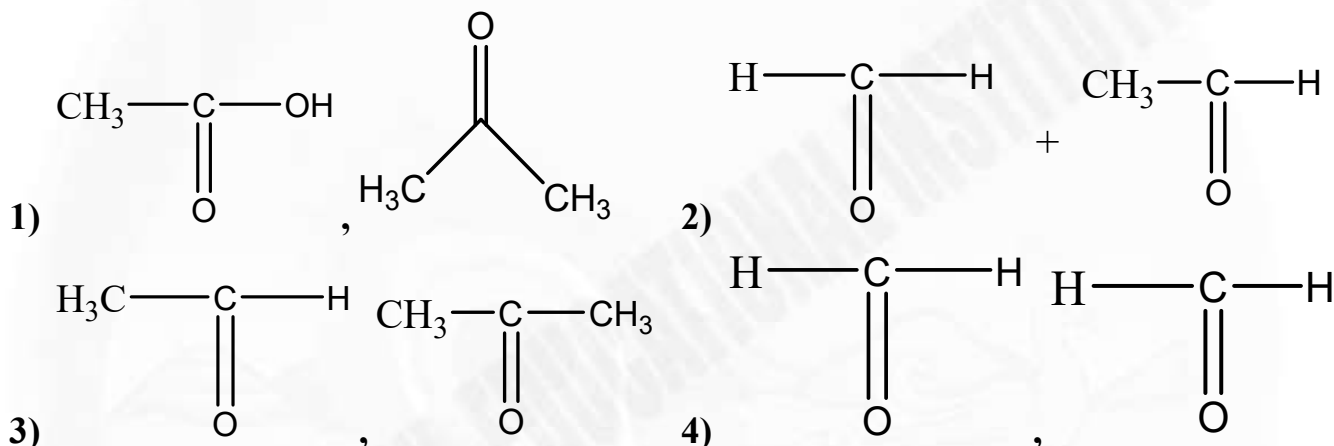
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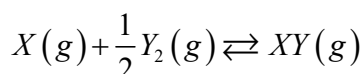
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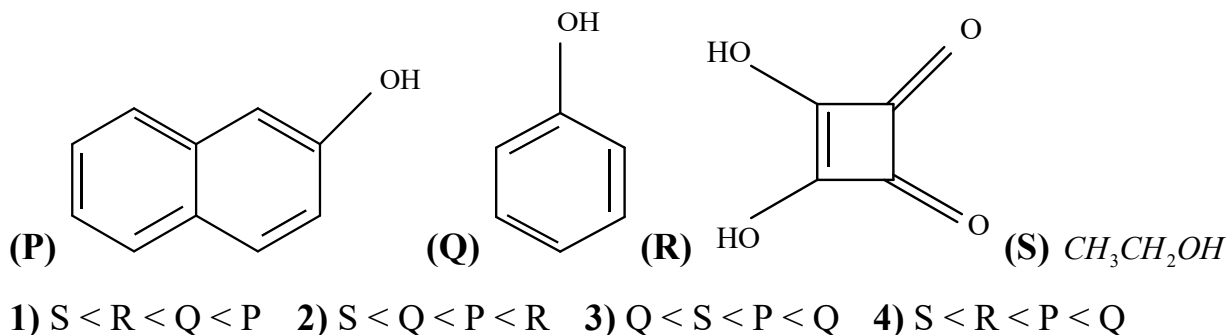
then the products formed in this reaction is



58. The equilibrium constant for the reaction $2XY(g) \rightleftharpoons 2X(g) + Y_2(g)$ is $K_c = 6.4 \times 10^{-3}$. The value of K_c for the reaction given below is

