Monthly Progressive Test

Class: IX (G)

Subject: PCMB

Test Booklet No.: MPT06	Test Date: 03102024
Time: 120 mins	Full Marks: 200

Solutions

Physics

1. Ⓓ

Apparent motion of Sun around the Earth

2. Ⓓ

G is universal constant

3. Ⓐ

$F \propto \frac{1}{d^2}$

4. Ⓑ

Apply $F = \frac{Gm_1m_2}{d^2}$

5. Ⓐ

$$F = \frac{m_1.m_2}{d^2} = \frac{\left(\frac{m_1}{2}\right)\left(\frac{m_2}{2}\right)}{\left(\frac{d}{2}\right)^2}$$

6. Ⓑ

Apply $H = ut \Rightarrow 100 = 25 \times t$

$\therefore\ t = 4s, \quad y = \frac{1}{2}\, gt^2 = 80\ m$

$y' = 100 - 80 = 20\ m.$

Cont.. 2

7. Ⓐ

Apply $g' = g\left(1 - \frac{2h}{R}\right) = g\left(1 - \frac{d}{R}\right)$

8. Ⓐ

Earth attracts towards its centre

9. Ⓐ

Every body attracts every body

10. Ⓒ

As $F = \frac{G.m_1.m_2}{d^2}$

$G \rightarrow$ is universal constant

11. Ⓒ

As $F \propto m_1 \, . \, m_2$

12. Ⓒ

As $F \propto \frac{1}{d^2}$

13. Ⓐ

$mg = F = \frac{GmM}{R^2}$

14. Ⓑ

F_g is Towards the centre of Earth

15. Ⓒ

Refer Keplar's law

16. Ⓐ

Apply $v = u + at$ put $u = 0$

$\therefore \; v \propto t$

17. Ⓒ

$S = \frac{1}{2} \, . \, 2 \, . \, (2 \times 4 - 1)$

$= 7$ m.

18. Ⓒ

$6 = u \times (2) - \frac{1}{2} . 3 . 2 . 2$

$u = 6$ m/s.

19. Ⓐ

Slope of S-t graph is constant

20. Ⓑ

$h = \frac{25}{2 \times g} \Rightarrow 10h = 12.5$

21. Ⓐ

$mg' = mg\left(1 - \frac{2h}{R}\right) = mg\left(1 - \frac{d}{R}\right)$

22. Ⓑ

$g' = g\left(1 - \frac{2h}{R}\right) = g\left(1 - \frac{d}{R}\right)$

23. Ⓑ

$GM = gR^2$

$G.2M = g_p . (2R)^2$

24. Ⓒ

$v = \sqrt{\frac{GM}{r}}$

$= \sqrt{\frac{gR^2}{R + y}}$

25. Ⓓ

Mass and mg (weight)

as g is invariant almost (in this case)

Chemistry

26. Ⓐ

Kalium is the Latin name of *Potassium*.

27. Ⓐ

M.W of ammonia (NH_3) = $1 \times 14 + 3 \times 1$

$= 14 + 3$

$= 17$

M.W expressed in gram is called Gram molecular mass.

So, the gram molecular mass of ammonia = 17 grams.

28. Ⓒ

Mass of 2.5 gm atoms of calcium = (40×2.5) g = 100 g

29. Ⓑ

The molecular formula of nitre is KNO_3. Chemical name is potassium nitrate.

30. Ⓓ

The value of Avogadro constant is 6.022×10^{23}.

31. Ⓑ

According to law of constant proportions, A chemical compound, no matter from which source it is obtained, always contains the same elements combined together in a definite proportion by mass. So, all samples of carbondioxide contain carbon and oxygen in the mass ratio of 3 : 8. This is in agreement with the law of constant proportion, or law of definite proportion.

32. Ⓓ

The number of atoms in a molecule of the elementary substances is called *atomicity*.

33. Ⓑ

Chemical properties of Nitrogen and Oxygen are different. This is true. Both Nitrogen and Oxygen are gases. This is also true. But, Nitrogen and Oxygen are different elements. So, Assertion and Reason both are correct but Reason is not the correct explanation of Assertion.

