Monthly Progressive Test

Class: X

Subject: PCMB

Test Booklet No.: MPT03

Test Date: 1 4 0 6 2 0 2 4

Time: 180 mins

Full Marks: 200

Important Instructions :

1. The Test is of 180 mins duration and the Test Booklet contains 100 multiple choice questions of single correct option only. There are four sections with four subjects. You have to attempt all 100 questions (Candidates are advised to read all 100 questions). Questions 1 to 25 contain Physics, Questions 26 to 50 contain Chemistry, Questions 51 to 75 contain Mathematics, Questions 76 to 100 contain Biology.

2. Each question carries 2 marks. For each correct response, the candidate will get 2 marks. There is no negative mark for wrong response. The maximum mark is 200.

3. Use Blue / Black Ball point Pen only for writing particulars marking responses on Answer Sheet.

4. Rough work is to be done in the space provided for this purpose in the Test Booklet only.

5. On completion of the test, the candidate must handover the Answer Sheet to the invigilator before leaving the Room / Hall. The candidates are allowed to take away this Test Booklet with them.

6. The CODE for this Booklet is Off Line MPT0314062024.

7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your UID No. anywhere else except in the specified space. Use of white fluid for correction is NOT permissible on the Answer Sheet. **Do not scribble or write on or beyond discrete bars of OMR sheet at both sides**.

8. Each candidate must show on-demand his/her Registration document to the Invigilator.

9. No candidate, without special permission of the Centre Superintendent or Invigilator, would leave his/her seat.

10. Use of Electronic Calculator/Cellphone is prohibited.

11. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.

12. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.

13. There is no scope for altering response mark in Answer Sheet.
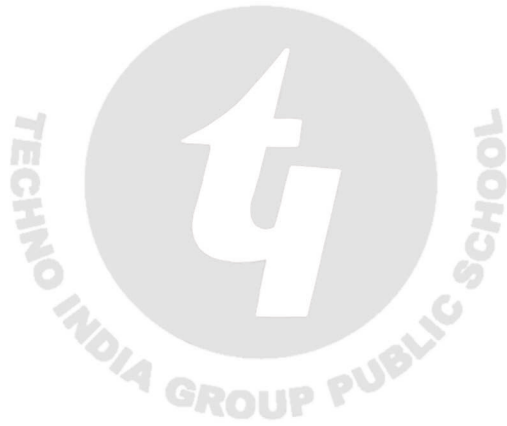
Physics

1. If the angle of incidence is 60° on a plane mirror, then angle of deviation δ is

   Ⓐ 30° Ⓑ 45° Ⓒ 60° Ⓓ 25°

2. When an object is placed between the pole and focus of a concave mirror, the image formed is:

   Ⓐ behind the mirror Ⓑ virtual and erect

   Ⓒ larger than the object (or magnified) Ⓓ all the above are correct

3. In case of concave reflector, a lighted bulb is placed at very large distance, the image is formed

   Ⓐ at centre of curvature Ⓑ at focus

   Ⓒ at $\frac{f}{2}$ distance from pole Ⓓ at $\frac{3}{4}$ distance from pole

4. A concave mirror has a focal length 10 cm. An object is placed at 1000 cm from pole. The image will form at a distance of

   Ⓐ 20 cm from the pole Ⓑ 10 cm from the pole

   Ⓒ 15 cm from the pole Ⓓ 25 cm from the pole

5. If $_{air}n_{water}$ = 4/3 then $_{water}n_{air}$ =

   Ⓐ 0.5 Ⓑ 0.75 Ⓒ 0.4 Ⓓ 0.9

6. If $_{air}\mu_{water}$ = 4/3 then critical angle of water-air media pair is [sin 49° = 3/4]

   Ⓐ 42° Ⓑ 45° Ⓒ 49° Ⓓ 60°

7. A vessel has depth 2d and is half filled by a liquid of r.i μ and the other half by another liquid of r.i 2μ, then when viewed perpendicularly, the apparent depth of the vessel is

