



Monthly Progressive Test (Solution)

Class: IX

Subject: PCMB



Test Booklet No.: MPT010

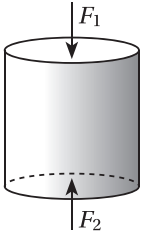
Test Date:

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Physics

1. (A)
'hatred' is not a physical quantity
2. (B)
'Perimeter' is derived quantity
3. (B)
As $10 \text{ m/s} = 36 \text{ km/h}$
4. (C)
As $\cos \theta$ is negative
5. (D)
As $T \propto (r)^{3/2}$ keplar's law of period.
6. (A)
Centripetal force acts towards the centre of circle.
7. (D)
As $v_A = 1 \text{ m/s}$ and $v_B = -2 \text{ m/s}$
8. (A)
For a particular time, there is unique velocity of particle.
9. (A)
Since it is accelerated motion.
10. (D)
 $(t_1 - t_2) \text{ s}$: accelerated motion as velocity is increasing
 $(t_2 - t_1) \text{ s}$: retarded motion as velocity is decreasing
11. (A)
As mg is constant near the earth surface
12. (B)
For same x , frequency in figure (ii) is less than frequency in figure (i).

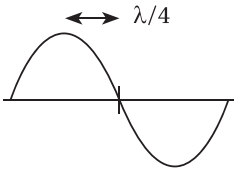
13. ©



14. ②

Displacement in the direction of applied force

15. ④



16. ②

$$2A = 1 + 1 = 2 \text{ mg/m}^3$$

17. ①

As mechanical energy = KE + PE

18. ②

More the frequency, more shrill is sound and more pitch

19. ②

$$\text{Displacement} = 2R = 2 \times 6400 = 12,800 \text{ km}$$

20. ①

$$\text{As R.D} = \frac{D_s}{D_{\text{water}}}$$

21. ©

Assertion statement is correct but statement of reason is false

22. ©

Average speed is 2 m/s as mentioned in the question

23. ©

$$\text{Displacement} = \sqrt{(4)^2 + (4)^2} = 4\sqrt{2} \text{ m}$$

24. ②

$$2 = \left(\frac{2\pi}{T}\right) \cdot 4 \quad \therefore \frac{T}{4} = \pi \text{ s}$$

$$V_{\text{avg}} = \frac{4\sqrt{2}}{(T/4)} = \frac{4\sqrt{2}}{\pi} \text{ s}$$

25. ②

$$g_{\text{pole}} \neq g_{\text{equator}}$$

As $R_p \neq R_{\text{equator}}$

Chemistry

26. ©

Blood is a mixture which contain different types of cells, salts, water, hormones etc.

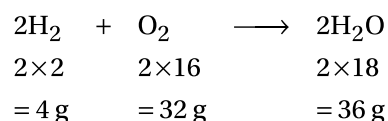
27. ©

$$\begin{aligned} \text{Concentration (c)} &= \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100 \\ &= \frac{50}{(50+450)} \times 100 = \frac{50}{500} \times 100 = 10\% \end{aligned}$$

28. Ⓑ

The correct option is: Ratio of number of moles of one component to total number of moles of other component is known as mole fraction.

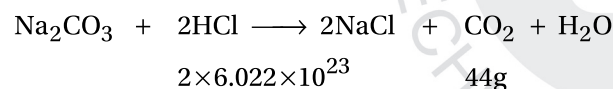
29. ©



$$4 \text{ g H}_2 \equiv 36 \text{ g H}_2\text{O}$$

$$\begin{aligned} 0.1 \text{ g H}_2 &\equiv \frac{36 \times 0.1}{4} \text{ g H}_2\text{O} \\ &\equiv 0.9 \text{ g H}_2\text{O} \end{aligned}$$

30. Ⓐ



$$44 \text{ g CO}_2 \equiv 2 \times 6.022 \times 10^{23} \text{ HCl molecules}$$

$$0.22 \text{ g CO}_2 \equiv 6.022 \times 10^{21} \text{ HCl molecules}$$

31. ©

$$1 \text{ mole of S}_8 \equiv 8 \times 6.022 \times 10^{23} \text{ atoms of sulphur.}$$

$$0.1 \text{ mole of S}_8 \equiv 0.1 \times 8 \times 6.022 \times 10^{23} \text{ atoms of sulphur}$$

$$\equiv 4.817 \times 10^{23} \text{ atoms of sulphur}$$

32. Ⓐ

At S.T.P., 94.5 ml of a gas = 0.2231 g

$$22,400 \text{ ml ,, ,, ,, } = \frac{0.2231 \times 22400}{94.5} = 52.88 \text{ g}$$

∴ Molecular mass = 52.88.