34. Ⓓ

Atomicity of sulphuric acid (H_2SO_4) is 9. This is wrong. Actual atomicity 7. Atomicity is defined as the total number of atoms present in the molecule. This is correct. So, assertion is wrong reason is correct.

35. Ⓑ

The smallest individual part of an element is atom.

Smallest particle of matter is called molecule.

Two or more element or compound in any proportion is called mixture.

When two or more element combine chemically in a definite proportion is called compound.

36. ©

According to law of conservation of mass atoms can not be created or destroyed.

37. Ⓑ

Atomic mass of X = 41u

,, ,, ,, Y = 72u

$\therefore$ The formula unit mass of $X_2Y_3 = 2 \times 41 + 3 \times 72$

$= 82 + 216$

$= 298\,u$

38. Ⓐ

6.022×10^{23} Ne atoms = 1 mole atom

3.011×10^{21} Ne atoms = $\frac{3{,}011 \times 10^{21}}{6.022 \times 10^{23}}$ mole atom

$= 0.005$ mole.

39. ©

M.W of $O_2 = 2 \times 16 = 32$

Number of moles of oxygen, $^{n}O_2 = \frac{\text{Mass(w)}}{\text{M.W(m)}}$

$= \frac{4}{32}$

$= 0.125$

40. Ⓐ

P_4	+	$5O_2$	$\longrightarrow$	$2P_2O_5$
4×31		$5(2 \times 16)$		$2[2 \times 31 + 5 \times 16]$
$= 124$		$= 160$		$= 2[62 + 80]$
				$= 2 \times 142$
				$= 284$

$124\ g\ P_4 \equiv 284\ g\ P_2O_5$

$0.31\ g\ P_4 \equiv \frac{284 \times 0.31}{124}\ g\ P_2O_5$

$\equiv 0.710\ g\ P_2O_5$

41. ©

Valency of Al = 3

Valency of $SO_4^{2-} = 2$

The chemical formula of Aluminium sulphate = $Al_2(SO_4)_3$

42. Ⓓ

$aPb(NO_3)_2 \xrightarrow{\Delta} bPbO + cNO_2 + O_2$

Balancing the equation: $2Pb(NO_3)_2 \xrightarrow{\Delta} 2PbO + 4NO_2 + O_2$

So, a = 2, b = 2, c = 4.

Thus, correct option is D.

43. ©

Aqueous solution of barium chloride reacts with the aqueous solution of sodium sulphate to give white precipitate of Barium sulphate

$BaCl_2(aq) + Ba_2SO_4(aq) \longrightarrow \underset{\text{(white ppt)}}{BaSO_4\downarrow} + 2NaCl$

44. Ⓓ

Fractional distillation makes use of the difference in *boiling point*, using fractionalating column.

45. Ⓐ

All the three statements I, II & III are wrong about atoms.

(I) only all liquid and solid matters are made of atom.

(II) At the end of reaction atom are destroyed.

(III) The relative number and kind of atoms are not constant for a given compound.

46. ©

Atomicity of Ozone (O_3) = 3

Atomicity of Sulphur (S_8) = 8

Atomicity of Argon (Ar) = 1

So, option (C) is correct

47. Ⓑ

Molar mass of calcium carbonate = [40 + 12 + (16 × 3)]

= 100

200 gm $CaCO_3 \equiv \frac{200}{100}$ = 2 mole

2 mole $CaCO_3 = (2 \times 6.022 \times 10^{24}) = 12.044 \times 10^{23}$ molecules.

48. Ⓒ

M.W of sulphurdioxide $SO_2 = 32 + 2 \times 16 = 64$

1 G.M.W of $SO_2 \equiv 64$ g of $SO_2 \equiv 1$ mole of SO_2

1 mole $SO_2 \equiv 64$ g SO_2

1.5 moles $SO_2 \equiv 64 \times 1.5$ g SO_2

$\equiv 96.0$ g SO_2

49. Ⓐ

Assertion: Atomic mass of Mg is 24 — Correct

Reason: An atom of magnesium is 24 times heavier than $\frac{1}{12}$th of the man of carbon atom (C–12) —correct. Reason is the correct explanation of Assertion. Thus, the option 'A' is Correct.