   Ⓐ 3d/2μ Ⓑ 2d/3μ Ⓒ 3d/μ Ⓓ 4d/3μ

8. Speed of light in different media is

   Ⓐ Same Ⓑ Unchanged

   Ⓒ Different Ⓓ None of the above is correct

9. Speed of light is comparatively less in denser medium

   Ⓐ True Ⓑ False Ⓒ Data insufficient Ⓓ None of the above

10. Speed of light in vacuum (or air): speed of light in medium is

    Ⓐ Absolute refractive index of medium Ⓑ Relative refractive index of medium

    Ⓒ Power index of medium Ⓓ Converging power of medium

11. Refractive index of water is

Ⓐ 3/4   Ⓑ 3/2   Ⓒ 4/3   Ⓓ 9/8

12. Speed of light in water $= Y \times 10^8$ m/s, then $y =$

Ⓐ 2   Ⓑ 2.25   Ⓒ 3   Ⓓ $\sqrt{2}$

13. When light enters a rarer medium, its speed increases and it bends away from normal

Ⓐ False   Ⓑ Some times false   Ⓒ True   Ⓓ Some times true

14. A pencil partially immersed in water appears to be bent because of

Ⓐ Diffraction   Ⓑ Refraction   Ⓒ Dispersion   Ⓓ Interference

15. When a light ray enters a glass slab, then the emergent ray is

Ⓐ Shifted slightly   Ⓑ No shift

Ⓒ Shifting sometimes   Ⓓ Data insufficient

16. Select the non-luminous object

Ⓐ Electric bulb (on condition)   Ⓑ Sun

Ⓒ Moon   Ⓓ Burning candle

17. If the angle of incidence (for reflection) is 30°, then angle of deviation is

Ⓐ 90°   Ⓑ 110°   Ⓒ 100°   Ⓓ 120°

18. If the focal length of a concave mirror is 20 cm, then if the mirror is kept inside kerosene medium, its new focal length is

Ⓐ 10 cm   Ⓑ 15 cm   Ⓒ 20 cm   Ⓓ 25 cm

19.
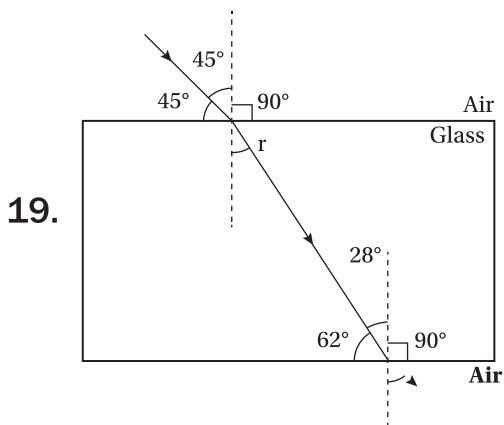
With reference to the above diagram, the value of angle of refraction, when ray is transmitted from air to glass is

Ⓐ 20°   Ⓑ 30°   Ⓒ 28°   Ⓓ 60°

20.
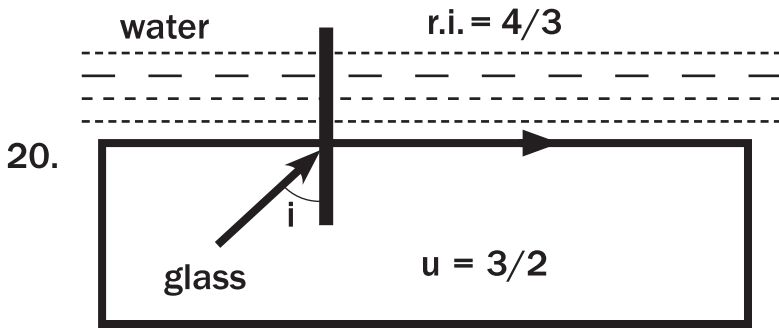
With reference to the diagram sin i =

