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NEET 2023-24

Mark 720	Group PCB	PRE FINAL ROUND -01	Date : 17/03/2024 Time : 3 :20 Hours

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

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

Biology									
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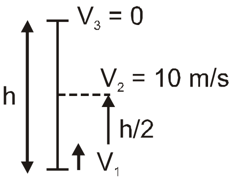
106. 4	117. 4	128. 2	138. 4	149. 3	156. 1	167. 3	178. 3	188. 3	199. 1
107. 4	118. 4	129. 1	139. 3	150. 2	157. 2	168. 4	179. 1	189. 2	200. 3
108. 3	119. 3	130. 4	140. 4		158. 3	169. 3	180. 2	190. 2	
109. 4	120. 3	131. 1	141. 1		159. 3	170. 3	181. 4	191. 3	

PHYSICS

SECTION - A (35 Questions)

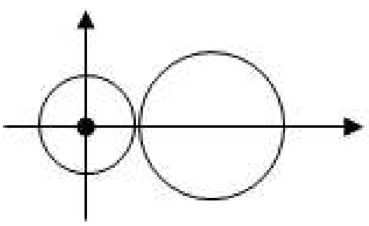
01. **(3)** $W_G - W_f = 0 \Rightarrow mgh = \mu mgl$
$h = \mu l$
$h = (0.2)l$
$\Rightarrow l = \frac{1.5}{0.2}$
$l = 7.5\text{ m} = (3 + 3 + 1.5)\text{ m}.$

02. **(3)**


$V_2^2 = V_3^2 + 2g\frac{h}{2}$
$\Rightarrow (10)^2 = 2 \times 10 \times \frac{h}{2}$
$\Rightarrow h = \frac{100}{10} = 10\text{ m}$

03. **(3)** It can be observed that power delivered to particle by force F is -
$P = Fv = K.$
The power is constant. Hence work done by force in time t is -
$\Delta W = Pt = Kt$

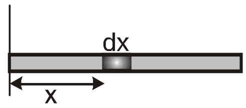
04. **(1)** $W_S + W_f = \Delta K$
$-\Delta U + W_f = -K_i$
$-U_f - \mu mgx = -K_i$
$\frac{1}{2}Kx^2 + \mu mgx = \frac{1}{2}mu^2$
$100x^2 + 2(0.1)(50)(10)x = 50 \times 4$
$x^2 + x - 2 = 0$
$x = 1\text{ m}.$

05. **(2)**


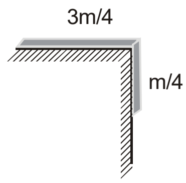
$$X_{com} = \frac{m \times 0 + 2m \times (3a)}{m + 2m} = 2a.$$

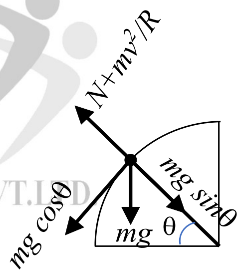
06. **(2)** $a = bt$
$\frac{dv}{dt} = bt$
$\int_u^v dv = \int_0^t bt\,dt$
$V = u + \frac{bt^2}{2}$
$[V = u + \frac{bt^2}{2}]$

07. **(1)** $W = \vec{F}.\vec{s} = (-2\hat{i} + 15\hat{j} + 6\hat{k}).10\hat{j}$
$= 150\text{ J}.$

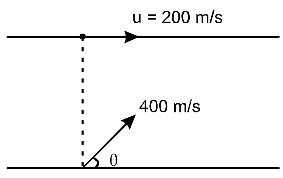
08. **(2)**


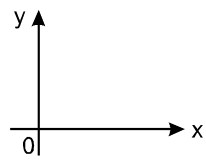
$$x_{cm} = \frac{\int dmx}{\int dm} = \frac{\int(\lambda_0 x dx)x}{\int \lambda dx} = \frac{\int_0^L \lambda_0 x^2 dx}{\int_0^L \lambda_0 x dx} = \frac{2L}{3}.$$