50. Ⓑ

0.49 gm $H_2SO_4 \equiv \frac{0.49}{98} = 0.005$ mole

1.8 gm water $\equiv \frac{1.8}{18} = 0.1$ mole

$\therefore$ Total number of moles = (0.1 + 0.005) = 0.105 mole.

Mathematics

51. Ⓓ

any number

52. Ⓐ

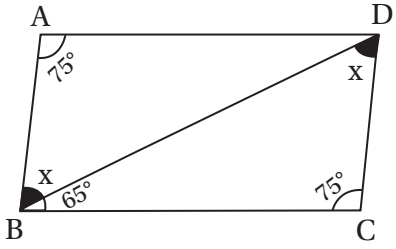
parallel to y-axis

53. Ⓐ

In ΔOAP and ΔOBP, $OA = OB$, $OP = OP$, $\angle AOP = \angle BOP$

$\therefore\ \Delta OAP \cong \Delta OBP$ (S–A–S)

54. Ⓐ



$\therefore\ x + 65° + 75° = 180^\circ$

$\Rightarrow\ x + 140^\circ = 180^\circ$

$\Rightarrow\ x = 40°$

55. Ⓒ

$x = 55^\circ$. As equal chords subtend equal angles at the centre, therefore $\angle COD = 70°$.

$$\therefore\ \angle OCD = \angle ODC = \frac{180° - 70°}{2} = \frac{110°}{2} = 55°$$

56. Ⓒ

$EF = \frac{1}{2}(AB + DC) = 6$ cm

57. Ⓒ

$3x + 8 = 17\ \Rightarrow\ 3x = 9\ \Rightarrow\ x = 3\ \therefore\ y = 4$

58. Ⓐ

Assertion and Reason both are true. Reason is correct explanation of (A).

59. Ⓓ

Assertion is false but reason is correct.

60. Ⓒ

In ΔADE and ΔCFE,

$AE = CE$

$DE = FE$

$\angle AED = \angle CEF$

$\therefore\ \Delta ADE \cong \Delta CFE$ (S–A–S)

61. Ⓑ

$\angle EFC = \angle EDA$

62. Ⓐ

$\angle ECF = \angle EAD$

63. Ⓐ

SSA

64. Ⓓ

$\angle ACD + \angle BAE + \angle CBF = 360°$

65. Ⓐ

$3y = ax + 7$

$\Rightarrow 3 \times 4 = a \times 3 + 7$

$\Rightarrow 3a = 5$

$\Rightarrow a = \frac{5}{3}$

66. Ⓐ

$3 + 0.\overline{6}$

$= 3 + \frac{^{2}\cancel{6}}{\cancel{9}^{3}}$

$= \frac{11}{3}$

67. Ⓑ

Since, $a^{\frac{1}{3}} + b^{\frac{1}{3}} + c^{\frac{1}{3}} = 0$

$$\Rightarrow \left(a^{\frac{1}{3}}\right)^3 + \left(b^{\frac{1}{3}}\right)^3 + \left(c^{\frac{1}{3}}\right)^3 = 3a^{\frac{1}{3}}\, b^{\frac{1}{3}}\, c^{\frac{1}{3}}$$

$\Rightarrow a + b + c = 3(abc)^{\frac{1}{3}}$

$\Rightarrow (a + b + c)^3 = 27\ abc$

68. Ⓓ

$x + y = 2013 \longrightarrow (1)$

$\Rightarrow \frac{x+y}{xy} = 2013$

$\Rightarrow (x + y) = 2013\ xy$

$\Rightarrow \cancel{2013} = \cancel{2013}\, xy\ (\because x + y = 2013)$

$\Rightarrow xy = 1 \longrightarrow (2)$

69. Ⓓ

$p(x) + p(-x) = x + 4 + (-x) + 4 = 8$

70. Ⓒ

$\angle A = \angle B = 125^\circ$

$\angle A = \angle C = 113^\circ$

$\underbrace{\angle A + \angle B + \angle C} + \angle A = 238^\circ$

$\Rightarrow \quad 180^\circ + \angle A = 238^\circ$

$\Rightarrow \angle A = 238^\circ - 180^\circ$

$= 58^\circ$

71. Ⓐ

$$\frac{3x}{4} = \frac{5y}{8} + 7$$

$$\Rightarrow \frac{3}{\cancel{4}} \times \frac{\cancel{8}}{5} x = \frac{\cancel{5}}{\cancel{8}} \times \frac{\cancel{8}}{\cancel{5}} y + 7 \times \frac{8}{5} \quad \left(\text{Multiplying both sides by } \frac{8}{5}\right)$$

$$\Rightarrow \frac{6}{5}X - \frac{56}{5} = Y \qquad \therefore \ m = \frac{6}{5} = 1\frac{1}{5}$$

