



Monthly Progressive Test (Solution)

Class: IX

Subject: PCMB



Test Booklet No.: MPT08

Test Date:

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Physics

1. Ⓐ

$$W = mgh = (0.5)(9.8)(1) \\ = 4.9\text{J}$$

2. Ⓑ

$$W = (200)(5)\cos 60^\circ \\ = 500\text{ J.}$$

3. Ⓒ

$$W = \text{change in kinetic energy} \\ = \frac{1}{2} \times 0.25 \times (4)^2 \\ = 2\text{J}$$

4. Ⓓ

$$\frac{1}{2}mu^2 = \frac{1}{2}(1)(2)^2 \\ = 2\text{ J}$$

5. Ⓐ

$$W = \frac{1}{2}mu^2 = mgH \\ = \frac{1}{2} \times (1)(10)^2 = 50\text{ J (Against Gravity)} \\ \therefore W = -50\text{ J}$$

6. Ⓓ

Work done by friction can be positive, negative and zero

7. Ⓐ

$$1\text{ H. P} = 746\text{ Watt.}$$

8. Ⓒ

$$1\text{ KWh} = 1000\text{ (Watt)} \times 3600\text{ (s)} \\ = 3.6 \times 10^6\text{ J}$$

9. Ⓐ

$$100\text{ MW} = 100\text{ M (J/s)} \\ \text{as } 1\text{ W} = 1\text{ J/s.}$$

10. D

$$\frac{25 \times 10^3 \times 1}{10^3} = 25 \text{ J/s}$$

11. B

A progressive wave is advancing a "disturbance" in elastic medium.

12. A

When wave passes through a medium, the particles of medium oscillate about mean position.

13. D

In case of longitudinal wave, oscillation of particles of medium is along the direction of propagation of wave.

14. B

As speed of sound in moist air is greater than the speed of sound in dry air.

15. C

As speed of sound in steel is greater than the speed of sound in water.

16. C

As the range of audible sound is 20 Hz to 20 kHz.

17. A

Speed of sound = frequency \times wavelength

18. D

As elastic medium is required for the sound to pass through.

19. A

$$V = f_1 \times \lambda_1 = f_2 \times \lambda_2$$

$$\frac{f_1}{f_2} = \frac{\lambda_2}{\lambda_1} = \frac{3}{2}$$

20. D

ultrasonic sound has frequency greater than 20 kHz.

21. B

Both are true, but Reason is not correct explanation of assertion.

22. A

$$h = \frac{1}{2}gt^2 \Rightarrow 80 = \left(\frac{1}{2}\right)(10)(t^2) \Rightarrow t = 4\text{s.}$$

$$p = \frac{mgh}{t} = \frac{(1)(10)(80)}{4} = 200 \text{ watt.}$$

23. C

$$\begin{aligned} \text{frequency} &= 200 \text{ oscillations per second.} \\ &= 200 \text{ Hz.} \end{aligned}$$

24. C

$$T = \frac{15}{300} = \frac{1}{20} = 0.05\text{s.}$$

25. B

$$\begin{aligned} \text{frequency of source} &= \text{frequency of sound wave} \\ &= 100 \text{ Hz.} \end{aligned}$$

Chemistry

26. Ⓑ

An alpha (α) particle is a helium nucleus. i.e. $\alpha = {}^4\text{He}^{++}$

27. Ⓑ

Formula of oxide is Y_2O_5

So, valency of Y = 5

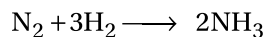
Valency of Cl = 1

\therefore Formula of the chloride of Y and Cl is YCl_5

28. Ⓒ

Formula of silver chromate is Ag_2CrO_4 .

