



Sample Paper

For Class - XII (PCM)

Time: 90 Min.		TEST PATTERN		Max. Marks: 135	
Total Questions	Subject		Type	Marks Criteria (Total 135 Marks)	
45	Physics (1-15), Chemistry (16-30), Mathematics (31-45)		Objective Question	Correct (+3) Mark	Incorrect (−1) Mark

1. PHYSICS

Straight Objective

This section contains 15 questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

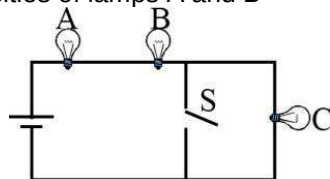
1. A coil having inductance L and resistance R is connected to a battery of emf ε at $t = 0$. If t_1 and t_2 are the times for 90% and 99% completion of the current growth in the circuit, then t_1/t_2 will be

(A) 1 : 2 (B) 2 : 1 (C) $\frac{\log_e 10}{2}$ (D) $2 \log_e 10$

2. Consider a neutral conducting sphere, A positive point charge is placed outside the sphere. Then the net charge on the sphere is

(A) Negative and distributed uniformly over the surface of the sphere
(B) Negative appears only at the point on the sphere closest to the point charge
(C) Negative and distributed non-uniformly over the entire surface of the sphere
(D) Zero

3. A circuit consists of three identical lamps connected to a battery as shown in the figure. When the switch S is closed then the intensities of lamps A and B



(A) will increase by eight times (B) will decrease by two times
(C) will increase by more than two times (D) will remain the same

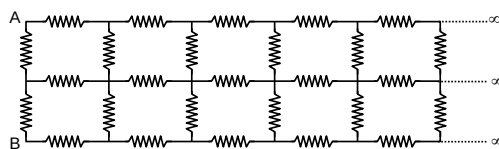
4. A rod of length l rotates with a uniform angular velocity ω about its perpendicular bisector. A uniform magnetic field B exists parallel to the axis of rotation. The potential difference between the two end of the rod is

(A) Zero (B) $\frac{1}{2} \omega B l^2$ (C) $B \omega l^2$ (D) $2 B \omega l^2$

5. Unpolarised light of intensity 32 W m^{-2} passes through three polarizers arranged such that the transmission axes of the first and the last polarizer are at right angles. If the intensity of emerging light is 3 W m^{-2} , then what is the angle (in degree) between the transmission axes of the first two polarizers?

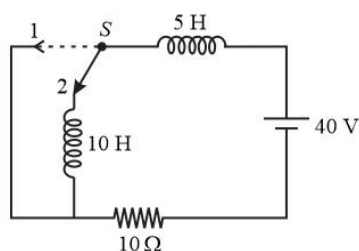
(A) 30 (B) 28 (C) 32 (D) None of these

6. In given arrangement all resistors are of 1Ω . What is equivalent resistance between A & B.



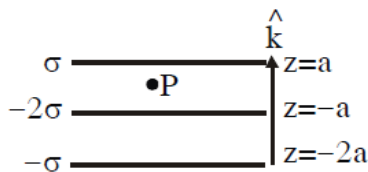
(A) $1 + \sqrt{5}$ (B) $2 + \sqrt{5}$ (C) $3 - \sqrt{5}$ (D) $\sqrt{5} - 1$

7. In the circuit shown in the figure, the switch was kept in position – 1 for a very long time and then at $t = 0$ it is shifted to position – 2. The current in the circuit immediately after that is $i = a/b \text{ A}$, then the value of $a + b$ is

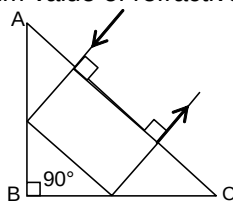


(A) 7 (B) 5 (C) 8 (D) 9

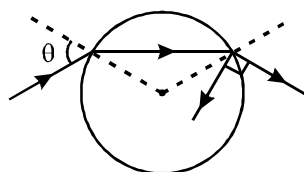
8. Two concentric coils of 10 turns each are placed in the same plane. Their radii are 20 cm and 40 cm and carry 0.2 A and 0.3 A current respectively in opposite directions. The magnetic induction (in tesla) at the centre is
 (A) $\frac{3}{4} \mu_0$ (B) $\frac{5}{4} \mu_0$ (C) $\frac{7}{4} \mu_0$ (D) $\frac{9}{4} \mu_0$
9. In the spectrum of the hydrogen atom, the ratio of the wavelengths of the longest wavelength in Lyman series to the longest wavelength in the Balmer series is
 (A) $\frac{5}{27}$ (B) $\frac{1}{93}$ (C) $\frac{4}{9}$ (D) $\frac{3}{2}$
10. Three large parallel plane sheet of charge have uniform surface charge densities as shown in the figure. What is the electric field at P