33. Ⓐ

$$n_{\text{SO}_2} = \frac{w}{m} = \frac{32}{64} = \frac{1}{2} \quad [\text{M.W. SO}_2 = 32 + 2 \times 16] = 64$$

$$n_{\text{CH}_4} = \frac{8}{16} = \frac{1}{2} \quad [\text{M.W. of CH}_4 = 12 + 4 = 16]$$

So, number molecules of SO_2 & CH_4 will be same. This is correct equal moles of two compounds here $\frac{1}{2}$ mole of SO_2 and $\frac{1}{2}$ mole of CH_4 will contain the same number of molecules (Avogadro laws)

34. (A)

$$\begin{aligned} \text{Moles of oxygen, } n_{\text{O}_2} &= \frac{\text{Mass(w)}}{\text{M.W(m)}} = \frac{8}{32} \quad [\text{M.W. of O}_2 = 32] \\ &= \frac{1}{4} = 0.25 \end{aligned}$$

Thus, assertion is correct

Reason : Number of moles of a molecule = $\frac{\text{Given Mass}}{\text{M.W}}$ is also correct and correct explanation of assertion.

35. (D)

${}^4\text{He}_2$ is the lightest element this world. This is wrong. ${}^4\text{He}_2$ has equal number of protons, electrons and neutrons.

Proton = 2, electron = 2, neutron = 4 - 2 = 2.

36. (C)

Let the percentage of ${}^{15}\text{X}_7 = x$.

\therefore the percentage of ${}^{11}\text{X}_7 = (100 - x)$

\therefore Average atomic weight = $\frac{\Sigma\% \text{ Abundance} \times \text{At. Wt}}{100}$

$$\Rightarrow 14 = \frac{x \times 15 + (100 - x) \times 11}{100}$$

$$\Rightarrow 15x + 1100 - 11x = 1400$$

$$\Rightarrow 4x = 300$$

$$\Rightarrow x = 75\%$$

\therefore % of ${}^{11}\text{X}_7 = 100 - 75 = 25$.

37. (C)

Total number of electrons in NO_3^- ion = electrons in 'N' + 3 \times electrons 'O' + 1 (due to 1 -ve charge) = 7 + 3 \times 8 + 1 = 32.

38. (B)

Hund's rule: "Maximum number of electrons would be three in an orbital." Thus, the presence of three unpaired electrons is given by Hund's rule.

39. (B)

X^{2-} contains 10 electrons and 8 Neutrons.

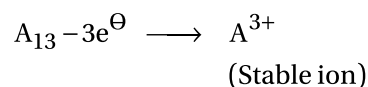
So, atomic number = 10 - 2 = 8

Atomic mass = P + N = 8 + 8 = 16

40. (A)

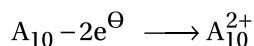
A^{3+} ; A_{13} has electronic configuration = $\text{K}_2\text{L}_8\text{M}_3$

Octet complete when it losses 3 electron & become stable.



41. ©

In A_{10} , number of protons = 10 = number of electron



42. ©

An atom of an element has 26 electrons and mass number = 56; Mass number = P + N.

∴ Neutron (N) = 56 - 26 = 30

43. ④

Balanced equation: $2\text{KMnO}_4 + 16\text{HCl} \longrightarrow 2\text{KCl} + 2\text{MnCl}_2 + 5\text{Cl}_2 + 4\text{H}_2\text{O}$

Comparing $a\text{KMnO}_4 + b\text{HCl} \longrightarrow c\text{KCl} + d\text{MnCl}_2 + e\text{Cl}_2 + \text{H}_2\text{O}$

a = 2, b = 16, c = 2, d = 2 and e = 5.

44. ③

$\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$ is the formula of ferric ferrocyanide.

