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NEET 2023-24

Mark 720	Group PCB	PRE FINAL ROUND - 04	Date : 23/03/2024 Time : 3 :20 Hours

Answer Key Version - S (PCB NEET 2023-24)

Physics					Chemistry				
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03. 2	14. 3	25. 2	**Sec. B**	46. 4	53. 2	64. 3	75. 1	**Sec. B**	96. 1
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07. 4	18. 1	29. 1	39. 4	50. 1	57. 1	68. 1	79. 1	89. 4	100. 1
08. 1	19. 1	30. 2	40. 3		58. 3	69. 4	80. 3	90. 1	
09. 4	20. 1	31. 2	41. 2		59. 1	70. 2	81. 3	91. 4	
10. 2	21. 1	32. 2	42. 3		60. 2	71. 3	82. 2	92. 3	

Biology									
Part-I Sec.A	110. 3	121. 1	132. 1	142. 4	**Part-II Sec.A**	160. 4	171. 2	182. 2	192. 1
	111. 3	122. 3	133. 1	143. 3		161. 4	172. 2	183. 2	193. 3
101. 4	112. 2	123. 1	134. 1	144. 2	151. 1	162. 4	173. 4	184. 4	194. 4
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103. 2	114. 1	125. 4	**Sec.B**	146. 3	153. 1	164. 4	175. 4	**Sec. B**	196. 2
104. 3	115. 3	126. 1	136. 2	147. 3	154. 1	165. 3	176. 4	186. 3	197. 2
105. 1	116. 4	127. 1	137. 4	148. 1	155. 3	166. 4	177. 2	187. 2	198. 2
106. 1	117. 2	128. 2	138. 4	149. 4	156. 4	167. 1	178. 4	188. 4	199. 2
107. 3	118. 2	129. 3	139. 1	150. 1	157. 4	168. 3	179. 3	189. 4	200. 1
108. 2	119. 1	130. 3	140. 4		158. 3	169. 2	180. 4	190. 1	
109. 1	120. 2	131. 1	141. 2		159. 4	170. 4	181. 2	191. 1	

PHYSICS

SECTION - A (35 Questions)

01. **(1)** $|dq| = \frac{d\phi}{R} = i\,dt =$ Area under $i - t$ graph

$\therefore d\phi =$ (Area under $i - t$ graph) R

$= \frac{1}{2} \times 4 \times 0.1 \times (10) = 2\,Wb$.

02. **(3)** Time difference

$= \frac{T}{2\pi} \times \phi = \frac{(1/50)}{2\pi} \times \frac{\pi}{4} = \frac{1}{400} s = 2.5\, m - s$

03. **(2)** $\cos\phi = \frac{R}{Z} = \frac{R}{\sqrt{R^2 + \omega^2 L^2}}$

$= \frac{12}{\sqrt{(12)^2 + 4 \times \pi^2 \times (60)^2 \times (0.1)^2}}$

$\Rightarrow \cos\phi = 0.30$

04. **(2)** $E_0 = CB_0$

$B_0 = \frac{9}{3 \times 10^8} = 3 \times 10^{-8} T$

05. **(1)** Angular momentum is integral multiple of $\frac{h}{2\pi}$

$mvr = \frac{nh}{2\pi}$

So momentum $mv = \frac{nh}{2\pi r}$

06. **(2)** Input [H.W.] Output

Input, 60 Hz   Output, 60 Hz

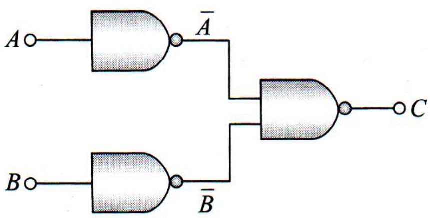
07. **(4)** $r_n \propto n^2$

$\Rightarrow \frac{r_4}{r_1} = \left(\frac{4}{1}\right)^2 = \frac{16}{1}$

$\Rightarrow r_4 = 16 r_1$

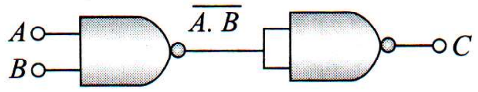
$\Rightarrow r_4 = 16\, r_0$

08. **(1)**



$C = \overline{\bar{A}\,.\,\bar{B}} = \overline{\overline{A + B}} = A + B$ (De Morgan's theorem)

Hence, Output C is equivalent to OR gate.