(A) 1/9   (B) 4/9   (C) 2/9   (D) 8/9

21. Speed of light in glass is

(A) 2.25×10^8 m/s   (B) 2×10^8 m/s   (C) 1.25×10^8 m/s   (D) None of these

22. r.i of water : r.i of glass =

(A) 8 : 9   (B) 4 : 3   (C) 3 : 2   (D) 1 : 2

23. Wavelength of violet light : Wavelength of Red light

(A) < 1   (B) > 1   (C) = 1   (D) Data insufficient

24. In case of Total internal reflection, the angle of refraction when angle of incidence is at critical angle is

(A) > 90°   (B) < 90°   (C) = 90°   (D) None of these

25.
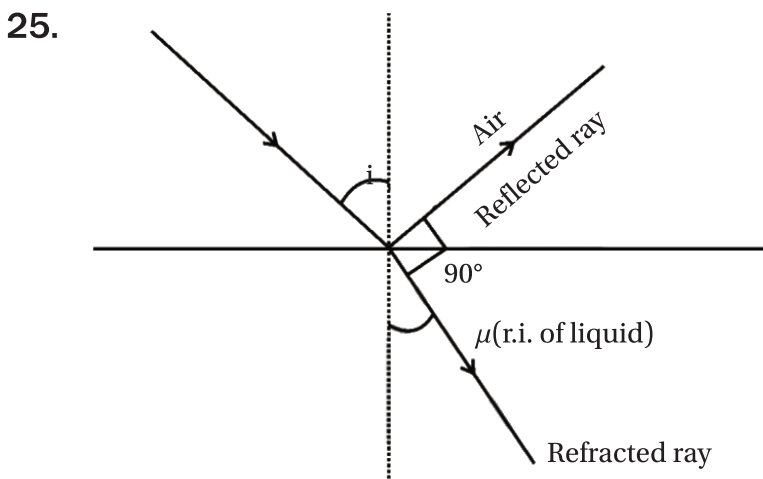
If the angle between reflected ray and refracted ray be 90°, then μ =