09. **(1)** Apply system equation
$\frac{m}{4}g = \frac{3m}{4}g \times \mu$
$\Rightarrow \mu = \frac{1}{3} = 0.33$


10. **(1)**


$$N + \frac{mv^2}{R} = mg\sin\theta$$
$$N = mg\sin\theta - \frac{mv^2}{R}$$
as $\theta \uparrow \Rightarrow N \uparrow$

11. **(2)**


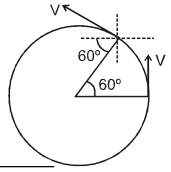


To hit, $400\cos\theta = 200$
{$\because$ Both travel equal distance along horizontal, of their start and coordinates an x axis are same}
$\Rightarrow \theta = 60°.$

12. **(3)** $V_{com} = \frac{200 \times 10\hat{i} + 500(3\hat{i} + 5\hat{j})}{200 + 500}$
$$= \frac{20\hat{i} + 15\hat{i} + 25\hat{j}}{7} = 5\hat{i} + \frac{25}{7}\hat{j}.$$

13. **(1)** $V=\sqrt{5lg}=\sqrt{5\times6.4\times10}=17.9\text{m/s}$

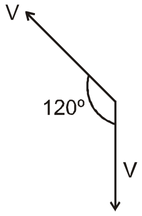
14. **(4)** $\Delta V = V_2 - V_1$
$= 0$



$\Delta\vec{V} = \vec{V_2} - \vec{V_1}$

$|\Delta\vec{V}| = \sqrt{V_2^2+V_1^2+2V_1V_2\cos120^\circ}$

$=\sqrt{V^2+V^2+2V^2\cos120^\circ}$



$=\sqrt{2V^2+2V^2\left(\frac{-1}{2}\right)}$

$|\Delta\vec{V}| = V$

15. **(2)** $X_{CM}=\dfrac{0\times m+m\times a+m\times\frac{a}{2}}{m+m+m}=\dfrac{a}{2},$

$Y_{CM}=\dfrac{0\times m+0\times m+m\times\frac{a\sqrt{3}}{2}}{m+m+m}=\dfrac{a\sqrt{3}}{6},$

16. **(4)** $a=\dfrac{S^2}{t^4}=\dfrac{(\text{metre})^2}{(\text{second})^4}=m^2\,s^{-4}$

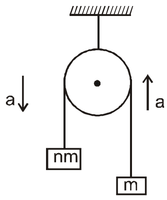
17. **(1)** KE. $=\frac{1}{2}mV^2$
$[KE] = ML^2T^{-2}]$
If unit of M and L are doubled
Then unit of K.E.
K.E. $= [(2M)(2L)^2T^{-2}]$
$= 8\,[ML^2T^{-2}]$
unit of K.E. is 8 times.

18. **(3)** $a=\dfrac{(nm-m)}{nm+m}g$

$=\dfrac{(n-1)}{(n+1)}g$

$a_1 = a_2 = a$

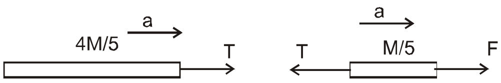
$a_{cm}=\dfrac{nma_1-ma_2}{(nm+m)}=\dfrac{(n-1)}{(n+1)}\times a$



$a_{cm}=\dfrac{(n-1)^2}{(n+1)^2}g.$

19. **(1)** Velocity can't change its value suddenly.