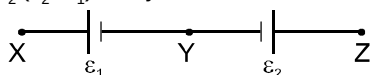
- (A) $-\frac{4\sigma}{\epsilon_0} \hat{k}$ (B) $\frac{4\sigma}{\epsilon_0} \hat{k}$ (C) $-\frac{2\sigma}{\epsilon_0} \hat{k}$ (D) $\frac{2\sigma}{\epsilon_0} \hat{k}$
11. A right-angled isosceles prism ABC is immersed in a liquid of refractive index μ . Incident and emergent rays are parallel as shown. The minimum value of refractive index of prism is $P\mu$ then find out P^2 .



- (A) 2 (B) 3 (C) 4 (D) 6
12. A man moves 2 m towards a plane mirror and the mirror moves perpendicular to itself by 3 m towards the man. Then the distance(in m) by which his image moves w.r.t ground is
 (A) 6 (B) 8 (C) 10 (D) 4
13. A ray incident at a point at an angle of incidence θ enters into a glass sphere placed in air which is reflected and refracted at the farther surface of the sphere as shown in the figure. The angle between reflected and refracted rays at this surface is 90° . If refractive index of the sphere is $\sqrt{3}$, the angle θ is :



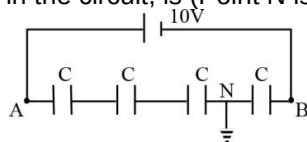
- (A) $\frac{\pi}{3}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\frac{2\pi}{3}$
14. Two cells of emf ϵ_1 and ϵ_2 ($\epsilon_2 < \epsilon_1$) are joined as shown in figure :



When a potentiometer is connected between x and y it balances for 300 cm length against ϵ_1 . On connecting the same potentiometer between x and z it balances for 100 cm length against ϵ_1 and ϵ_2 . Then the ratio $\frac{\epsilon_2}{\epsilon_1}$ is

- (A) $\frac{1}{3}$ (B) $\frac{3}{4}$ (C) $\frac{1}{4}$ (D) $\frac{2}{3}$

15. The potential at point A, in the circuit, is (Point N is grounded, i.e. the potential of that point is zero.)



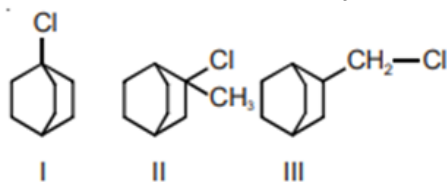
- (A) 10 V (B) 7.5 V (C) 5 V (D) 2.5 V

2. CHEMISTRY

Straight Objective Type

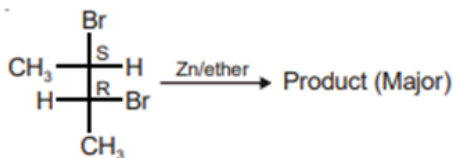
This section contains 15 questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

16. The complex compound bearing square planar geometry is
 (A) $\text{Ni}(\text{CO})_4$ (B) $[\text{Ni}(\text{CN})_4]^{2-}$ (C) $[\text{Mn}(\text{CN})_6]^{3-}$ (D) $[\text{MnCl}_4]^{2-}$
17. The complex compound having maximum magnetic moment is
 (A) $[\text{CoF}_6]^{3-}$ (B) $[\text{Cr}(\text{NH}_3)_6]^{3+}$ (C) $[\text{FeF}_6]^{3-}$ (D) $[\text{Mn}(\text{CN})_6]^{4-}$
18. CFSE(Δ_0) for metal ion in d7 configuration in presence of strong ligand field is
 (A) $-0.6 \Delta_0$ (B) $-0.8 \Delta_0$ (C) $-1.6 \Delta_0$ (D) $-1.8 \Delta_0$
19. In case of high spin complex
 (A) $\Delta_0 = P$ (B) $\Delta_0 > P$ (C) $\Delta_0 < P$ (D) $\Delta_0 \cdot P = 1$
20. The correct orders of reactivity towards $\text{S}_{\text{N}}1$ reaction is



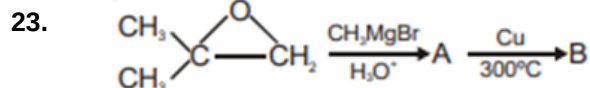
- (A) $\text{I} > \text{II} > \text{III}$ (B) $\text{II} > \text{III} > \text{I}$ (C) $\text{III} > \text{II} > \text{I}$ (D) $\text{I} > \text{III} > \text{II}$