$C = \overline{\overline{AB}\,.\,\overline{AB}} = \overline{\overline{AB}} + \overline{\overline{AB}} = AB + AB = AB$

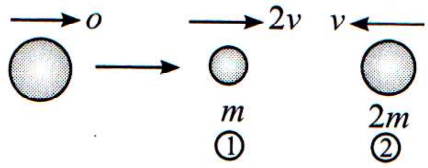
In this case output C is equivalent to AND gate.

09. **(4)** If E is the energy radiated in transition,

then $E_{R\to G} > E_{Q\to S} > E_{R\to S} > E_{Q\to R} > E_{P\to Q}$

For getting blue line energy radiated should be maximum $\left(E \propto \frac{1}{\lambda}\right)$. Hence (4) is the correct option.

10. **(2)**



$0 = m.2v - 2mv$

mass $\propto$ volume $\propto$ (radius)^3

$\frac{r_1^3}{r_2^3} = \frac{m}{2m} \Rightarrow \frac{r_1}{r_2} = \left(\frac{1}{2}\right)^{1/3}$

11. **(3)** $r \propto (A)^{1/3}$

12. **(1)**

13. **(4)** The output D for the given combination

$D = \overline{(A + B)\cdot C} = \overline{(A + B)} + \bar{C}$

If A = B = C = 0

then $D = \overline{(0 + 0)} + \bar{0} = \bar{0} + \bar{0} = 1 + 1 = 1$

If A = B = 1, C = 0

then $D = \overline{(1 + 1)} + \bar{0} = \bar{1} + \bar{0} = 0 + 1 = 1$

14. **(3)**

15. **(1)** $V_n \propto \frac{Z}{n}$

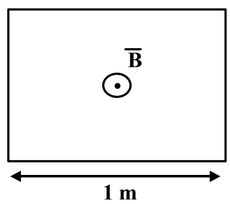
$v_n n$ = constant

16. **(2)** $\lambda = \frac{h}{\sqrt{2mqV}} \Rightarrow \lambda\sqrt{V}$ = constant

A rectangular hyperbola.

17. **(2)** Poles always occur in pair.

18. **(1)**



$R = 1\Omega$

B = 0.5 T

$\oint_B = \overline{B}.\overline{ds} = 0.5 \times 1 \times 1 \times \cos 0 = 0.5$

19. **(1)** $\phi = 5t^3 + 4t^2 + 2t - 5$

$|e| = \frac{d\phi}{dt} = 15t^2 + 8t + 2$

At t = 2, $|e| = 15 \times 2^2 + 8 \times 2 + 2$

$\Rightarrow e = 78V \Rightarrow I = \frac{e}{R} = \frac{78}{5} = 15.60$

20. **(1)** $C = \frac{\omega}{k} = \frac{E_0}{B_0}$

21. **(1)** In vacuum velocity of all EM waves are same but their wavelengths are different.

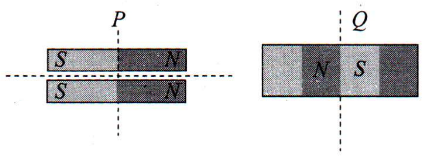
22. **(3)** At the time $t = 0$, e is maximum and is equal to E, but current i is zero.
As the time passes, current through the circuit increases but induced emf decreases.

23. **(4)** Peak value of r.m.s. value means, current become $\frac{1}{\sqrt{2}}$ times.

So from $i = i_0 \sin 100\pi t \Rightarrow \frac{1}{\sqrt{2}} \times i_0 = i_0 \sin 100\pi t$

$\Rightarrow \sin\frac{\pi}{4} = \sin 100\pi t \Rightarrow t = \frac{1}{400}\sec = 2.5 \times 10^{-3}\sec$.