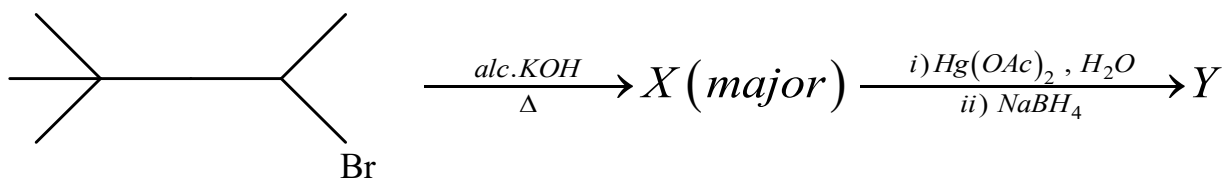


- 1) 25 2) 6.25 3) 12.5 4) 50
59. Increasing order of acidic strength of the following is

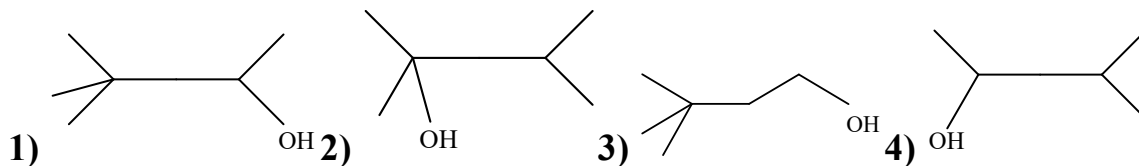
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60.



The final product 'Y'



61. At 35°C , the vapor pressure of CS_2 is 512mm Hg and that of acetone (CH_3COCH_3) is 344mm Hg. A solution of CS_2 and acetone, in which the mole fraction of CS_2 is 0.25 has a total vapor pressure of 600mmHg. Which the following statement about the solution of acetone and CS_2 is true ?

- 1) A mixture of 100ml of acetone and 100ml of CS_2 has a total volume of 200ml.
- 2) When acetone and CS_2 are mixed at 35°C , heat is released.
- 3) When acetone and CS_2 are mixed at 35°C , heat is absorbed.
- 4) Raoul's law is obeyed by both CS_2 and acetone for the solution in which the mole fraction of CS_2 is 0.25.

62. **STATEMENT-I:** Acetic acid is more acidic than benzoic acid

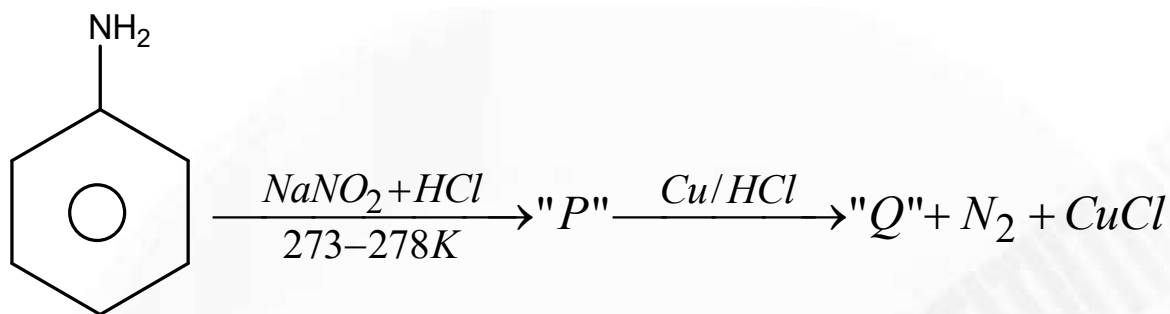
STATEMENT-II : pK_a value of benzoic acid is more than formic acid.