45. ©

M.W. of $\text{O}_2 = 2 \times 16 = 32$

M.W. of $\text{SO}_2 = 32 + 2 \times 16 = 64$

∴ M.W. of SO_2 is the twice the M.W. of oxygen

M.W. of $\text{CO}_2 = 12 + 32 = 44$

M.W. of $\text{CO} = 12 + 16 = 28$

M.W. of $\text{H}_2\text{S} = 2 + 32 + 34$

46. ④

197 g Au $\equiv 6.022 \times 10^{23}$ atoms of Au

19.7 g Au $\equiv \frac{6.022 \times 10^{23} \times 19.7}{197}$ atom of

$\equiv 6.022 \times 10^{22}$ atom of Au.

47. ①

Number of electrons = Number of protons (P) = 15

Number of Neutrons (N) = 16

So, Mass number = P + N = 15 + 16 = 31

Thus, correct representation = ${}^{31}\text{X}_{15}$.

48. ④

$2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$

4g 32g 36g

4g $\text{H}_2 \equiv 32\text{g } \text{O}_2$

15g $\text{H}_2 \equiv \frac{32 \times 15}{4}$ g O_2

$\equiv 120\text{g } \text{O}_2$

49. ④

Shaving cream is an example of aerosol. Colloids are classified on the basis of the physical state of dispersion medium and dispersed phase. In fog, clouds and mist dispersed phase is liquid and dispersion medium is gas.

50. D

Isodiaphers: The atoms of different elements that show same isotopic number i.e. same $(n - p)$ value is called isodiaphers.

$$\begin{array}{ll} {}^{39}\text{K}_{19} & {}^{19}\text{F}_9 \\ P = 19, N = 39 - 19 = 20 & P = 9, N = 19 - 9 = 10 \\ N - P = 20 - 19 = 1 & N - P = 10 - 9 = 1 \end{array}$$

Mathematics

51. B

$$\frac{13}{52} = \frac{1}{4} = \frac{1}{2^2} \text{ which will give terminating decimal.}$$

52. B

$$\begin{aligned} (3 - \sqrt{3})(3 + \sqrt{3}) &= (3)^2 - (\sqrt{3})^2 \\ &= 9 - 3 = 6 \text{ which is rational number.} \end{aligned}$$

53. D

$$\begin{aligned} p(x) &= 5x^3 - 2x^2 + x + k \\ p(3) &= 0 \\ \Rightarrow 5(3)^3 - 2(3)^2 + 3 + k &= 0 \\ \Rightarrow 135 - 18 + 3 + k &= 0 \\ \Rightarrow k &= -120. \end{aligned}$$

54. A

$$\begin{aligned} x &= \frac{1}{2 + \sqrt{3}} \Rightarrow x = 2 - \sqrt{3} \\ \Rightarrow x - 2 &= -\sqrt{3} \\ \Rightarrow (x - 2)^2 &= 3 \\ \Rightarrow x^2 - 4x + 4 &= 3 \\ \Rightarrow x^2 - 4x + 1 &= 0 \end{aligned}$$

$$\begin{aligned} \therefore 2x^3 - 7x^2 - 2x + 1 \\ &= 2x(x^2 - 4x + 1) + x^2 - 4x + 1 \\ &= 0 + 0 = 0 \end{aligned}$$

55. A

$$\frac{4}{(216)^{\frac{-2}{3}}} + \frac{1}{(256)^{\frac{-3}{4}}} + \frac{2}{(243)^{\frac{-1}{5}}}$$

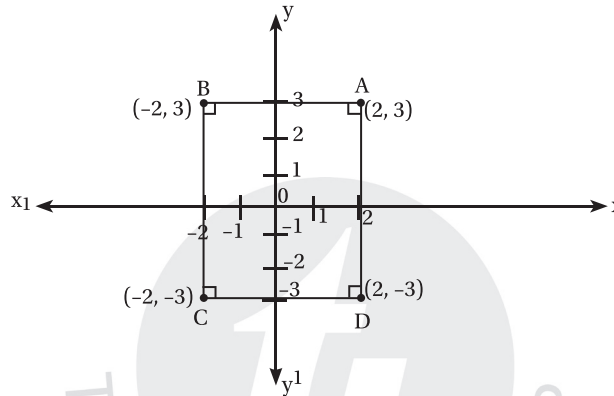
$$\begin{aligned}
 &= \frac{4}{(6)^{-2}} + \frac{1}{(4)^{-3}} + \frac{2}{(3)^{-1}} \\
 &= 4 \times (6)^2 + (4)^3 + 2(3) \\
 &= 144 + 64 + 6 = 214
 \end{aligned}$$