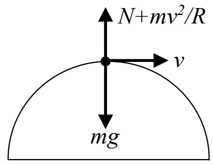
20. **(3)** $a=\dfrac{F}{M}$



By FBD

$T=\dfrac{4M}{5}\times a=\dfrac{4M}{5}\times\dfrac{F}{M}=\dfrac{4F}{5}\Rightarrow T=4\text{ N}.$

21. **(2)**



For leaving contact $N=0$

$\Rightarrow\dfrac{mv^2}{R}=mg\Rightarrow v=\sqrt{gR}.$

22. **(3)** use $m_1v_1=m_2v_2=P$

K.E. $=\frac{1}{2}mv_1^2+\frac{1}{2}m_2v_2^2$

$=\frac{1}{2}m_1\left(\frac{P}{m_1}\right)^2+\frac{1}{2}m_2\left(\frac{P}{m_2}\right)^2$

$=\frac{1}{2}\,\frac{P^2(m_2+m_1)}{m_1m_2}.$

23. **(2)** $x=6t$ $\qquad y=8t-5t^2$

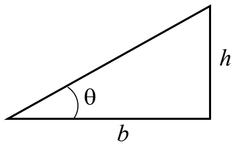
$\frac{dx}{dt}=6$ $\qquad \frac{dy}{dt}=8-10t$

at $t=0$

$V_x = 6$ m/sec $\qquad V_y = 8$m/sec

$V=\sqrt{V_y^2+V_x^2}=\sqrt{8^2+6^2}=10$ m/sec

24. **(1)**



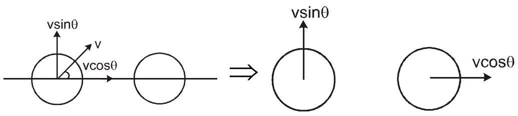
as $\upsilon=\sqrt{Rg\tan\theta}$

$h=\dfrac{\upsilon^2 b}{Rg}$

25. **(2)** $\dfrac{H}{R}=\dfrac{\tan\theta}{4}$

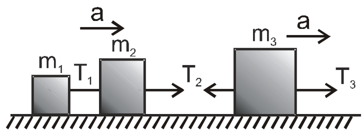
$\theta=45^\circ$ & $R=36$ m $\qquad\therefore H=9$ m.

26. **(3)**



be fore collision $\qquad$ after collision
So angle between velocity vectors is 90°

27. **(3)** $a=\dfrac{60}{10+20+30}=1\text{ ms}^{-2}$



$\Rightarrow T_2 = (m_1 + m_2)\, a = (10 + 20) \times 1 = 30$ N.

28. **(4)** It can be observed that component of acceleration perpendicular to velocity is $a_c = 5 \text{m/s}^2$

$\therefore$ radius $= \dfrac{v^2}{a_c} = \dfrac{25}{5} = 5$ metre.

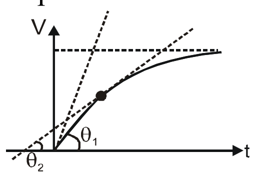
29. **(4)**

30. **(3)** Let v be the speed of B at lowermost position, the speed of A at lowermost position is 2v.
From conservation of energy

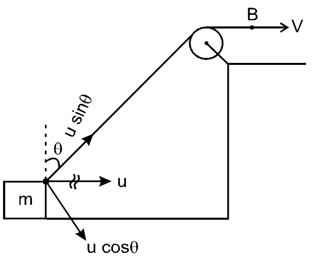
$\frac{1}{2}\text{m}(2\text{v})^2 + \frac{1}{2}\text{mv}^2 = \text{mg}(2l) + \text{mg}l.$

Solving we get $\text{v} = \sqrt{\frac{6}{5} gl}.$

31. **(1)** As the slope of tangent decreases, velocity also decreases with time.
after time distance becomes constant i.e particle stops.



32. **(2)**



The length of string AB is constant.

$\Rightarrow$ speed A and B along the string are same u sin θ = V

u sin θ = V

$\text{u} = \dfrac{\text{V}}{\sin\theta}$

33. **(3)** $[Y] = [F^a A^b D^c]$

$[ML^{-1}T^{-2}] = [(MLT^{-2})^a (L^2)^b (ML^{-3})^c]$

equating power of M, L and T

$1 = a + c,\quad -1 = a + 2b - 3c$

$-2 = -2a \quad a = 1,\quad c = 0$

$b = -1$

$[Y] = F A^{-1} D^0.$

34. **(2)** $[h] = ML^2T^{-1}$

$[V_s] = \dfrac{[W]}{[Q]} = \dfrac{ML^2T^{-2}}{AT} = ML^2T^{-3}A^{-1}$

$[\phi] = ML^2T^{-2}$

$[P] = MLT^{-1}.$

35. **(2)**

SECTION - B (Attempt Any 10 Questions)