(A) sin i   (B) cos i   (C) tan i   (D) None of these

Chemistry

26. When dilute hydrochloric acid is added to granulated zinc placed in a test tube, the observation made is.

    Ⓐ the surface of the metal turns shining

    Ⓑ the reaction mixture turns milky

    Ⓒ odour of chlorine is observed

    Ⓓ a colourless and odourless gas evolves with bubbles

27. When hydrochloric acid is added to sodium carbonate we observe:

    Ⓐ a colourless gas evolves which turns lime water milky

    Ⓑ a brown gas with a pungent smell evolves

    Ⓒ a colourless gas evolves which has no effect on lime water

    Ⓓ a colourless gas evolves which burns with pop sound

28. Two solutions X and Y were found to have pH value of 4 and 10 respectively. The inference that can be drawn is

    Ⓐ X is base and Y is an acid   Ⓑ Both X and Y are acidic solutions

    Ⓒ X is an acid and Y is a base   Ⓓ Both X and Y are bases

29. H_2SO_4 is a

    Ⓐ Monoprotic acid   Ⓑ Monobasic acid

    Ⓒ Polyprotic acid   Ⓓ Both Ⓐ and Ⓑ are correct

30. What is aqua regia ?

    Ⓐ 1 : 2 mixture of chromic acid and sulphuric acid

    Ⓑ 1 : 3 Mixture of conc. HCl and conc. HNO_3

    Ⓒ 1 : 3 mixture of conc. HNO_3 and conc. HCl

    Ⓓ 1 : 1 mixture of conc. H_2SO_4 conc. HCl

31. The acid produced in our stomach is

    Ⓐ Sulphuric acid   Ⓑ Hydrochloric acid

    Ⓒ Acetic acid   Ⓓ Oxalic acid

32. pH of Blood is

    Ⓐ 6.4   Ⓑ 7.4   Ⓒ 4.7   Ⓓ 6.4

33. When NaOH reacts with zinc granules then the product formed along with hydrogen gas is

    Ⓐ Soduim oxide   Ⓑ Sodium peroxide   Ⓒ Sodium zincate   Ⓓ Sodium + O_2 gas

34. General antacids contain

Ⓒ KOH   Ⓓ $Ca(OH)_2$ Ⓔ NaOH   Ⓕ $Mg(OH)_2$

35. Indicators differentiate acids and bases by changing

Ⓒ temperature   Ⓓ reaction time

Ⓔ colour of the medium   Ⓕ boiling point

36. In alkaline medium, which colour is shown by phenolphthalein indicator ?

Ⓒ Blue   Ⓓ Red   Ⓔ Pink   Ⓕ Colourless

Question number 37 and 38 are STATEMENT BASED MCQ. Select the correct answer

OPTION A : Both statement I and II are correct

OPTION B : Statement I is correct but statement II is wrong

OPTION C : Statement I is wrong but statement II is correct

OPTION D : Both statement I and II are wrong

37. Statement I : In baking powder, slight oxalic acid is added to sodium bicarbonate

     Statement II : $NaHCO_3$ cannot produce CO_2 gas after reacting with dilute H_2SO_4 but Na_2CO_3 can

38. Statement I : $CaOCl_2$ is an oxidising agent

     Statement II : A small amount of $Ca(OH)_2$ can be applied for the relief after ant string touches human body

**Question number 39 and 40 are ASSERTION - REASON type questions.
Select the correct option**

OPTION A : Both assertion and reason is correct and reason is the correct explanation of assertion

OPTION B : Both assertion and reason is correct and reason is not the correct explanation of assertion

OPTION C : Assertion is correct statement but reason is wrong statement

OPTION D : Assertion is wrong statement but reason is correct statement

39. Assertion : To prevent acidity, NaOH solution is used instead of using $Mg(OH)_2$ solution

     Reason : NaOH is stronger alkali than $Mg(OH)_2$

40. Assertion : NaOH solution turns red litmus paper blue instantly

     Reason : NaOH can react with acids to form salts and water

41. Which of the following is the main constituent of natural gas that burns with oxygen readily

Ⓒ Sulpher dioxide   Ⓓ Methane   Ⓔ Nitrogen dioxide   Ⓕ Chlorine

42. Consider the reaction NaOH + HCl $\longrightarrow$ NaCl + H_2O. In this reaction

Ⓐ NaOH is oxidised and HCl is reduced

Ⓑ NaOH is reduced and HCl is oxidised

Ⓒ Both NaOH and HCl are oxidised

Ⓓ Neither NaOH nor HCl face oxidation or reduction

43. Curd is not placed inside copper containers because

Ⓐ Curd becomes solid

Ⓑ Water present in curd starts vapourizing

Ⓒ Curd starts to react with oxygen

Ⓓ Curd starts to react with the metal

44. CH_3COOH is a

Ⓐ Monobasic acid   Ⓑ Dibasic acid

Ⓒ Tribasic acid   Ⓓ Cannot be predicted about its basicity

45. When barium chloride reacts with sodium sulphate then the colour of the precipitation is

Ⓐ Brown   Ⓑ yellow   Ⓒ green   Ⓓ White

46. Find out correct statement

Ⓐ Dry HCl can change the colour of litmus

Ⓑ Sulpher dioxide can react with NaOH

Ⓒ When nitric acid and KOH reacts then NO_2 gas is released

Ⓓ CO_2 can react with concentrated H_2SO_4

47. Which of the following salts does not contain water of crystallisation?

Ⓐ Blue vitriol   Ⓑ Baking soda   Ⓒ Washing soda   Ⓓ Gypsum

48. Pb(OH)Cl is a/an

Ⓐ Acidic salt   Ⓑ Basic salt   Ⓒ Normal salt   Ⓓ Double salt

49. NH_4Cl is

Ⓐ A salt of strong acid and weak base   Ⓑ A salt is weak acid and strong base

Ⓒ A salt is weak acid and weak base   Ⓓ A salt is strong acid and strong base

50. Chemical formula of Glauber salt is

Ⓐ $Na_2CO_3.10H_2O$ Ⓑ $Na_2SO_4.5H_2O$ Ⓒ $Na_2SO_4.10H_2O$ Ⓓ $MgSO_4.7H_2O$

Mathematics

51. The values of k for which the equation $16x^2 + 4kx + 9 = 0$ has real and equal roots are

(A) $6, \dfrac{-1}{6}$ (B) $36, -36$ (C) $6, -6$ (D) $\dfrac{3}{4}, -\dfrac{3}{4}$

