

ISO 9001: 2015 Certified



NEET FRESH 2023-24

Mark
720

Group
PCB

PCB EXAM - 59

Date : 24/12/2023
Time : 3:20 Hours

Answer Key Version - S (NEET FRESH All Batches)

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PHYSICS

SECTION - A (35 Questions)

01. (1)

$$R.D. = \frac{\text{wt in air}}{\text{loss in wt}} = \frac{5.00 \pm 0.05}{(5.00 \pm 0.05) - (4.00 \pm 0.05)}$$

$$= \frac{5.00 \pm 0.05}{1.00 \pm 0.1}$$

$$= \frac{5.00}{1.00} \pm \left(\frac{0.05}{5.00} + \frac{0.1}{1.00} \right) \times 100\% = 5.0 \pm 11\%$$

02. (2) Person will feel his weight less when the lift goes down with some acceleration.

03. (3) The acceleration of both the blocks = $\frac{15}{3x} = \frac{5}{x}$

$$\therefore \text{Force on } B = \frac{5}{x} \times 2x = 10N$$

04. (2) Average value

$$= \frac{2.63 + 2.56 + 2.42 + 2.71 + 2.80}{5} = 2.62s$$

$$\text{Now } |\Delta T_1| = 2.63 - 2.62 = 0.01$$

$$|\Delta T_2| = 2.62 - 2.56 = 0.06$$

$$|\Delta T_3| = 2.62 - 2.42 = 0.20$$

$$|\Delta T_4| = 2.71 - 2.62 = 0.09$$

$$|\Delta T_5| = 2.80 - 2.62 = 0.18$$

Mean absolute error

$$\Delta T = \frac{|\Delta T_1| + |\Delta T_2| + |\Delta T_3| + |\Delta T_4| + |\Delta T_5|}{5}$$

$$= \frac{0.54}{5} = 0.108 = 0.11s$$

05. (3) $N = (10 + 5)(g + a) = 15(10 + 3) = 195N$

06. (4) The tension in massless spring at every point is same and in this case it is

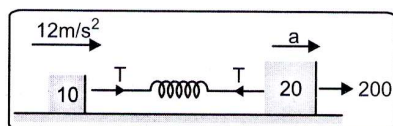
$$T = \frac{2m_1 m_2}{m_1 + m_2} g$$

and reading is $\frac{T}{g}$.

07. (1)

08. (4)

09. (2)



$$T = 10 \times 12 = 120$$

$$200 - T = 20a \Rightarrow a = 4m/s^2$$

10. (2) Since downward force along the inclined plane = $mg \sin \theta = 5 \times 10 \times \sin 30^\circ = 25N$

$$11. (1) L.C. = \frac{\text{pitch}}{\text{no. of division}} = \frac{2}{4 \times 50} = 0.01 \text{ mm}$$

12. (1) Acceleration at $t = 1s$, $a_1 = \frac{3.6}{2} = 1.8 \text{ m/s}$

$$T = m(g + a) = 1500(9.8 + 1.8) = 17400 \text{ N}$$

13. (1) 29 MSD = 30 VSD

$$1 \text{ VSD} = \frac{29}{30} \text{ MSD}$$

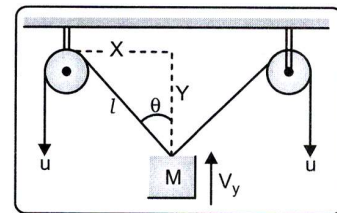
$$L.C. = 1 \text{ MSD} - 1 \text{ VSD}$$

$$= \left(1 - \frac{29}{30} \right) \text{ MSD} = \frac{1}{30} \text{ MSD}$$

$$= \frac{1}{30} \text{ MSD}$$

$$= \frac{1}{30} \times 0.5 = 1 \text{ min}$$

14. (2)