36. **(1)** As block is shifted slowly $\Delta K.E. = 0$

$\therefore W_g + W_f + W_F = 0$

Work done :

$= Mgh_1 + Mgh_2 + Mgh_3 + \mu_1 Mgl_1 + \mu_2 Mgl_2 + \mu_3 Mgl_3$

$= Mg(h_1 + h_2 + h_3) + Mg(\mu_1 l_1 + \mu_2 l_2 + \mu_3 l_3)$

$= Mg(8 + 0.2 + 0.4 + 0.4) = 90$ J.

37. **(2)** $W = \int \vec{F}.d\vec{s} = \int (3t\hat{i} + 5\hat{j}).(4t\ dt\ \hat{i})$

$= \int_0^2 12t^2 dt = \dfrac{12\left[t^3\right]_0^2}{3} = 32J.$

38. **(1)** $m\vec{V}_m = -M\vec{V}_b$

$m(\vec{V}_{rel} + \vec{V}_b) = -M\vec{V}_b$

$\vec{V}_b = \dfrac{-m\vec{V}_{rel}}{M + m}$

$\Rightarrow \vec{V}_b$ will be opposite to V_{rel}.

39. **(1)** $\Delta U = \dfrac{1}{2}\dfrac{m_1 m_2}{(m_1 + m_2)}(V_1 - V_2)^2 = \dfrac{100}{3}$

$(V_1 - V_2)^2 \times \dfrac{2m.m}{2(m + 2m)} = \dfrac{100}{3}$

putting m = 1 kg

$(V_1 - V_2) = 10$ m/sec.

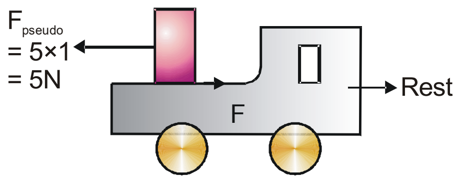
40. **(2)** Case (1) : $a = \dfrac{F}{3m}$

$N_1 = m \times a$

Similarly in case (2)

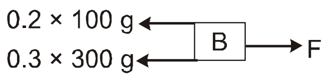
$N_2 = 2m \times a \Rightarrow \dfrac{N_1}{N_2} = \dfrac{1}{2}.$

41. **(1)** Solving from the frame of truck



$f \le \mu mg = 6 \Rightarrow f = 5$N.

42. **(4)**



for motion to start

$F \ge 0.2 \times 100\ g + 0.3 \times 300\ g = 1100$ N

$F_{min} = 1100$ N.

43. **(1)** $N = mg + Q\cos\theta$

frictional force $f = \mu(mg + Q\cos\theta)$

$P + Q\sin\theta = \mu(mg + Q\cos\theta)$

$$\mu = \frac{P + Q\sin\theta}{mg + Q\cos\theta}$$

44. **(1)** From given conditions :

$$V_A = V_B \cos 37^0 = 15.\frac{4}{5} = 12 \text{ m/sec.}$$

$$\therefore \text{ time of flight of } A(t) = \sqrt{\frac{2\times 20}{10}} = 2 \text{ sec.}$$

$$\Rightarrow \text{Range} = V_A t = 24 \text{ m.}$$

45. **(3)**

46. **(3)** Density, $\rho = \frac{m}{V}$

$$\Rightarrow \left|\frac{\Delta\rho}{\rho}\right|_{max} = \frac{m}{\pi r^2 l} = \left|\frac{\Delta m}{m}\right| + 2\left|\frac{\Delta r}{r}\right| + \left|\frac{\Delta l}{l}\right|$$

$$= \frac{0.01}{0.4} + \frac{2(0.03)}{6} + \frac{0.04}{8}$$

$$\%\text{ error in density} = \left(\frac{\Delta\rho}{\rho}\right)\times 100\%$$

$$= \left(\frac{1}{0.4} + \frac{6}{6} + \frac{4}{8}\right)\% = (2.5 + 1 + 0.5)\% = 4\%$$

47. **(3)** MSR = 2.5 mm

$$CSR = 45 \times \frac{0.5}{50} mm = 0.45\ mm$$

Diameter reading = Reading of crew gauge = 2.5 + 0.45 – (–0.03) = 2.98 mm.

