



# Monthly Progressive Test

Class: X

Subject: PCMB



Test Booklet No.: MPT-03

Test Date: 

2	2	0	8	2	0	2	5
---	---	---	---	---	---	---	---

Time: 120 mins

Full Marks: 200

## Important Instructions :

1. The Test is of 120 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 MPT03 22082025.
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 scibble 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.

**Space For Rough Works**



**Physics**

- If the resistance of a wire is doubled and voltage is constant, then current becomes:  
**(A)** Doubled                      **(B)** Halved                      **(C)** Four times                      **(D)** Remains the same
- Which graph best represents Ohm's law?  
**(A)** Current vs Voltage is a straight line passing through the origin  
**(B)** Current vs Voltage is a parabola  
**(C)** Voltage vs Resistance is a hyperbola  
**(D)** Current vs Resistance is a straight line
- A bulb is rated 12 V, 24 W. What is the resistance of the bulb?  
**(A)** 6  $\Omega$                       **(B)** 12  $\Omega$                       **(C)** 24  $\Omega$                       **(D)** 0.5  $\Omega$
- The resistance of an aluminum wire of length 4m and area 1 mm<sup>2</sup> is 0.068 $\Omega$ . The resistivity of aluminum is:  
**(A)**  $1.7 \times 10^{-8} \Omega \text{ m}$                       **(B)**  $2.7 \times 10^{-8} \Omega \text{ m}$                       **(C)**  $4.25 \times 10^{-8} \Omega \text{ m}$                       **(D)**  $6.8 \times 10^{-8} \Omega \text{ m}$
- If the resistance of a wire is R, then resistance of another wire of same material, double length and double radius will be:  
**(A)** R/2                      **(B)** R                      **(C)** R/4                      **(D)** R/8
- Which of the following is true for resistors in series?  
**(A)** Equivalent resistance is always less than smallest resistance  
**(B)** Equivalent resistance is always greater than largest resistance  
**(C)** Equivalent resistance is always between smallest and largest resistance  
**(D)** Equivalent resistance has no relation with individual resistances
- Two bulbs of resistances 60  $\Omega$  and 90 $\Omega$  are connected in series with a 300 V supply. The power consumed by the circuit is:  
**(A)** 300 W                      **(B)** 400 W                      **(C)** 600 W                      **(D)** 500 W
- In a parallel connection of three resistors, the total current is 6A. If the currents through two of the resistors are 2A and 1.5 A, the current through the third resistor is:  
**(A)** 2.5 A                      **(B)** 3 A                      **(C)** 4.5 A                      **(D)** 1 A
- The effective resistance of two resistors in parallel is 2.4 $\Omega$ . If one of the resistors is 6 $\Omega$ , the other resistor is :  
**(A)** 3.6  $\Omega$                       **(B)** 4  $\Omega$                       **(C)** 2  $\Omega$                       **(D)** 1.5  $\Omega$
- Two bulbs, one rated 60 W, 220 V and the other 100 W, 220 V are connected in series to a 220 V supply. Which bulb will glow brighter?  
**(A)** 60 W bulb                      **(B)** 100 W bulb                      **(C)** Both glow equally                      **(D)** None glow

**Assertion – Reason type Questions (Q No. 11 – 14):**

**Directions:** Read the following questions and choose any one of the following four responses.

- A. Both Assertion and Reason are true and Reason is the correct explanation of the Assertion
- B. Both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. Assertion is true but the Reason is false
- D. Assertion is False but the Reason is true

**11. Assertion (A):** A fuse is always connected in parallel with the electric device.

**Reason (R):** A fuse is used to protect electrical appliances by breaking the circuit when excessive current flows.

- A                                       B                                       C                                       D

**12. Assertion (A):** A 100W bulb glows brighter than a 40W bulb when both are connected in parallel across the same supply voltage.

**Reason (R):** In parallel connection, both bulbs receive the same voltage but the 100 W bulb draws more current than the 40 W bulb.

- A                                       B                                       C                                       D

**13. Assertion (A):** For the same supply voltage, power consumed by a device decreases if its resistance increases.

**Reason (R):** Power consumed P, which is inversely proportional to resistance at constant voltage.

- A                                       B                                       C                                       D

**14. Assertion (A):** Series connection of resistors is preferred in domestic circuits.

**Reason (R):** In series connection, each device receives the same potential difference.

- A                                       B                                       C                                       D

**Case Based Questions (Q No. 15 – 25):**

Whenever an electric current flows through a conductor, electrical energy is partly converted into heat energy due to collisions of electrons with atoms of the conductor. This phenomenon is known as the heating effect of current. The heat produced in a conductor is given by Joule's law of heating:

$$H = I^2Rt$$

This principle is used in many household and industrial appliances such as electric irons, electric heaters, geysers, electric kettles, and in devices like fuses. In a fuse, if current exceeds the safe limit, excessive heat melts the fuse wire, thereby breaking the circuit and protecting the appliance. Similarly, the heating effect is also useful in electric bulbs where the filament glows due to the production of heat and light.