$$(i) x^2 + y^2 = l^2$$

$$(ii) 2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 2l \frac{dl}{dt}$$

$$\frac{dx}{dt} = 0, \text{ since } x \text{ is constant}$$

$$V_y = \frac{u}{y/l} = \frac{u}{\cos \theta}$$

15. (2) $V = \frac{\text{distance}}{\text{time}} = \frac{13.8}{4.0} = 3.45$

$$\frac{\Delta V}{V} = \frac{\Delta d}{d} + \frac{\Delta t}{t} = \frac{0.2}{13.8} + \frac{0.3}{4.0} = 0.089$$

$$\Delta V = 0.089 \times 3.45 = 0.30$$

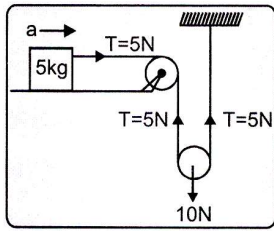
$$\therefore \text{Velocity} = (3.45 \pm 0.3) \text{ m/s}$$

16. (3) 10m rope has mass = 10kg

$$\text{So, 3m rope will have mass} = \frac{10}{10} \times 3 = 3\text{kg}$$

$$\text{Tension at point P is } T = (10 + 3)g = 130N$$

17. (2) $T = 5a$



$$5 = 5a$$

$$\text{or } a = 1\text{m/s}^2$$

18. (2) Impulse =

$$mv - mu = m \times 0 - 0.1 \times \frac{4}{2} = -0.2\text{kms}^{-1}$$

19. (3) L.C. 1 MSD – 1 VSD

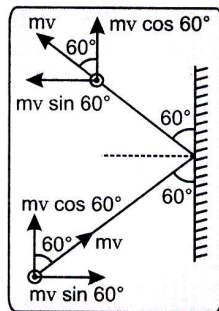
$$= 0.02 = 0.1 - 1 \text{ VSD}$$

$$1 \text{ VSD} = 0.08$$

$$\text{but } 1 \text{ VSD} = \frac{\text{vernier scale length}}{\text{No. of division}}$$

$$\frac{m}{n} = 0.08 \text{ So option (3) is correct.}$$

20. (3)



Change in momentum along the wall

$$= mv \cos 60^\circ - mv \cos 60^\circ = 0$$

Change in momentum perpendicular to the wall

$$= mv \sin 60^\circ - (-mv \sin 60^\circ)$$

$$= 2mv \sin 60^\circ$$

\therefore Applied force

$$= \frac{\text{Change in momentum}}{\text{Time}}$$

$$= \frac{2mv \sin 60^\circ}{0.20}$$

$$= \frac{2 \times 3 \times 10 \times \sqrt{3}}{2 \times 0.20} = 50 \times 3\sqrt{3}$$

21. (2)

22. (2) Velocity $v = \sqrt{2gh}$

and momentum $p = mv$

we have $p \propto \sqrt{h}$

$$\text{Here } \frac{p_2}{p_1} = \sqrt{\frac{h_2}{h_1}}$$

$$\frac{p_2}{p_1} = \sqrt{\frac{2h}{h}} = \sqrt{2}$$

$$\therefore p_2 = 1.414p_1$$

$$\% \text{ change} = \frac{p_2 - p_1}{p_1} \times 100 = 41\%$$

23. (4) Given, $p = a + bt + ct^2$

Differentiating with respect to t (time), we get

$$\frac{dp}{dt} = 0 + b + 2ct$$

From Newton's second law of motion,

$$F \propto \frac{dp}{dt}$$

$\Rightarrow F \propto t$, force is dependent linearly on time.