52. If $y = 1$ is a common root of the equations $ay^2 + ay + 3 = 0$ and $y^2 + y + b = 0$, then ab equals

(A) 3   (B) -3.5 (C) 6   (D) -3

53. If one root of the equation $4x^2 - 2x + (\lambda - 4) = 0$ be the reciprocal of the other then $\lambda =$

(A) 8   (B) -8 (C) 4   (D) -4

54. If $x^2 + k(4x + k - 1) + 2 = 0$ has equal roots, then $k =$

(A) $1, -\dfrac{2}{3}$ (B) $-1, \dfrac{2}{3}$ (C) $\dfrac{3}{2}, \dfrac{1}{3}$ (D) $-\dfrac{3}{2}, -\dfrac{1}{3}$

55. If one root of the equation $ax^2 + bx + c = 0$ is three times the other, then $b^2 : ac =$

(A) $3 : 1$ (B) $3 : 16$ (C) $16 : 3$ (D) $16 : 1$

56. If 2 is a root of the equation $x^2 - ax + 12 = 0$ and the equation $x^2 + ax + q = 0$ has equal roots, then $q =$

(A) 12   (B) 8   (C) 20   (D) 16

57. The value of $\sqrt{6 + \sqrt{6 + \sqrt{6 + \ldots\ldots}}}$ is

(A) 4   (B) 3   (C) -2 (D) 3.5

58. If $b^2 - 4ac \geq 0$, then the roots of quadratic equation $ax^2 + bx + c = 0$ are

(A) $\dfrac{b}{2a} \pm \dfrac{\sqrt{b^2 - 4ac}}{2a}$ (B) $-\dfrac{b}{2a} \pm \dfrac{\sqrt{b^2 - 4ac}}{2a}$ (C) $\dfrac{b}{2a} \pm \dfrac{\sqrt{b^2 + 4ac}}{2a}$ (D) $-\dfrac{b}{2a} \pm \dfrac{\sqrt{b^2 + 4ac}}{2a}$

59. If the sum of the roots of the equation $ax^2 + bx + c = 0$ is equal to product of their reciprocals, then

(A) $a^2 + bc = 0$ (B) $b^2 + ca = 0$ (C) $c^2 + ab = 0$ (D) $b + c = 0$

60. The quadratic equation $ax^2 + bx + c = 0$ will have real and distinct roots if

(A) $b^2 - 4ac < 0$ (B) $b^2 - 4ac > 0$ (C) $b^2 - 4ac = 0$ (D) all the above

61. What are the roots of the equation whose graphed below?
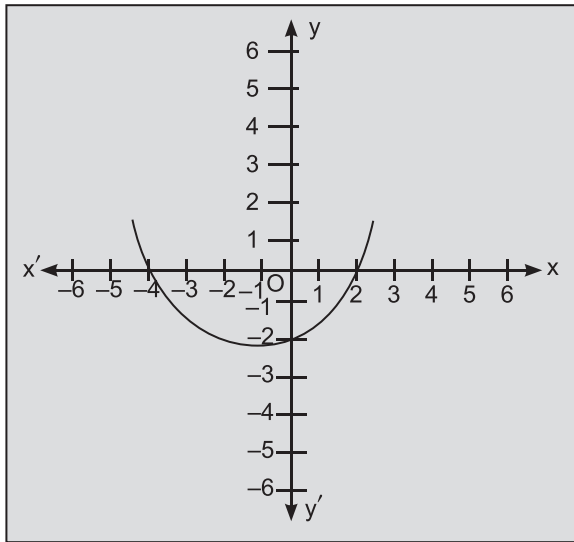
Ⓐ 1 and 0   Ⓑ 0 and 2   Ⓒ –4 and 2   Ⓓ 0 and 0