72. Ⓒ

A(0, 6), C(0, −5), E(1, 2) do not lie on x-axis

73. Ⓑ

$n + p = 40^\circ + 40^\circ$

$= 80^\circ$

$= 2.(40^\circ)$

$= 2\ m.$

74. Ⓐ

$$\angle PMQ = \frac{1}{2} \times \text{ reflex angle } POQ$$

$$= \frac{1}{2} \times 110^0$$

$$= 55^0$$

75. ©

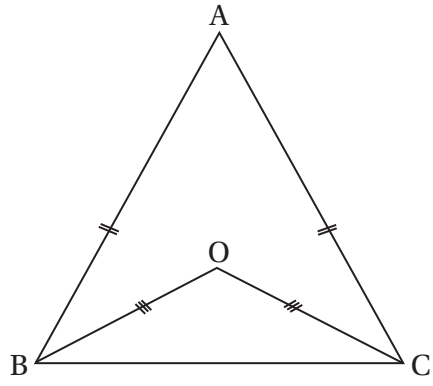
$\because$ AB = AC

$\Rightarrow \angle B = \angle C$

$\Rightarrow \frac{\angle B}{2} = \frac{\angle C}{2}$

$\Rightarrow \angle OBC = \angle OCB$

$\Rightarrow OB = OC$



Biology

76. Ⓓ

All of the above

These are young cells, hence vacuole is small and nucleus is central

77. ©

Connective tissue

Bones have a matrix between their cells

78. ©

Protoplasm

Protoplasm is cytoplasm plus nucleus.

79. Ⓓ

Lymph

Lymph serves as a 'middle man', transporting oxygen, food materials, hormones, etc to body cells, while transporting CO_2 and other metabolic wastes from body cells to blood.

80. Ⓑ

Sarcoplasm

81. Ⓐ

Mitotic

82. ©

Both A and B

Connective tissue is characterised by the presence of cells, lying in an intercellular matrix.

83. Ⓓ

Apical meristem

It is a meristematic tissue, which consists of undifferentiated cells

84. Ⓐ

Xylem

85. Ⓑ

Collenchyma

86. Ⓒ

3

Tracheids, vessels and xylem fibres are the dead components of xylem

87. Ⓒ

Sclerenchyma

Provides mechanical strength

88. Ⓐ

Both Assertion and Reason are true and Reason is the correct explanation of the Assertion

The liquid matrix, plasma, fills up the space between the cells

89. Ⓐ

Both Assertion and Reason are true and Reason is the correct explanation of the Assertion

The wire like shape helps in quicker transmission of signals

90. Ⓓ

Assertion is false but Reason is true

Epithetial tissue forms the lining of organs

91. Ⓐ

Amitosis

Special type of reproduction-simplest mode of reproduction

92. Ⓑ

Diploid

The diploid mother cell undergoes meiosis to form four haploid daughter cells

93. Ⓓ

Bone

The other three are components of blood

94. Ⓐ

Chromoplast

Chromoplast contain pigments, other than chlorophyll, which impart colour to flowers and fruits.

95. Ⓓ

Companion cells

Companion cells are components of phloem

96. Ⓑ

Basement membrane

97. Ⓐ

Squamous

The thin and flat squamous cells help in exchange of gases between air and blood in the blood capillaries surrounding the alveoli

98. Ⓑ

Cuboidal

They help in protection, absorption, secretion and excretion of substances

99. Ⓓ

Assertion is false but Reason is true

Chlorenchyma is a type of parenchyma

100. Ⓑ

Both Assertion and Reason are true but Reason is not the correct explanation of the Assertion