24. (3) $u_y = 40\text{m/s}$, $F_y = 5\text{N}$, $m = 5 \text{ kg}$

$$\text{So, } a_y = \frac{F_y}{m} = -1\text{m/s}^2 \quad (\text{As } v = u + at)$$

$$\therefore v_y = 40 - 1 \times t = 0 \Rightarrow t = 40\text{sec.}$$

25. (3)

$$\rho = \frac{m}{v} = \frac{4.237}{25} = 1.695$$

but by rule $\rho = 1.7 \text{ g/cm}^3$

26. (3) $w - f = (w/g)a$ or $f = w \left(1 - \frac{a}{g}\right)$

27. (3) Area under F -t curve = change in momentum

$$20 \times 1 = 2(v - 0) \Rightarrow v = 10 \text{ m/s}$$

28. (3) L + B = 4.431 but by rule 4.4 cm.

29. (1) Momentum carried by each bullet = Mv

$$= 0.010 \times 500 \text{ kg} \cdot \text{ms}^{-1} = 5 \text{ kg} \cdot \text{ms}^{-1}$$

force due to 10 bullets/s = total change in momentum in 1s

$$= 5 \times 10 = 50 \text{ N}$$

$$\text{acceleration} = \frac{50}{200} \text{ms}^{-2} = 25\text{cm}^{-2}$$

30. (4)

Rocket exerts force on gases and gases exert force on the rocket in opposite direction.

31. (1) Here, $A = 2.5 \text{ms}^{-1} \pm 0.5 \text{ms}^{-1}$, $B = 0.10\text{s} \pm 0.01\text{s}$

$$AB = (2.5 \text{ms}^{-1})(0.10\text{s}) = 0.25\text{m}$$

$$\frac{\Delta AB}{AB} = \left(\frac{\Delta A}{A} + \frac{\Delta B}{B} \right) = \left(\frac{0.5}{2.5} + \frac{0.01}{0.10} \right) = 0.3$$

$$\Delta AB = 0.3 \times 0.25m = 0.075m = 0.08m$$

(Round off to two significant figures)

The value of AB (0.25 ± 0.08) m

32. (3) As, $a = \frac{\Delta v}{\Delta t} = \frac{v}{m} \cdot \frac{\Delta m}{\Delta t}$

$$= \frac{50}{2} \times 0.1 = 2.5 \text{ms}^{-1}$$

33. (4)

34. (1) The water jet striking the block at the rate of 1kg/s at a speed of 5m/s will exert a force on the block

$$F = v \frac{dm}{dt} = 5 \times 1 = 5 \text{N}$$

Under the action of this force of 5N, the block of mass 2kg will move with an acceleration given by

$$a = \frac{F}{m} = \frac{5}{2} = 2.5 \text{m/s}^2$$

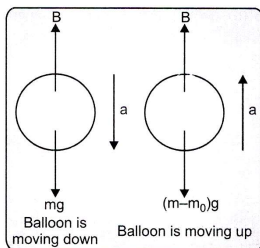
35. (1) Forces acting on balloon are its weight and buoyant force (B). The buoyant force will be constant as there is no change in volume of the balloon.

When balloon is descending down

$$mg - B = ma \tag{i}$$

When balloon is moving up

$$B - (m - m_0)g = (m - m_0)a \tag{ii}$$



Equation (i) + equation (ii)

$$\Rightarrow mg - mg + m_0g = ma + ma - m_0a$$

$$\Rightarrow m_0 = \frac{2ma}{g + a}$$

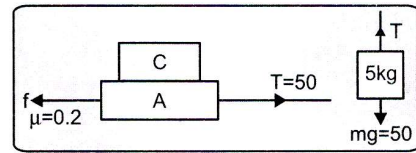
Section - B (Attempt Any 10 Questions)

36. (2) $f_s(\text{max}) = mg$
 $\mu_s F = mg$ or $0.1 \times F = 1 \times 10$ or $F = 100\text{N}$

$$= 150\sqrt{3} \text{ newton}$$

37. (1) System is at rest contract

So,



At rest $f = T = \mu N$

$$N = 50/0.2 = 250 \text{ newton}$$

$$\text{so } m_c = 15\text{kg}$$

38. (4) Friction can cause motion and it is possible even when body is at rest.