62. What will be the difference of the roots of quadratic equation $4y^2 - 4y + 1 = 0$?

Ⓐ 0   Ⓑ 1   Ⓒ $\frac{-1}{2}$ Ⓓ 2

63. If α, β be the roots of equation $4x^2 - 7x + 3 = 0$, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ will be

Ⓐ 25/12   Ⓑ 23/8   Ⓒ 24/25   Ⓓ 24/23

64. If one root is $3+\sqrt{5}$, then quadratic equation will be

Ⓐ $x^2 + 6x - 4 = 0$ Ⓑ $x^2 + 6x + 4 = 0$ Ⓒ $x^2 - 6x + 4 = 0$ Ⓓ $x^2 - 6x - 4 = 0$

65. Discriminant of the equation $(-3)x^2 + 2x - 8 = 0$ is

Ⓐ –92   Ⓑ –29   Ⓒ 39   Ⓓ 49

66. If $(x + a)$ is a factor of $2x^2 + 2ax + 5x + 10$, then the value of a is—

Ⓐ 3   Ⓑ 2   Ⓒ 0   Ⓓ 1

67. For what value of k, – 4 is a zero of the polynomial $x^2 - x - (2k + 2)$?

Ⓐ 4   Ⓑ 5   Ⓒ 9   Ⓓ 8

68. For what value of k, do the equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ represent coincident lines?

Ⓐ $\frac{1}{2}$ Ⓑ $-\frac{1}{2}$ Ⓒ 2   Ⓓ –2

69. The sum of the digits of a two digit number is 9. If 27 is added to it, the digits of the number get reversed. The number is

Ⓐ 25   Ⓑ 72   Ⓒ 63   Ⓓ 36

70. The area of the triangle formed by the lines $y = x$, $x = 6$ and $y = 0$ is

Ⓐ 36 sq. units   Ⓑ 18 sq. units   Ⓒ 9 sq. units   Ⓓ 72 sq. units

71. Mr. A and Mr. B together have 45 marbles. Both of them lost 5 marbles each and the product of the number of marbles they now have is 124. The representation of the above situation mathematically is

Ⓐ $x^2 - 45x + 324 = 0$ Ⓑ $x^2 + 45x + 324 = 0$ Ⓒ $x^2 - 45x - 324 = 0$ Ⓓ $x^2 + 45x - 324 = 0$

72. Check whether the following is quadratic equation: $(x - 2)^2 + 1 = 2x - 3$

Ⓐ No   Ⓑ Yes   Ⓒ Cannot say   Ⓓ None of these

73. Discriminant of the equation $(x + 2)^3 = x^3 - 4$

Ⓐ 8   Ⓑ 4   Ⓒ –4   Ⓓ 6

74. Given: $x(x + 1) + 8 = (x + 2)(x - 2)$, then $x =$

Ⓐ 12   Ⓑ 6   Ⓒ –6   Ⓓ –12

75. The product of two consecutive positive integers is 306. Then the integers are

Ⓐ 17, 18   Ⓑ 16, 17   Ⓒ 18, 19   Ⓓ –17, –18

Biology

76. Water will be absorbed by root hair when :

Ⓐ Concentration of solutes in the cell sap is high

Ⓑ Plant is rapidly respiring

Ⓒ They are separated from soil by permeable membrane

Ⓓ Concentration of salts in the soil is high

77. If the cut end of a plant is put in eosin solution :

Ⓐ Leaves remain fresh but ascent of sap stops

Ⓑ Phloem gets coloured because of ascent of sap

Ⓒ Xylem elements get stained showing ascent of sap through them

Ⓓ Ascent of sap stops

78. The carbohydrate synthesized in the leaves are transported through sieve tubes mostly in the form of :
Ⓐ Glucose   Ⓑ Triose   Ⓒ Sucrose   Ⓓ Soluble starch

79. Due to low atmospheric pressure, the rate of transpiration will :
Ⓐ Increase   Ⓑ Decreases slowly
Ⓒ Decrease rapidly   Ⓓ Remain unaffected