29. Ⓑ



$$28\text{g} \quad 6\text{g} \qquad 2 \times 17 = 34\text{g}$$

$$34\text{g NH}_3 \equiv 28\text{g N}_2$$

$$6.8\text{g} \text{ ,, } \equiv 28 \times 6.8$$

$$\frac{\quad}{34} \text{ g N}_2$$

$$\equiv 5.6\text{g N}_2$$

$$\therefore \text{H}_2 = 6.8 - 5.6 = 1.2\text{g}$$

30. Ⓐ

$$1 \text{ a.m.u} = \frac{1}{12} \text{ th of mass of C-12 atom}$$

31. Ⓐ

$$\text{Ratio by mass of the element present in SO}_2 = 1 \times 32 : 2 \times 16$$

$$= 1 : 1$$

32. Ⓒ

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

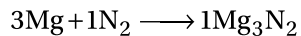
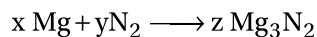
$$\text{,, ,, CO}_2 = 12 + 2 \times 16 = 44$$

$$\text{,, ,, SO}_2 = 32 + 2 \times 16 = 64$$

$$\text{,, ,, H}_2\text{S} = 2 + 32 = 34$$

$$\therefore \text{M.W. of SO}_2 = 2 \times \text{M.W. of O}_2$$

33. Ⓓ



$$\text{Comparing: } x = 3, y = 1, z = 1$$

34. Ⓑ

Elements 'X' & 'Y' react to form $X_a Y_b$

∴ Valency of 'X' = b

Elements 'P' & 'Q' react to form $P_m Q_n$.

∴ Valency of Q is m

∴ The formula of the compound formed by X & Q is $X_m Q_b$.

35. Ⓓ

M.W. of copper (II) sulphate = 160; M.W. of water = 18.

∴ The % of water = $\frac{5 \times 18 \times 100}{(160 + 5 \times 18)}$

36. Ⓐ

Both assertion and reasons are correct and reason is the correct explanation of assertion. Thus the answer is A.

37. Ⓐ

Both assertion and reasons are correct and reason is the correct explanation of assertion. Thus the answer is A.

38. Ⓒ

Assertion is correct but reason is incorrect. Thus the answer is C.

39. Ⓐ

a-(ii), b-(i), c-(iv), d-(iii)

40. Ⓓ

1 G.M.W of $N_2 = 28 \text{ g of } N_2 \equiv 1 \text{ mole of } N_2 \text{ molecule}$
 $\equiv 6.022 \times 10^{23} \text{ molecules}$

41. Ⓑ

Ratio of number of moles of a component to the total number of moles is known as a mole fraction. Molality (m) is the number of moles of solute per kilogram of solvent.

Molarity (M) is the number of moles of solution per litre of solution.

42. Ⓑ

2, 8, 2.

Mg_{12} ; Proton (P) = Electron (d) = 12

∴ Electronic configuration of $Mg_{12} = K_2 L_8 M_2$

43. Ⓒ

Chronological order is II, I, III; where

I → Rutherford's atomic model

II → Thomson's atomic model

III → Bohr's atomic model

44. Ⓐ

Mass of an electron is: $9.1083 \times 10^{-31} \text{ kg}$.

45. Ⓑ

A natural phenomenon that supports the experimental emulsion that atoms are divisible is radioactivity.

46. Ⓑ

X^{2-} contains 10 electrons & 8 Neutron.

So, atomic number = $10 - 2 = 8$.

Atomic Mass = $P + N = 8 + 8 = 16$

47. Ⓐ

A^{3+} ; A_{13} has electronic configuration = $K_2L_8M_3$

Octet complete when it loses 3 electrons

$A_{13} - 3 \longrightarrow A^{3+}$; (stable ion)

48. Ⓒ

10 ; A_{10} , number of protons = 10 = number of electron.

$A_{10} - 2e^- \rightarrow A_{10}^{2+}$

So, number of protons A^{2+} is also 10.

49. Ⓒ

An atom of an element has 26 electrons and mass number = 56;

Mass number = $P + N$

\therefore Neutron (N) = $56 - 26 = 30$

50. Ⓑ

The presence of the three unpaired electrons in nitrogen atom is given by Hund's rule.