39. (2)

40. (3) For F_{min}
 Force should be applied at angle of friction

$$\mu = \tan \theta$$

$$\sqrt{3} = \tan \theta$$

$$\theta = 60^\circ$$

41. (1) $\Delta P = I = (\text{Total Area}) = 0.$

42. (3) $T_2 = (2 + 3)g = 5g.$

43. (2) $T_2 = (m_2 + m_3) a$

$$a = \frac{40}{10 + 6 + 4} = \frac{40}{20} = 2 \text{m/s}^2.$$

$$= (6 + 4) \times 2 = 20 \text{N}.$$

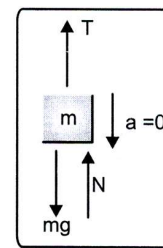
44. (3) By FBD $F = mg \sin \theta - \mu mg \cos \theta$

45. (3)

46. (3)

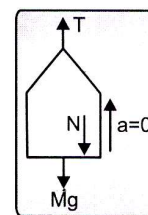
47. (2)

48. (1) Man:



$$T + N = mg \tag{i}$$

Frame:

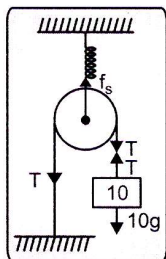


$$T - N = Mg \tag{ii}$$

$$T = \frac{(M + m)g}{2}$$

49. (4)

50. (1) $T = mg = 10 \times 10 = 100N$



$$f_s = 2T = 2 \times 100 = 200N$$

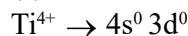
$$kx = 200$$

$$1000x = 200 \text{ or } x = 0.2m = 20 \text{ cm}$$

CHEMISTRY

SECTION - A (35 Questions)

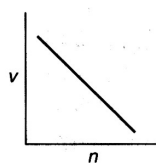
51. (1)



52. (2)

$$v \propto \frac{Z}{n}$$

53. (4)



54. (1)

$$P = 9, \text{ So } e^- \equiv 9$$

$$\text{i.e. } 2, 7$$

$$\text{so valency} = 1$$

55. (4)

All belong to same group except option (4).

56. (4)

According to Bohr

$$\text{angular momentum of } e^- = n \times \frac{h}{2\pi}$$

where $n = 1, 2, 3, \dots$

$$\Rightarrow mvr = \frac{nh}{2\pi} = \frac{5h}{2\pi} = 2.5 \frac{h}{\pi}$$

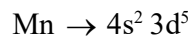
57. (1)

For the transition $n = 1$ to $n = 2$, the energy change, ΔE is positive, i.e., energy is absorbed. For the transition $n = 5$ to $n = 1$, ΔE is negative, i.e., energy is released.

58. (2)

Uut – 113. (13th group)

59. (3)



Mn^{x+} have $n = 3$

So $4s^0 3d^3$ i.e., remove $4e^-$

$$\text{Mn}^{4+} \Rightarrow x = 4.$$

60. (1)

Number of wave in one complete revolution = shell number.

61. (1)

$$\lambda = \frac{h}{mv} = \frac{h}{\text{momentum}}$$

62. (2)

$$O < C < S < Se$$

63. (4)

Due to high attraction of +ve charges.

64. (1)

$$\lambda = \frac{h}{mv} = \frac{6.6 \times 10^{-34}}{9.1 \times 10^{-31} \times 10^7} = 7.27 \times 10^{-11} \text{ m}$$

65. (4)

$$\text{Orbital angular momentum} = \sqrt{l(l+1)} \frac{h}{2\pi}; l = 1$$

for p-orbital.

66. (3)

Down the group I.P decreases.

67. (2)

Stability increases so energy released.

68. (4)

$$|m| \neq l$$

69. (1)

$$\text{Angular momentum of orbital} = \frac{nh}{2\pi} = \frac{3h}{2\pi}$$

70. (4)

Metal oxides are basic

Down the group, basicity increases

71. (3)

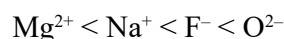
No. of angular nodes in 4d-orbital = $l = 2$.