24. **(3)** If pole strength, magnetic moment and length of each part are m', M' and L' respectively then



$m' = \frac{m}{2}$	$m' = m$
$L' = L$	$L' = \frac{L}{2}$
$\Rightarrow M' = \frac{M}{2}$	$\Rightarrow M' = \frac{M}{2}$

25. **(2)** At t = 0, phase of the voltage is voltage is zero, while phase of the current is $-\frac{\pi}{2}$ i.e., voltage leads by $\frac{\pi}{2}$.

26. **(2)** Potential across the PN junction varies symmetrically linear, having P side negative and N side positive.

27. **(3)** β – rays are beams of fast electrons.

28. **(2)** The energy of a photon is given by $E = \frac{hc}{\lambda} \Rightarrow E \propto \frac{1}{\lambda}$. Therefore, the graph of E v/s λ is rectangular hyperbola.

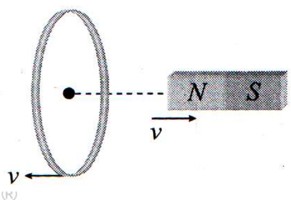
29. **(1)** $v = \frac{C}{\lambda}$

$\Rightarrow v_1 = \frac{3\times10^8}{1} = 3\times10^8\ Hz = 300\ MHz$

and $v_2 = \frac{3\times10^8}{10} = 3\times10^7\ Hz = 30\ MHz$

30. **(2)** $\left(\frac{d\phi}{dt}\right)_{In\ first\ case} = e$

$\left(\frac{d\phi}{dt}\right)_{relative\ velocity\ 2v} = 2\left(\frac{d\phi}{dt}\right)_{I\ case} = 2e$



31. **(2)** Repelled due to induction of similar poles.

32. **(2)** For a diamagnetic substance χ is small, negative and independent of temperature.

33. **(2)** This is because, when frequency v is increased, the capacitive reactance $X_C = \frac{1}{2\pi vC}$ decreases and hence the current through the bulb increases.

34. **(1)** The stopping potential for curves a and b is same.

$\therefore f_a = f_b$

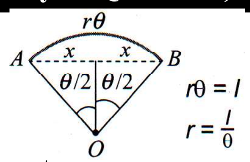
Also saturation current is proportional to intensity

$\therefore I_a < I_b$.

35. **(3)** $\vec{E}$ and $\vec{B}$ are mutually perpendicular to each other and are in phase i.e. they become zero and minimum at the same place and at the same time.

SECTION - B (Attempt Any 10 Questions)

36. **(4)** From figure



$\sin\frac{\theta}{2} = \frac{x}{r} \Rightarrow x = r\sin\frac{\theta}{2}$

Hence new magnetic moment

$M' = m(2x) = m\,.\,2r\sin\frac{\theta}{2}$

$= m.\frac{2l}{\theta}\sin\frac{\theta}{2} = \frac{2ml\sin\theta/2}{\theta} = \frac{2M\sin(\pi/6)}{\pi/3} = \frac{3M}{\pi}$

37. **(3)** When magnet of length l is cut into four equal

parts. then $m' = \frac{m}{2}$ and $l' = \frac{l}{2}$;

$$\therefore M' = \frac{m}{2} \times \frac{l}{2} = \frac{ml}{4} = \frac{M}{4}$$

New moment of inertia $I' = \frac{wl^2}{12}$

$$= \frac{\frac{w}{4}\left(\frac{1}{2}\right)^2}{12} = \frac{1}{16} \cdot \frac{wl^2}{12}$$

Here w is the mass of magnet

$\therefore I' = \frac{1}{16} I$; Time period of each part

$$T' = 2\pi\sqrt{\frac{I}{M'B_H}}$$

$$= 2\pi\sqrt{\frac{I/16}{(M/4)B_H}} = 2\pi\sqrt{\frac{I}{4MB_H}} = \frac{T}{2}$$