- 1) Both statements are true
- 2) Both statements are false
- 3) Statements -1 is true and statements-2 is false
- 4) Statement-1 is false and statement-2 is true

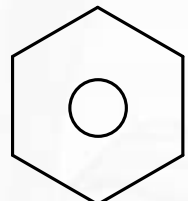
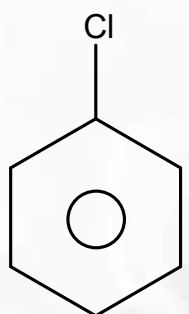
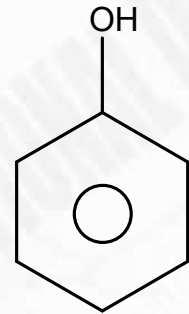
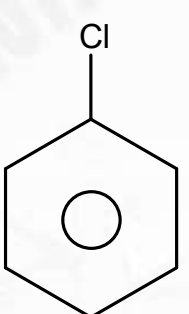
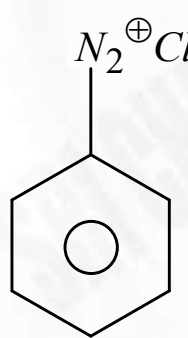
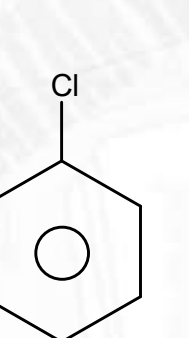
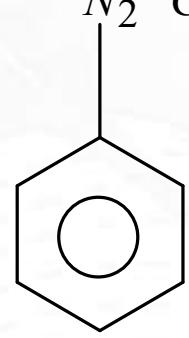
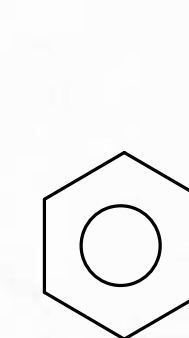
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63.



Then "P" and "Q" are respectively

- 1)  , 
- 2)  , 
- 3)  , 
- 4)  , 

64. $CH_3 - C \equiv CH + H_2O \xrightarrow[333K]{Hg^{+2}/H^+} \text{major product}$, then the major product of this reaction is

- 1) $CH_3 - CO - CH_3$ 2) $CH_3 - CH_2 - CHO$
 3) $CH_3 - CH_2 - OH$ 4) $CH_3 - \underset{\substack{| \\ OH}}{CH} - CH_3$

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65. **ASSERTION:** Amino acids behave like salts rather than simple amines or carboxylic acids.
REASON: In an amino acid carboxylic acid group lose proton and amino group accept proton.
- 1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
 - 2) (A) is not correct but (R) is correct
 - 3) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 - 4) (A) is correct but (R) is not correct
66. Calculate the enthalpy change for the reaction: $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$ by using the following data at reaction temperature of $27^\circ C$.
 Bond enthalpies(kJ/mol) :
 $H-H = 435; Cl-Cl = 240; H-Cl = 430$
- 1) 245 J
 - 2) -92.5 J
 - 3) 122.5 kJ
 - 4) -185 kJ
67. **Assertion(A):** Though the central atom of both NH_3 and H_2O molecules are sp^3 hybridized, yet $H-N-H$ bond angle is greater than that of $H-O-H$.
Reason (R): This is because nitrogen atom has one lone pair and oxygen atom has two lone pairs.
- 1) A and R both are correct, and R is the correct explanation of A
 - 2) A and R both are correct, but R is not the correct explanation of A
 - 3) A is true but R is false
 - 4) A and R both are false
68. Correct order among the following as per bond energies of given bond is:
- 1) $(Cl-Cl) > (Br-Br) > (F-F) > (I-I)$
 - 2) $(H-O) < (H-S) < (H-Se)$
 - 3) $(H-F) < (H-Cl) < (H-Br)$
 - 4) $(N-H) < (P-H) < (As-H)$