48. **(1)** $\frac{dx}{dt}$ = slope ≥ 0 always increasing

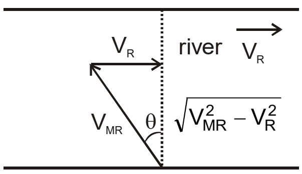
$\frac{dx}{dt} < 0$; and at $t \to \infty \frac{dx}{dt} \to 0$

$\frac{dx}{dt} > 0$ for first half $\frac{dx}{dt} < 0$ for second half.

$\frac{dx}{dt}$ = constant

49. **(1)** Work done by a force is positive if displacement is in direction of force and work done by a force is negative if displacement is in direction opposite to that of force.

50. **(2)** 15 min = 1/4 hr.



$$t = \frac{d}{V_y}$$

$$\Rightarrow \frac{1}{4} = \frac{1}{\sqrt{V_{MR}^2 - V_R^2}} \quad \frac{1}{4} = \frac{1}{\sqrt{5^2 - V_R^2}}$$

$$\Rightarrow V_R = 3 \text{ km/h}$$

CHEMISTRY

SECTION - A (35 Questions)

51. **(4)**
(1)-(iv), (2)-(iii), (3)-(ii), (4)-(i)

52. **(2)**
3, 3 and 3 respectively

53. **(2)**
–COOH, $-SO_3H$, $-CONH_2$, –CHO

54. **(3)**
$(A) \to (iii), (B) \to (iv), (C) \to (ii), (D) \to (i)$

55. **(3)**
Three, that is, $CH_3OCH_2CH_2CH_3$, CH_3–O–$CH(CH_3)_2$ and $CH_3CH_2OCH_2CH_3$.

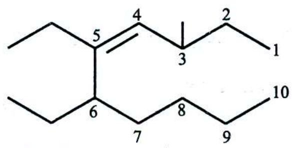
56. **(3)**
Wt. of solvent = Wt. of solution – Wt. of solute
= [1000 × 1.02 – 20.5 × 60] = 897 g.

$$m = \frac{\text{Moles of } CH_3COOH}{\text{Wt. of solvent in kg}} = \frac{2.05\times 1000}{897}$$
$$= 2.285$$

57. **(2)**
Mol. wt. of H_3PO_4 is 98 and change in its valence = 1.

$$\text{Eq. wt. of } H_3PO_4 = \frac{\text{Mol. wt.}}{\text{Change in valency}}$$
$$= 98/1 = 98$$

58. **(2)**



5, 6-Diethyl-3-methyldec-4-ene

59. **(3)**
NO_2^+, $AlCl_3$, SO_3 and $CH_3\overset{+}{C}{=}O$ are electrophiles.

60. **(1)**
Three, that is, d-tartaric acid, 1-tartaric acid and meso-tartaric acid.

61. **(1)**

$$2NaHCO_3 \longrightarrow Na_2CO_3 + H_2O + CO_2$$

2 mol of $NaHCO_3$ on complete decomposition gives 1 mol of Na_2CO_3.
So, 0.2 mol of $NaHCO_3$ on complete decomposition gives 0.1 mol of Na_2CO_3.

62. **(4)**
According to stoichiometry, they should react as follows:

$$4NH_3(g) + 5O_2(g) \to 4NO(g) + 6H_2O(l)$$

4 mol	5 mol	4 mol	6 mol
0.8 mol	1 mol	0.8 mol	1.2 mol

In this reaction 1 mole of O_2 and 0.8 mole of NH_3 are consumed. There by indicating complete consumption of O_2.