38. **(2)** $e = \frac{NBA(\cos\theta_2 - \cos\theta_1)}{\Delta t}$

$$= -2000 \times 0.3 \times 70 \times 10^{-4} \frac{(\cos 180 - \cos 0)}{0.1}$$

$$\Rightarrow e = 84\, V$$

39. **(4)** $N\phi = Li$

$$\Rightarrow \frac{Nd\phi}{dt} = \frac{Ldi}{dt}$$

$$\Rightarrow NB\frac{dA}{dt} = \frac{Ldi}{dt}$$

$$\Rightarrow \frac{1 \times 1 \times 5}{10^{-3}} = L \times \left(\frac{2-1}{2 \times 10^{-3}}\right)$$

$$\Rightarrow L = 10\, H$$

40. **(3)** $E = W_0 + K_{\max}$

$$\Rightarrow \frac{hc}{\lambda_1} = W_0 + E_1$$

and $\frac{hc}{\lambda_2} = W_0 + E_2$

$$\Rightarrow hc = W_0\lambda_1 + E_1\lambda_1 \text{ and } hc = W_0\lambda_2 + E_2\lambda_2$$

$$\Rightarrow W_0\lambda_1 + E_1\lambda_1 = W_0\lambda_2 + E_2\lambda_2$$

$$\Rightarrow W_0 = \frac{E_1\lambda_1 - E_2\lambda_2}{(\lambda_2 - \lambda_1)}$$

41. **(2)** By using $E = W_0 + K_{\max} \Rightarrow K_{\max} = E - W_0$

Hence, $K_1 = 1 - 0.5 = 0.5$ and $K_2 = 2.5 - 0.5 = 2$

$$\Rightarrow \frac{K_1}{K_2} = \frac{1}{4}.$$

42. **(3)** Since $W_0 = \frac{hc}{\lambda} - W_0$ and $2E = \frac{hc}{\lambda'} - W_0$

$$\lambda_T = \frac{\lambda_{Na} \times (W_0)_{Na}}{(W_0)_T} = \frac{5460 \times 2.3}{4.5} = 2791\, \mathring{A}$$

43. **(1)** For Lyman series

$$v_{Lymen} = \frac{c}{\lambda_{\max}} = Rc\left[\frac{1}{(1)^2} - \frac{1}{(2)^2}\right] = \frac{3RC}{4}$$

For Balmer series

$$v_{Balmer} = \frac{c}{\lambda_{\max}} = Rc\left[\frac{1}{(2)^2} - \frac{1}{(3)^2}\right] = \frac{5RC}{36}$$

$$\therefore \frac{v_{Lyman}}{v_{Balmer}} = \frac{27}{5}$$

44. **(3)** The Hydrogen atom before the transition was at rest. Therefore from conservation of momentum.

$$\rho_{H-atom} = p_{photon} = \frac{E_{radiated}}{c} = \frac{13.6\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)eV}{c}$$

$$1.6 \times 10^{-27} \times v = \frac{13.6\left(\frac{1}{1^2} - \frac{1}{5^2}\right) \times 1.6 \times 10^{-19}}{3 \times 10^8}$$

$$\Rightarrow v = 4.352\, m/s \approx 4\, m/\text{sec}$$

45. **(3)** Energy is released in a process when total Binding energy (B.E.) of the nuclues is increased or we can say when total B.E. of products is more than the reactants. By calculation we can see that only in case of option (3), this happens.

Given W $\rightarrow$ 2Y

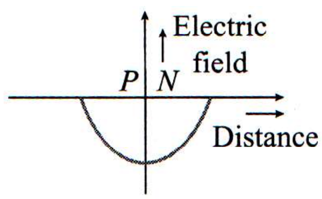
B.E. of reactants = 120 × 75 = 900 MeV

and B.E. of products = 2 × (60 × 85)

= 1020 MeV

i.e. B.E. of products > B.E. of reactants

46. **(4)** The electric field strength versus distance curve across the P-N junction is as follows



47. **(4)**

48. **(1)** $v_n \propto \frac{Z}{n}$, v_n v/s Z, inclined straight line

$r_n \propto \frac{n^2}{Z}$, r_n v/s Z, rectangular hyperbola

$L_n = \frac{nh}{2\pi}$, $L_n \propto Z^0$, parallel to x-axis, st. line

$E_n = -13.6\frac{Z^2}{n^2}$, rectangular hyperbola, E_n is –ve

49. **(3)** $\omega = 2\pi v = 2\pi \times 50 = 100\pi$

$L = \frac{50}{\pi} \times 10^{-3} Hz$

$C = \frac{10^3}{\pi} \times 10^{-6} = \frac{10^{-3}}{\pi}$.