72. (3)

No. of orbitals in 3rd shell ($n = 3$) = $n^2 = 3^2 = 9$

73. (2)

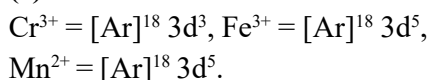
Amongst isoelectronic species, ionic radii increase as the +ve charge decrease or the negative charge increases. Ionic radii increases in the order:



74. (1)

Within the same shell, screening effect decreases in the order: $s > p > d > f$, i.e., option (1) is correct.

75. (2)

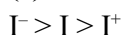


76. (4) $\lambda = \frac{h}{mv}$

77. (3)

The electronic configuration of La ($Z = 57$) is $[\text{Xe}] 5d^1 6s^2$. Thereafter, further addition of electrons occurs in the lower energy 4f-orbital till it is exactly half-filled at Er ($Z = 63$). Thus, the electronic configuration of Eu is $[\text{Xe}] 4f^7 6s^2$: Thereafter, addition of next electron does not come in the more stable exactly half-filled 4f shell but comes in the little higher energy d-orbital. Thus, the electronic configuration of Gd ($Z = 64$) is $[\text{Xe}] 4f^7 5d^1 6s^2$, i.e., option (3) is correct.

78. (4)



79. (3)

$$E = 13.6Z^2 \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right] \\ = 13.6(1)^2 \left[\frac{1}{2^2} - \frac{1}{4^2} \right] \\ = 13.6 \times \left(\frac{3}{16} \right) = 2.55 \text{ eV}$$

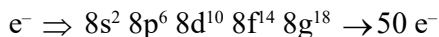
80. (2)

No. of magnetic quantum number = n^2
 $\Rightarrow 4^2 = 16$

81. (3)

Assertion and reason both are correct statements and reason is correct explanation for assertion.

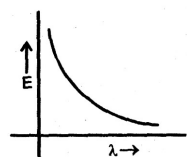
82. (2)



83. (4)

$$E = \frac{hc}{\lambda}$$

$$E \propto \frac{1}{\lambda}$$



84. (4)

$$E = \frac{hc}{\lambda} = \frac{(6.6 \times 10^{-34})(3 \times 10^8)}{\lambda} = 3.03 \times 10^{-19}$$

$$\lambda = 656 \text{ nm}$$

85. (4)

Electronic configuration

SECTION - B (Attempt Any 10 Questions)

86. (3)

Electronic configuration

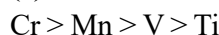
87. (4)

Both statement I and statement II are true

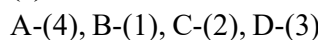
88. (1)

Both A and R are correct and R is the correct explanation of A

89. (1)



90. (2)



91. (4)

$$E = \frac{1240}{\lambda_{\text{nm}}} = \frac{1240}{91} = 13.6 \text{ eV}$$

92. (2)

$$8 \times 10^6 \text{ m/s}$$

93. (2)

S-subshell should be filled first as it possesses lower energy level than p-subshell.

94. (1)

Same orbital can have two different values of spin

$$\text{of } e^- \text{ of } +\frac{1}{2} \text{ and } -\frac{1}{2} \text{ (spin quantum number).}$$

95. (1)

Number of radial nodes = $n - l - 1$

$$\text{For } 3s, \quad = 3 - 0 - 1 = 2$$

$$2p, \quad = 2 - 1 - 1 = 0$$

96. (2)

$$\lambda = \frac{h}{m_e v} = \frac{h}{m_p V} = \frac{h}{1840 m_e V} [m_p = 1840 m_e]$$

$$\text{Hence, } V = \frac{x}{1840}$$

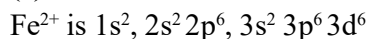
97. (3)

Statement I is false but statement II is true

98. (2)

Assertion and reason both are correct statements and reason is correct explanation of assertion

99. (2)



100. (3)

$$\sqrt{r}$$