21. In the given reaction



The product will be

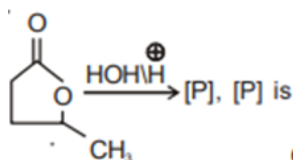
- (A) Cis-2-butene (B) Trans-2-butene (C) 2-butyne (D) Buta-1, 3-diene
22. Reaction of t-butyl bromide with sodium methoxide produces
 (A) Sodium t-butoxide (B) t-butyl methyl ether (C) Isobutane (D) Isobutylene



B is

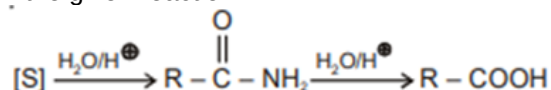
- (A) $(\text{CH}_3)_3\text{CHO}$
 (B) $\text{CH}_3-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_3$
 (C) $(\text{CH}_3)_2\text{CHCOCH}_3$
 (D) $\text{CH}_3\text{C}(\text{CH}_3)_2-\text{CH}_2-\text{CH}_2\text{CH}_3$

24. In the given reaction



- (A) $\text{HOOC}-\text{CH}_2-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$
 (B) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{COOH}$
 (C) $\text{HO}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{COOH}$
 (D) $\text{CH}_3-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{CH}_2-\text{COOH}$

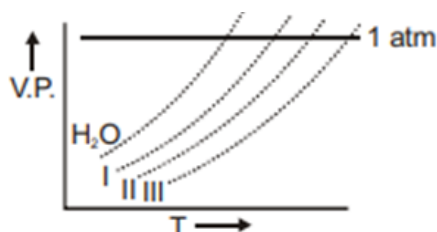
25. In the given reaction



[S] will be

- (A) RCN (B) RNC (C) RCHO (D) R_2CO

- 26.



Which is having highest elevation in boiling point?

- (A) H_2O (B) Aqueous solution I (C) Aqueous solution II (D) Aqueous solution III
27. If any solute 'A' dimerises in water at 1 atm pressure and the boiling point of this solution is 100.52°C . If 2 moles of A is added to 1 kg of water and k_b for water is 0.52°C/molal , calculate the percentage association of A
 (A) 50% (B) 30% (C) 25% (D) 100%
28. Substance A tetramerises in water to the extent of 80%. A solution of 2.5 of A in 100 g of water lowers the freezing point by 0.3°C . The molar mass of A (K_f for water = $1.86 \text{ K kg mol}^{-1}$)
 (A) 122 (B) 31 (C) 244 (D) 62
29. Standard cell voltage for the cell $\text{Pb/Pb}^{2+}||\text{Sn}^{2+}/\text{Sn}$ is -0.01V . If the cell is to exhibit $E_{\text{cell}} = 0$ then the value of $\log [\text{Sn}^{2+}] / [\text{Pb}^{2+}]$ should be
 (A) 0.33 (B) 0.5 (C) 1.5 (D) -0.5
30. The following facts are available
 $2\text{A}^- + \text{B}_2 \rightarrow 2\text{B}^- + \text{A}_2$
 $2\text{C}^- + \text{B}_2 \rightarrow \text{No reaction}$
 $2\text{D}^- + \text{A}_2 \rightarrow 2\text{A}^- + \text{D}_2$
 Which of the following statement is correct?
 (A) $E_{\text{C}/\text{C}_2}^\circ > E_{\text{B}/\text{B}_2}^\circ > E_{\text{A}/\text{A}_2}^\circ > E_{\text{D}/\text{D}_2}^\circ$
 (B) $E_{\text{C}/\text{C}_2}^\circ < E_{\text{B}/\text{B}_2}^\circ < E_{\text{A}/\text{A}_2}^\circ < E_{\text{D}/\text{D}_2}^\circ$
 (C) $E_{\text{C}/\text{C}_2}^\circ < E_{\text{B}/\text{B}_2}^\circ > E_{\text{A}/\text{A}_2}^\circ > E_{\text{D}/\text{D}_2}^\circ$
 (D) Can't predict

3. MATHEMATICS

Straight Objective Type

This section contains 15 questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of Which **ONLY ONE** is correct.