56. ©

$$\begin{aligned}
 &(2-a)^3 + (2-b)^3 + (2-c)^3 - 3(2-a)(2-b)(2-c) \\
 &= (2-a+2-b+2-c) \{ (2-a)^2 + (2-b)^2 + (2-c)^2 - (2-a)(2-b) - (2-b)(2-c) - (2-c)(2-a) \} \\
 &= \{ 6 - (a+b+c) \} \{ (2-a)^2 + (2-b)^2 + (2-c)^2 - (2-a)(2-b) - (2-b)(2-c) - (2-c)(2-a) \} \\
 &= 0.
 \end{aligned}$$

57. Ⓑ

The figure is rectangle



58. Ⓐ

$$2x + 0y + 9 = 0$$

$$\Rightarrow x = \frac{-9}{2}$$

Any solution is $(\frac{-9}{2}, m)$.

59. Ⓑ

$$a + b = 90^\circ$$

$$a : b = 2 : 3$$

$$\therefore b = \frac{3}{5} \times 90^\circ = 54^\circ$$

$$b + c = 180^\circ \Rightarrow c = 180^\circ - 54^\circ = 126^\circ$$

60. Ⓓ

$$\angle A + \angle B + \angle C = 180^\circ$$

$$2 < A = 3 < B = 6 < C$$

$$\Rightarrow \angle A = \frac{3}{2} < B, \angle C = \frac{1}{2} < B$$

$$\Rightarrow \frac{3}{2} < B + \angle B + \frac{1}{2} < B = 180^\circ$$

$$\Rightarrow 3 < B = 180^\circ$$

$$\Rightarrow \angle B = 60^\circ$$

61. Ⓐ

$$AB = AC \Rightarrow \angle ABC = \angle ACB$$

$$BD = CD \Rightarrow \angle DBC = \angle DCB$$

$$\therefore \angle ABC - \angle DBC = \angle ACB - \angle DCB$$

$$\Rightarrow \angle ABD = \angle ACD$$

$$\therefore \angle ABD : \angle ACD = 1 : 1$$

62. Ⓓ

In $\triangle BMR$ and $\triangle DNR$

$$\angle BMR = \angle DNR [90^\circ \text{ each}]$$

$$BM = DN \text{ (given)}$$

$$\angle BRM = \angle DRN \text{ (v. o.)}$$

$$\triangle BMR = \triangle DNR \text{ (A-A-S)}$$

$$\therefore BR = DR \text{ (c. p. c. t.)}$$

$$\therefore DR = 8 \text{ cm}$$

$$\therefore BD = 16 \text{ cm}$$

63. Ⓓ

$$BC = \sqrt{289 - 225} \text{ cm}$$

$$= \sqrt{64} \text{ cm}$$

$$= 8 \text{ cm}$$

$$\therefore \text{Area of ABCD} = \frac{1}{2}[8 \times 15 + 9 \times 12] \text{ cm}^2$$

$$= \frac{1}{2}[120 + 108] \text{ cm}^2$$

$$= \frac{1}{2} \times 228 \text{ cm}^2$$

$$= 114 \text{ cm}^2$$

64. Ⓓ

$$l = \sqrt{(28)^2 + (21)^2} \text{ cm}$$

$$= \sqrt{784 + 441} \text{ cm}$$

$$= \sqrt{1225} \text{ cm}$$

$$= 35 \text{ cm}$$

$$\therefore \text{L. S. A} = \frac{22}{7} \times 21 \times 35^2$$

$$= 110 \times 21 \text{ cm}^2$$

$$= 2310 \text{ cm}^2$$

65. Ⓑ

$$\text{Volume} = \frac{2}{3} \times \frac{22}{7} \times (10.5)^3 \text{ cm}^3$$

$$= \frac{2}{3} \times \frac{22}{7} \times 10.5^{1.5 \times 0.5} \times 10.5 \times 10.5 \text{ cm}^3$$

$$= 2425.5 \text{ cm}^3$$

$$= 2.4255 \text{ litres}$$

$$= 2.426 \text{ litres.}$$

66. Ⓐ

$$9(x) = x^3 - 64$$

$$= (x - 4)(x^2 + 4x + 16)$$

67. Ⓑ

$$p(y) = 9y^2 - 9y + 2$$

$$\begin{aligned}
 &= 9y^2 - 6y - 3y + 2 \\
 &= 3y(3y - 2) - 1(3y - 2) \\
 &= (3y - 2)(3y - 1)
 \end{aligned}$$

68. ©

$$x^2 - 81 = 0 \Rightarrow x = \pm 9$$

69. ©

$$2 + \sqrt{3} + 4 + \sqrt{3} = 6 + 2\sqrt{3} \text{ is irrational.}$$

∴ Assertion is true.

$$2 + \sqrt{3} + 2 - \sqrt{3} = 4 \text{ which is rational.}$$

∴ Reason is false.