$R = 10\ \Omega$.

$X_C = \frac{1}{\omega C} = \frac{1}{100\pi \times \frac{10^{-3}}{\pi}} = 10$

$X_L = \omega L = 100\pi \times \frac{50}{\pi} \times 10^{-3} = 5$.

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

$= \sqrt{10^2 + (10-5)^2} = \sqrt{100+25} = \sqrt{125} = 5\sqrt{5}$.

50. **(1)** $\frac{n}{t} \times \frac{hc}{\lambda} = P$

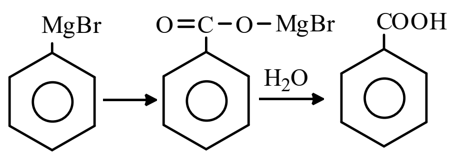
$\frac{n}{t} \times \frac{6.6 \times 10^{-34} \times 3 \times 10^8}{600 \times 10^{-9}} = 3.3 \times 10^{-3}$ $\frac{n}{t} = 10^{16}$

CHEMISTRY

SECTION - A (35 Questions)

51. **(2)** Lysine contains two basic groups. e.g., NH_2

52. **(2)** Retinol

53. **(2)** 

54. **(4)** Statement-I is incorrect and Statement-II is correct.

55. **(1)** Number of equivalents of $H_2C_2O_4 = 2$

Number of equivalents of $K_2Cr_2O_7 = \frac{1}{3} \times 6 = 2$

56. **(2)** Peptization

57. **(1)**

X–X bond	F–F	Cl–Cl	Br–Br	I–I
Bond dissociation energy (kcal/mol)	38	57	45.5	35.6

The lower value of bond dissociation energy of fluorine is due to the high inter-electronic repulstions between non-bonding electrons in the 2p-orbitals of fluorine. As a result F–F bond is weaker in comparison to Cl–Cl and Br–Br bonds.

58. **(3)** Due to larger size of iodine atom it can accommodate upto seven small fluorine atoms around, it while due to smaller sizes of chlorine and bromine atoms do not accommodate seven fluorine atoms, i.e., steric factor dominate in case of chlorine and bromine.

59. **(1)** Uracil

60. **(2)** Pyridine

61. **(1)** a-iv, b-ii, c-i, d-iii

62. **(2)** Sulphur only

63. **(4)** As for a pure substance T_A and T_B represent the same temperature so, option 4 is correct here.

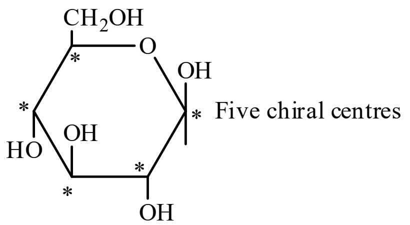
64. **(3)** A red coloured ppt. is obtained

65. **(2)** 1-iii, 2-iv, 3-i, 4-ii

66. **(3)** Statement-I is correct and Statement-II is incorrect

67. **(2)** Due to the absence of H-bonding, PH3 has the lowest b.p. The boiling point of the V group hydrides is :

$BiH_3 > SbH_3 > NH_3 > AsH_3 > PH_3$

68. **(1)** 

Five chiral centres

69. **(4)** Abscisic acid (ABA)

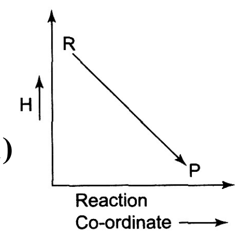
70. **(2)** $K_2Fe[Fe(CN)_6]$–white]

71. **(3)** Pentan 3-one can not show iodoform test here as it don't have CH_3CO– gp.

72. **(3)** Etard's reaction

73. **(1)** Benzaldehyde

74. **(4)** $\Delta E = 0$, in a cyclic process.