31. If $A = \{1, 2, 3\}$ and $B = \{1, 2\}$ and $C = \{4, 5, 6\}$, then what is the number of elements in the set $A \times B \times C$?
(A) 8 (B) 9 (C) 15 (D) 18
32. In the set $A = \{1, 2, 3, 4, 5\}$ a relation R is defined by $R = \{(x, y) | x, y \in A \text{ and } x < y\}$. Then R is
(A) Reflexive (B) Symmetric (C) Transitive (D) Equivalence relation
33. The value of $[e] - [-\pi]$ is, where $[.]$ denotes greatest integer function
(A) 5 (B) 6 (C) 7 (D) 8
34. The domain of the function $f(x) = \frac{\sqrt{-\log_{0.3}(x-1)}}{\sqrt{x^2 + 2x + 8}}$ is
(A) (1, 4) (B) (-2, 4) (C) (2, 4) (D) $[2, \infty)$
35. Which of the following pair of functions are identical ?
(A) $\sqrt{1+\sin x}, \sin \frac{x}{2} + \cos \frac{x}{2}$ (B) $x, \frac{x^2}{x}$
(C) $\sqrt{x^2}, (\sqrt{x})^2$ (D) $\ell nx^3 + \ell nx^2, 5\ell nx$
36. $\lim_{x \rightarrow 1} (1-x + [x-1] + [1-x])$ is equal to (where $[.]$ denotes greatest integer function)
(A) 0 (B) 1 (C) -1 (D) does not exist
37. $\lim_{x \rightarrow \frac{\pi}{2}} \left[\frac{x - \frac{\pi}{2}}{\cos x} \right]$ is equal to (where $[.]$ represents greatest integer function)
(A) -1 (B) 0 (C) -2 (D) does not exist
38. The function $f(x) = \sin^{-1}(\cos x)$ is:
(A) discontinuous at $x = 0$ (B) continuous at $x = 0$
(C) differentiable at $x = 0$ (D) none of these
39. Given that $f'(2) = 6$ and $f'(1) = 4$, then $\lim_{h \rightarrow 0} \frac{f(2h+2+h^2) - f(2)}{f(h-h^2+1) - f(1)} =$
(A) does not exist (B) is equal to $-3/2$ (C) is equal to $3/2$ (D) is equal to 3
40. If the function $g(x) = \begin{cases} k\sqrt{x+1} & , 0 \leq x \leq 3 \\ mx+2 & , 3 < x \leq 5 \end{cases}$ is differentiable, then the value of $k+m$ is;
(A) 2 (B) $\frac{16}{5}$ (C) $\frac{10}{3}$ (D) 4
41. $\begin{bmatrix} x^2+x & x \\ 3 & 2 \end{bmatrix} + \begin{bmatrix} 0 & -1 \\ -x+1 & x \end{bmatrix} = \begin{bmatrix} 0 & -2 \\ 5 & 1 \end{bmatrix}$ then x is equal to -
(A) -1 (B) 2 (C) 1 (D) No value of x

42. If $A = \text{diag}(2, -1, 3)$, $B = \text{diag}(-1, 3, 2)$, then $A^2B =$
 (A) $\text{diag}(5, 4, 11)$ (B) $\text{diag}(-4, 3, 18)$ (C) $\text{diag}(3, 1, 8)$ (D) B
43. If A and B are square matrices of order 3 such that $|A| = -1$, $|B| = 3$, then $|3AB|$ is equal to
 (A) -9 (B) -81 (C) -27 (D) 81
44. The determinant $\begin{vmatrix} \cos(\theta + \phi) & -\sin(\theta + \phi) & \cos 2\phi \\ \sin\theta & \cos\theta & \sin\phi \\ -\cos\theta & \sin\theta & \cos\phi \end{vmatrix}$ is:
 (A) 0 (B) independent of θ
 (C) independent of ϕ (D) independent of θ & ϕ both
45. Let $A = \begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ and X be a matrix such that $A = BX$, then X is equal to
 (A) $\frac{1}{2} \begin{bmatrix} 2 & 4 \\ 3 & -5 \end{bmatrix}$ (B) $\frac{1}{2} \begin{bmatrix} -2 & 4 \\ 3 & 5 \end{bmatrix}$ (C) $\begin{bmatrix} 2 & 4 \\ 3 & -5 \end{bmatrix}$ (D) none of these

CLASS : XII_PCM

STAR SAMPLE PAPER

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	A	D	C	A	A	D	A	B	A	C	A	B	A	D	B
Ques.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	B	C	D	C	B	B	D	B	A	A	D	D	D	A	B
Ques.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	D	C	B	D	D	C	C	B	D	A	A	B	B	B	A