Mathematics

51. Ⓐ

$$x^y = y^x \Rightarrow y = x^{\frac{y}{x}}$$

$$\therefore \left(\frac{x}{y}\right)^{\frac{x}{y}} = \left(\frac{\frac{x}{y}}{x^{\frac{y}{x}}}\right)^{\frac{x}{y}} = \frac{\frac{x}{y}}{x^{\frac{y}{x}}} = x^{\frac{x}{y}-1}$$

52. Ⓑ

$$108 \times 192 = 3^3 \times 2^2 \times 2^6 \times 3 = 3^4 \times 2^8$$

\therefore Sum of powers of prime factors = $4 + 8 = 12$

53. Ⓐ

$$3\sqrt[3]{2} \times 7\sqrt[3]{6} \times 5\sqrt[3]{18}$$

$$= 105\sqrt[3]{2 \times 6 \times 18} = 105\sqrt[3]{6 \times 6 \times 6} = 105 \times 6 = 630$$

54. Ⓑ

$$\sqrt{[0.04 \times 0.4 \times x]} = 0.4 \times 0.04 \times \sqrt{y}$$

$$\Rightarrow 0.04 \times 0.4 \times x = (0.4)^2 \times (0.04)^2 \times y$$

$$\Rightarrow x = 0.4 \times 0.04 \times y$$

$$\Rightarrow \frac{x}{y} = 0.016$$

55. ©

$$\frac{1}{11} = 0.090909 \dots = 0.\overline{09}$$

56. Ⓐ

$$(3x + 2y)^2 = 144$$

$$\Rightarrow 9x^2 + 4y^2 + 12xy = 144$$

$$\Rightarrow 9x^2 + 4y^2 + 72 = 144$$

$$\Rightarrow 9x^2 + 4y^2 = 72$$

57. Ⓓ

$$px^2 + qx + rx^4 + 5$$

Degree of this polynomial = 4

∴ It is biquadratic.

58. Ⓑ

$$(x+2) \text{ is a factor of } x^3 - 2ax^2 + 16$$

$$\therefore -8 - 8a + 16 = 0$$

$$\Rightarrow -8a = -8$$

$$\Rightarrow a = 1$$

59. Ⓓ

A quadratic polynomial can have at most 3 terms.

60. ©

$$x^3 + 8y^3 + z^3 - 6xyz$$

$$= (x)^3 + (2y)^3 + (z)^3 - 3 \times x \times 2y \times z$$

$$= (x + 2y + z)(x^2 + 4y^2 + z^2 - 2xy - 2yz - xz)$$

61. ©

The co-ordinates of the point which lies on the y-axis and is 3 units away from the origin are (0, 3) and (0, -3).

62. Ⓓ

If a point is equidistant from co-ordinate axes, then the line passing through this point and origin makes an angle 45° with the x-axis.

63. Ⓐ

When the point (a, b) is reflected over the origin, then its image is (-a, -b).

64. Ⓑ

The point (3, 4) lies on $y = mx + 8$

$$\therefore 4 = 3m + 8 = 3m - 4$$

$$\Rightarrow m = \frac{-4}{3}$$

65. ©

The common point of lines $x = 0$ and $y = 0$ is $(0, 0)$ only.
So, number of common points = 1

66. ©

The total cost = ₹ $(50x + 30y)$
 $\therefore 50x + 30y = 200$
 $\Rightarrow 5x + 3y = 20.$

67. Ⓑ

$5x + 3 \times 2.5 = 20$
 $\Rightarrow 5x = 20 - 7.5 = 12.5$
 $\Rightarrow x = 2.5$

68. Ⓑ

$5x + 3y = 20$
For $x = 0$, $y = \frac{20}{3}$

\therefore The graph of $5x + 3y = 20$ cuts y -axis at $\left(0, \frac{20}{3}\right)$

69. Ⓑ

$$p(x) = x^2 - 4x + 3 = (x - 3)(x - 1)$$

\therefore Zeroes are 1 and 3
 \therefore Assertion (A) is true.