63. **(3)**
Order of stability of carbanions is 1° > 2° > 3°.

64. **(1)** II > I > III

65. **(3)** As both the carbon atoms of each of the three double bonds are differently substituted, therfore, $2^3 = 8$ geometrical isomers are possible.

66. **(4)** Number of moles of oxygen = 2 × number of moles of given compounds

67. **(1)** 1

68. **(4)** If both assertion and reason are false.

69. **(4)** E^+ attacks on ring which has more e^- density.

70. **(2)** 1 is staggered and 2 is eclipsed.

71. **(2)** 2s

72. **(2)** As values of m is from –1 to +1 including zero.

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

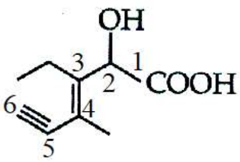
74. **(2)** Higher are number of $\alpha - H$, more the hyperconjugating structures, more the stability of the compound.

75. **(1)** 1, 2 and 3

76. **(4)** Helium nuclei, which impinged on a metal foil and got scattered

77. **(1)** 1

78. **(4)**



79. **(4)**
(A) is elimination, (B) is substitution and (C) is addition reaction

80. **(4)** (1)-(iv), (2)-(iii), (3)-(ii), (4)-(i)

81. **(4)**

$$X_3 = \frac{X_1X_2}{X_1 + X_2}$$

82. **(3)** (1)-(iv), (2)-(ii), (3)-(i), (4)-(iii)

83. **(3)** Four primary amines are possible. These are: $CH_3CH_2CH_2CH_2NH_2$, $(CH_3)_2CH–CH_2NH_2$, $CH_3CH(NH_2)CH_2CH_3$ and $(CH_3)_3CNH_2$.

84. **(1)** 9σ and 9π

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

SECTION - B (Attempt Any 10 Questions)

86. **(3)**
Statement-I is correct but Statement - II is incorrect. Zeros at the end or right of a number are significant provided they are on the right side of the decimal point.

87. **(1)**
Molecular weight of the metal chloride

$$= \frac{0.72 \times 22400}{100} = 161.28\,g$$

Weight of chlorine in metal chloride

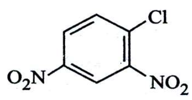
$$= \frac{65.5 \times 161.28}{100} = 105.64\,g$$

So, Mole atoms of chlorine $= \frac{105.64}{35.5} = 3$

Hence, metal chloride is MCl_3

88. **(4)** 4-chloro-3-ethylcyclohexanol

89. **(3)**



4-chloro-1,3-dinitrobenzene

90. **(3)** Charge of electron

91. **(1)** As halogens are most electronegative so the configuration is $ns^2\,np^5$.

92. **(2)**
Carbanions are stabilised by electron withdrawing groups. $–NO_2$ is stronger electron withdrawing group as compared to –CHO. At ortho-position, the effect is more pronounced.

93. **(3)**
$–NO_2$ group is meta-directing, thus will stabilize a electrophile at m-position.

94. **(3)**

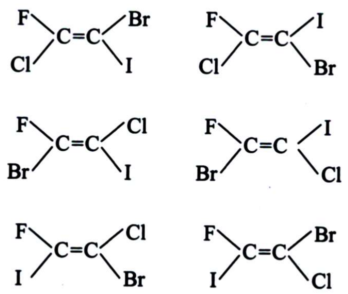
$$\lambda = \frac{h}{\sqrt{2m(KE)}} = 0.3328 \text{ nm}$$

95. **(3)** As maximum number of electrons in any orbit, sub-orbit or orbital is decided by Pauli's law.

96. **(1)** Non-superimposable on its mirror image.

97. **(4)** The two stereoisomers are not mirror images and hence, the diastereomers.

98. **(4)** Six isomers are



99. **(3)** 2 and 3

100. **(3)**