70. Ⓐ

$$(3 + 2\sqrt{5})(3 - 2\sqrt{5}) = 9 - 20 = -11 \text{ which is rational.}$$

∴ rationalizing factor of $3 + 2\sqrt{5}$ is $3 - 2\sqrt{5}$

∴ Assertion is true.

Reason is also true and it is the correct explanation of (A).

71. Ⓐ

Class mark = 25, class size = 10

∴ class interval = 20 - 30.

72. ©

First class interval = 0 - 10

∴ last class interval = 40-50

73. Ⓓ

$$\text{Volume of sphere} = \frac{4}{3}\pi(10)^3 \text{ cm}^3.$$

New radius = 11 cm.

$$\therefore \text{New volume} = \frac{4}{3}\pi(11)^3 \text{ cm}^3.$$

$$\therefore \text{increase in volume} = \frac{4}{3}\pi \times (1331 - 1000) \text{ cm}^3$$

$$= \frac{4}{3}\pi \times 331 \text{ cm}^3$$

$$\therefore \text{Percentage of increase} = \frac{\frac{4}{3}\pi \times 331}{\frac{4}{3}\pi \times 1000} \times 100\% = 33.1\%.$$

74. ©

$$s = \frac{35 + 54 + 61}{2} \text{ cm.}$$

$$= \frac{150}{2} \text{ cm} = 75 \text{ cm.}$$

$$\therefore \text{Area} = \sqrt{75(75-35)(75-54)(75-61)} \text{ cm}^2$$

$$= \sqrt{75 \times 40 \times 21 \times 14} \text{ cm}^2$$

$$= \sqrt{25 \times 3 \times 4 \times 2 \times 5 \times 7 \times 3 \times 7 \times 2} \text{ cm}^2$$

$$= 5 \times 3 \times 4 \times 7\sqrt{5} \text{ cm}^2$$

$$= 420\sqrt{5} \text{ cm}^2$$

∴ length of longest altitude

$$= \frac{12\sqrt{5} \cdot 420\sqrt{5} \times 2}{35} \text{ cm} = 24\sqrt{5} \text{ cm.}$$

75. Ⓓ

$a = d, f = c$
 $a + f + e = 180^\circ$
 $\Rightarrow a + c + e = 180^\circ$
 ∴ (ii) is true
 ∴ $b = e$
 ∴ $b + f = e + c$
 ∴ (iii) is true.

Biology

76. Ⓓ

All of the above

77. Ⓓ

Apis mellifera

78. Ⓑ

I & III
Egg production & Chicken production

79. Ⓓ

Catla

80. Ⓑ

Large
Dense cytoplasm, vacuole absent

81. Ⓓ

All

82. Ⓑ

Stratified squamous epithelium
To offer protection of the underlying parts from wear and tear

83. Ⓑ

Epithelial
Glandular epithelium

84. Ⓓ

All

85. Ⓓ

Xylem
It is a complex tissue made up of 4 different types of cells

86. Ⓒ

Proteins

87. Ⓑ
Nucleoid
88. Ⓒ
Lysosome
89. Ⓑ
Shrinkage of cytoplasm in hypertonic medium
90. Ⓐ
Bacteria
Cell wall is made up of peptidoglycan
91. Ⓓ
A is false but R is true
Epithelium is the outer layer of an animal body
92. Ⓒ
A is true but R is false
Tendon is fibrous connective tissue
93. Ⓓ
A is false but R is true
Ribosome is an organelle
94. Ⓑ
A and R both are true but R is not the correct explanation of A
Protoplasm is absent in sclerenchyma as it is a dead tissue
95. Ⓐ
A and R both are true and R is the correct explanation of A
96. Ⓓ
A is cardiac muscle; B is striated muscle
97. Ⓑ
Neither A nor B
Smooth muscles are present in the walls of stomach
98. Ⓐ
Fig. A
99. Ⓓ
Ribosome
100. Ⓓ
Nucleolus
It is present within the nucleus