80. The transpiration in plants will be lowest :
Ⓐ When there is high humidity in the atmosphere
Ⓑ There is excess of water in the cell
Ⓒ Environmental conditions are very dry
Ⓓ High wind velocity

81. The instrument used to measure transpiration is :
Ⓐ Barometer   Ⓑ Porometer   Ⓒ Thermometer   Ⓓ Potometer

82. The rate of transpiration increases when :
Ⓐ Soil is dry and air is humid   Ⓑ Soil is wet and air is dry
Ⓒ Soil is wet and air is humid   Ⓓ Soil is dry and air is dry

83. Role of transpiration is :
Ⓐ Conduction of water, mineral salts   Ⓑ Cooling effect
Ⓒ Maintenance of cell turgidity   Ⓓ All of these

84. Which one of the following is connected with transport of water in plants ?
Ⓐ Phloem   Ⓑ Xylem   Ⓒ Epidermis   Ⓓ Cambium

85. The principal pathway by which water is transported in angiosperms is—
Ⓐ Xylem vessel system   Ⓑ Xylem and phloem
Ⓒ Sieve tube of phloem   Ⓓ Sieve cells of phloem

86. Water available to the plant is—
Ⓐ Run off water   Ⓑ Gravitational water
Ⓒ Hygroscopic water   Ⓓ Capillary water

87. Transport of water through xylem in tall plants is best explained by—
Ⓐ Root pressure theory   Ⓑ Pulsation theory
Ⓒ Capillary theory   Ⓓ Cohesion theory

88. Transpiration causes—
Ⓐ Descent of sap   Ⓑ Ascent of sap
Ⓒ Does not have any effect on sap   Ⓓ Both Ⓐ and Ⓑ

89. Xylem conducts sap from—
    Ⓐ Leaves to root   Ⓑ Roots to leaves   Ⓒ Root to stem   Ⓓ Stems to roots

90. The main function of phloem in plants is the conduction of—
    Ⓐ Food   Ⓑ Minerals   Ⓒ Water   Ⓓ All of the above

91. Those organisms who depend on other living organisms for food are—
    Ⓐ Autotrophs   Ⓑ Saprotrophs   Ⓒ Parasites   Ⓓ Holozoic feeders

92. The end product of protein digestion is—
    Ⓐ Glucose   Ⓑ Fatty acids   Ⓒ Glycerol   Ⓓ Amino acids

93. Which of the following is not a part of the human respiratory system?
    Ⓐ Nose   Ⓑ Oesophagus   Ⓒ Trachea   Ⓓ Lungs

94. Muscle cramps, during a strenuous activity, is caused due to the accumulation of
    Ⓐ Ethyl alcohol   Ⓑ Pyruvic acid   Ⓒ Water   Ⓓ Lactic acid

95. Sphygmomanometer measures
    Ⓐ Blood volume   Ⓑ Heart beat   Ⓒ Blood pressure   Ⓓ Cardiac output

96. Fat $\xrightarrow{A}$ Fatty acids + B
    Identify the enzyme A and product B
    Ⓐ Amylase and maltose, respectively   Ⓑ Lipase and glycerol, respectively
    Ⓒ Maltase and maltose, respectively   Ⓓ None of the above

97. If pyruvate breaks down anaerobically, the number of ATP molecules produced are
    Ⓐ 1   Ⓑ 2   Ⓒ 3   Ⓓ 4

98. Bicuspid valve is present —
    Ⓐ Between the right atrium and right ventricle
    Ⓑ Between the left atrium and left ventricle
    Ⓒ At the base of the pulmonary artery
    Ⓓ At the base of the aorta

99. C-shaped rings of cartrilage are present on the —
    Ⓐ Trachea only   Ⓑ Trachea and bronchi
    Ⓒ Trachea, bronchi and bronchioles   Ⓓ Bronchi and bronchioles

100. Transport through xylem is —
    Ⓐ Unidirectional
    Ⓑ Bidirectional
    Ⓒ Multidirectional
    Ⓓ Xylem does not take part in the transport process

Space For Rough Works

Space For Rough Works