Number of zeroes of a polynomial cannot exceed its degree. Reason (R) is also correct. But reason is not the correct explanation of Assertion (A).

70. ©

Sum of $2 + \sqrt{3}$ and $4 + \sqrt{3} = 6 + 2\sqrt{3}$ which is irrational.

\therefore Assertion (A) is true

Sum of two irrational numbers is not always irrational number.

For example, $3 + \sqrt{5} + 3 - \sqrt{5} = 6$ which is rational.

\therefore Reason is false.

71. Ⓑ

$$\sqrt[4]{x} + \frac{1}{\sqrt[4]{x}} = 2$$

$$\Rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} = 2$$

$$\Rightarrow x + \frac{1}{x} = 2$$

$$\Rightarrow x^2 + 1 = 2x$$

$$\Rightarrow (x - 1)^2 = 0$$

$$\Rightarrow x = 1$$

$$\therefore x^{2024} + \frac{1}{x^{2024}} = 1 + \frac{1}{1} = 2$$

72. B

$$x^{2023} + 2 = (x^2 - 1) \times g(x) + ax + b$$

For $x = 1$

$$3 = a + b$$

For $x = -1$

$$1 = -a + b$$

$$\therefore 2b \Rightarrow 4 = b = 2$$

$$\therefore a = 1$$

$$\therefore \text{Remainder} = x + 2$$

73. C

Name of quadrilateral ABCD is square because all sides are equal and also diagonals are equal.

74. C

The number of solution for $2x + 3 = 0$ is only one in one dimension.

Again, the number of solutions for $2x + 3 = 0$ is infinitely many in two dimensions.

75. C

$$\begin{aligned} & (x+1)^2 + (x+2)^2 + (x+3)^2 - (x+1)(x+2) - (x+2)(x+3) - (x+3)(x+1) \\ &= \frac{1}{2} [2a^2 + 2b^2 + 2c^2 - 2ab - 2bc - 2ca] \text{ where } a = x+1, b = x+2, c = x+3 \\ &= \frac{1}{2} [(a-b)^2 + (b-c)^2 + (c-a)^2] \\ &= \frac{1}{2} [1 + 1 + 4] = 3 \end{aligned}$$

76. B

Muscle cell

77. A

Cell sap

78. A

2

Meristematic and permanent tissues

79. B

Slower than myelinated neuron

80. B

Collenchyma

81. B

Cellulose + pectin + hemicellulose

82. A

Roots

83. D

Tensile strength

Flexibility, i.e, ability to bend without breaking

84. Ⓓ
Simple permanent tissue
Tissue made of the same type of cells. Cells generally do not divide and are specialized functionally
85. Ⓐ
Thin and flat
86. Ⓒ
Basement membrane
Characteristic feature of epithelial tissues
87. Ⓑ
Cuboidal epithelium
88. Ⓒ
Testis
It produces the gametes
89. Ⓑ
Squamous epithelium of skin
90. Ⓐ
Single membrane covering of vacuoles
91. Ⓑ
Tendons connect cartilage to bones
Tendons connect muscles to bones
92. Ⓓ
Collenchyma
It is a simple permanent tissue not found in the xylem
93. Ⓐ
Both A and R are true and R is the correct explanation of A
94. Ⓒ
A is true but R is false
Lysosomes are organelles present in the cytoplasm
95. Ⓑ
Both A and R are true but R is not the correct explanation of A
96. Ⓒ
Intercropping
Each type of plant is assigned a separate row
97. Ⓐ
Protein
98. Ⓓ
All of the above
99. Ⓐ
Cereal crop
100. Ⓐ
Cereal crop