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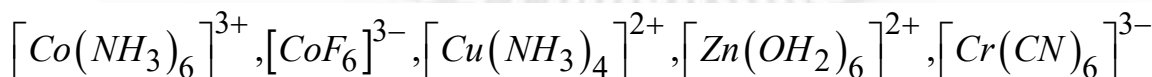
69. An aqueous solution is 0.3M in Al^{3+} and 3M in Mg^{2+} . Select the only correct option.
GIVEN : $K_{sp} Al(OH)_3 = 3 \times 10^{-34} M^4$
 $K_{sp} Mg(OH)_2 = 3 \times 10^{-12} M^3$
- 1) On adding $NaOH$ slowly to the solution, both $Al(OH)_3$ and $Mg(OH)_2$ precipitate together.
 - 2) On adding $NaOH$ slowly to the solution, $Mg(OH)_2$ precipitate first.
 - 3) On adding $NaOH$ slowly to the solution, neither $Al(OH)_3$ nor $Mg(OH)_2$ precipitate.
 - 4) On adding $NaOH$ slowly to the solution, $Al(OH)_3$ precipitate first.
70. Statement I: In group 14, the stability of '+2' oxidation state increases down the group
 Statement II: Stable oxidation state of thallium(Tl) is '+1'
- 1) Both statements are true
 - 2) Both statements are false
 - 3) Statement I is false and Statement II is true
 - 4) Statement I is true and Statement II is false

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions**. The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

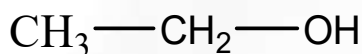
Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

71. In first row of transition metals, atomic number of the element which can exhibit highest oxidation state is
72. Consider the following unbalanced equation
 $KIO_3 + H_2C_2O_4 + H_2SO_4 \rightarrow K_2SO_4 + CO_2 + I_2 + H_2O$
 If 'x' is the number of moles of oxalic acid oxidized by one mole of potassium iodate by using 'y' moles of H_2SO_4 , The value of (x+y) is_____.
73. How many of the following complexes have unpaired electrons:

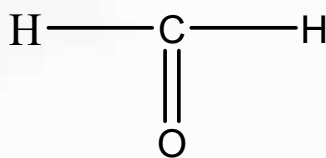




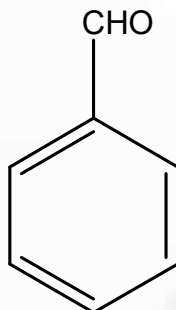
74. How many of the following compounds give tollen's test?



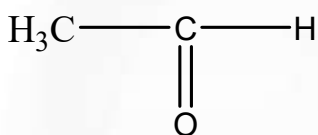
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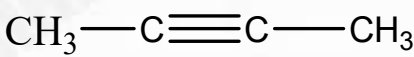
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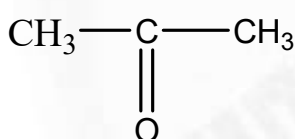
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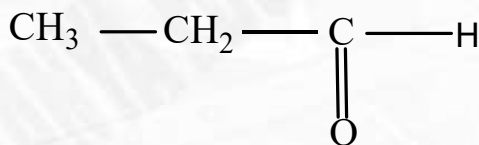
(V)



(VI)



(VII)



(VIII)

75. If 30g of a metal can displace 2g of hydrogen from an acid. The equivalent weight of metal is _____ g.eq^{-1} .

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RANK



PALAGIRI SATHISH REDDY
Appl.No. 240310905497

70
RANK



MD K GHOUSE MOHIUDDIN
Appl.No. 240310176352

76
RANK



T V S SAI NAGA BHUSHAN
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92
RANK



M M PRUTHVI RAJ
Appl.No. 24031084545

93
RANK



M SAI SIVA LOCHAN
Appl.No. 240310866829*

95
RANK



RAJDEEP MISHRA
Appl.No. 240310265621*

96
RANK



MANOJ SOHAN GAJULA
Appl.No. 240310529661

98
RANK



KRISHNA NARSARIA
Appl.No. 240310028285*



Below
100
All-India Open
Category Ranks

25

Below
500
All-India Open
Category Ranks

108

Below
1000
All-India Open
Category Ranks

222

Below
100
All-India All
Category Ranks

97

Below
1000
All Category
Ranks

888

**TOTAL QUALIFIED RANKS FOR
JEE ADVANCED-2024**

21,987

**FOR OFFER ON JEE MAIN &
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