75. **(1)** 

76. **(1)** CCl_4 does not undergo hydrolysis at room temperature. Because C-atom does not have vacant orbital for accept lone pair electrons of H_2O molecule (Nucleophile)

$$CCl_4 + H_2O \longrightarrow \text{No hydrolysis}$$

77. **(1)** ${}^{226}_{88}Ra \longrightarrow {}^{222}_{86}Rn + {}^{4}_{2}He$

78. **(1)** α-Keratin

79. **(1)** 5-Methyluracil

80. **(3)** Its dissociation constant is less as compound to carboxylic acids

81. **(3)** Hell-Volhard Zelinsky reaction

82. **(2)** 100π J

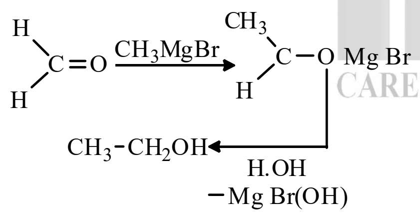
83. **(1)** As in process $A \rightarrow B$ volume is constant so it is isochoric.
In $B \rightarrow C$, pressure remains constant so it isobaric.
In $C \rightarrow A$, temperature remains constant so it isothermal.

84. **(3)** $PH_3 + H_3PO_4$

85. **(1)** Statement-I and Statement-II both are correct

SECTION - B (Attempt Any 10 Questions)

86. **(3)**



87. **(1)** $\ln\dfrac{K_2}{K_1} = \dfrac{\Delta H}{R} = \dfrac{1}{T_1} - \dfrac{1}{T_2}$

As K_{eq} is increasing with decrease in temperature, reaction is Exothermic.

88. **(3)** Helium provide inert atmosphere in the welding of metals of alloys that are easily oxidised. Argon is used in gas filled electric lamps, i.e., cryogenics

Neon is used in electric sign, i.e., advertising sign.

P_4O_{10} is used as a valuable drying and dehydrating agent.

PCl_5 is used in organic reaction for the replacement of hydroxyl group by chlorine atom.

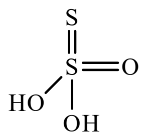
89. **(4)** All the above

90. **(1)** $FeSO_4.NO$

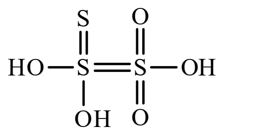
91. **(4)** Tollen's reagent is not used in the detection of unsaturation but is used for distinction of (1) aldehydes from ketones (2) terminal alkynes from non-terminal alkynes.

92. **(3)** 1-iii, 2-i, 3-ii, 4-iii

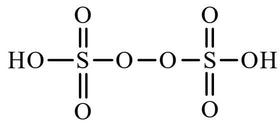
93. **(3)** $H_2S_2O_4$ =



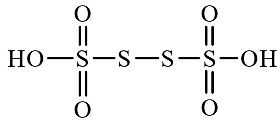
$H_2S_2O_6$ =



$H_2S_2O_8$ =

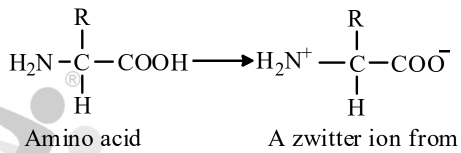


$H_2S_4O_6$ =



Hence, $H_2S_2O_8$ has O–O (peroxide) linkage.

94. **(2)**



A zwitter ion is formed by transfer of a proton from a –COOH groups to an $-NH_2$ group.

95. **(3)** Combustion reactions are always exothermic as thery release heat so ΔH = –ve.

96. **(1)** a-iv, b-iii, c-ii, d-i

97. **(4)** Number of milli Equivalents of

$KMnO_4 = 0.04 \times 5 \times 50 = 10$

Number of milli Equivalents of

$H_2C_2O_4 = 50 \times 2 \times 0.1 = 10$

98. **(3)** Acidic character : $HOCl < HClO_2 < HClO_3 < HClO_4$

Oxidising power : $HOCl > HClO_2 > HClO_3 > HClO_4$

Thermal stability : $HOCl < HClO_2 < HClO_3 < HClO_4$

'Cl–O' bond order : $HOCl < HClO_2 < HClO_3 < HClO_4$

99. **(3)**

Vitamin	Deficiency disease
A. Vitamin-B_{12}	1. Pernicious anaemia
B. Vitamin-B_6	2. Skin disease
C. Vitamin-E	3. Sterility
D. Vitamin-K	4. Haemorrhagic condition

100. **(1)** a-iv b-i, c-ii, d-iii