**15.** Which of the following is correct according to Joule's law of heating?

- A  $H \propto I$                                        B  $H \propto R$                                        C  $H \propto t$                                        D  $H \propto I^2Rt$

**16.** A 5 A current flows through a 2  $\Omega$  resistor for 10 s. The heat produced is:

- A 50 J                                       B 100 J                                       C 250 J                                       D 500 J

**17.** Which household device uses heating effect of current for protection?

- A Electric fan                                       B Electric fuse                                       C Refrigerator                                       D Transformer

**18.** The filament of an electric bulb is generally made of:

- A Copper                                       B Tungsten                                       C Aluminium                                       D Nichrome

19. The main reason for using tungsten as a filament in bulbs is:
- (A) It is cheap (B) It has low resistance  
(C) It has high melting point (D) It glows without heat
20. An electric heater of resistance  $10\ \Omega$  is operated on 220 V. The heat produced in 5 minutes is:
- (A) 24.2 kJ (B) 121 kJ (C) 242 kJ (D) 484 kJ
21. In which case will maximum heat be produced?
- (A) High current, low resistance, short time (B) High current, high resistance, long time  
(C) Low current, low resistance, short time (D) Low current, high resistance, short time
22. Which of the following does not work on the heating effect of current?
- (A) Electric kettle (B) Electric geyser (C) Electric fuse (D) Electric bell
23. Why is Nichrome used in heating elements of electric appliances?
- (A) It is cheap and durable  
(B) It has high resistivity and can withstand high temperature  
(C) It has low resistivity  
(D) It melts easily
24. A heater coil is cut into two equal parts and both parts are connected in parallel across the same supply. If the original power of the heater was P, the new power will be:
- (A) P/4 (B) P/2 (C) 2P (D) 4P
25. A geyser consumes 2000 W when connected to a 220 V supply. If the geyser is used for 1 hour, how much heat is produced (in kJ)?
- (A) 440 kJ (B) 1320 kJ (C) 2200 kJ (D) 7200 kJ

## Chemistry

26. Discomfort of wasp stings can be treated with :
- (A) Baking soda (B) Sodium hydroxide (C) Vinegar (D) Ammonium hydroxide
27. Which of the following contains oxalic acid?
- (A) Tamarind (B) Tomato (C) Orange (D) Sour milk
28. When magnesium ribbon reacts with hydrochloric acid, they produce :
- (A) Hydrogen and Magnesium Oxide (B) Hydrogen and Magnesium Chloride  
(C) Chlorine and Magnesium Chloride (D) Chlorine and Magnesium Oxide
29. Aqueous solution of which of the following salts will show pH less than 7 ?
- (A) KCl (B)  $5\text{NH}_4\text{Cl}$  (C)  $\text{Na}_2\text{CO}_3$  (D)  $\text{CH}_3\text{COONa}$
30. Which of the following phenomenon occurs when a small amount of acid is added to water ?
- (i) Ionisation (ii) Neutralisation (iii) Dilution (iv) Salt formation
- (A) (i) & (ii) (B) (i) & (iii) (C) (ii) & (iii) (D) (ii) & (iv)

31. An aqueous solution 'A' turns phenolphthalein solution pink. On addition of an aqueous solution 'B' to 'A' the pink colour disappears. The following statement is true for solution 'A' & 'B'.

- (A) 'A' is strongly basic & 'B' is a weak base.                      (B) 'A' is strongly acidic & 'B' is a weak acid  
 (C) 'A' has pH greater than 7 & 'B' has pH less than 7            (D) 'A' has pH < 7 & 'B' has pH > 7.

32. The pH of acid rain is approximately :

- (A) 5.6    (B) 2    (C) 7    (D) 7.9

33. There are four solutions A, B, C & D with pH values as follows :

Solution	A	B	C	D
pH	2	7	8	12

Which solutions would liberate hydrogen gas with zinc?

- (A) 'A' only                                      (B) 'D' only                                      (C) 'A' & 'D'                                      (D) 'B' & 'C'

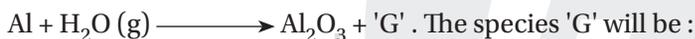
34. Consider the following compounds :



The compound having maximum number of water of Crystallisation in its crystallisation form in one molecule is :

- (A)  $\text{FeSO}_4$                                       (B)  $\text{CuSO}_4$                                       (C)  $\text{CaSO}_4$                                       (D)  $\text{Na}_2\text{CO}_3$

35. Aluminium reacts with steam according to the following equation :



- (A)  $\text{O}_2$     (B)  $\text{H}_2$     (C)  $\text{Al}(\text{OH})_3$                                       (D)  $\text{AlH}_3$

36. 22 carat gold means :

- (A) 22 parts pure gold & 6 parts Cu & Ag                      (B) 22 parts pure gold & 4 parts Cu & Ag  
 (C) 22 parts pure gold & 2 parts Cu & Ag                      (D) 22 parts pure gold & 8 parts Cu & Ag

37. Metal 'X' reacts with both  $\text{FeSO}_4$  and  $\text{CuSO}_4$  solution and metal 'Y' reacts with only  $\text{CuSO}_4$  solution, while metal 'Z' does not react neither with  $\text{FeSO}_4$  nor  $\text{CuSO}_4$  solution. The correct order of reducing power of metals is :

- (A)  $Z > Y > X$                                       (B)  $X > Z > Y$                                       (C)  $X > Y > Z$                                       (D)  $Z > X > Y$

38. Select the correct one ?

- (A) In salted water corrosion speed up  
 (B) Corrosion of copper is a slow process  
 (C) Formation of silver sulphide causes a blackish layer on surface of silver articles.  
 (D) All are correct.

39. The rusting of an iron articles can be prevented by :

- (A) Painting                                      (B) Alloying                                      (C) Galvanisation                                      (D) All of these.

40. Aqua regia is a mixture of volume ratio, 3 : 1 of :

- (A) Conc. HCl + Conc.  $\text{H}_2\text{SO}_4$                       (B) Conc. HCl + Conc.  $\text{HNO}_2$   
 (C) Conc. HCl + Conc.  $\text{HNO}_3$                       (D) Conc. HCl + Conc.  $\text{CH}_3\text{COOH}$ .

**Assertion and Reason Q. 41 – 44) :**

**Directions:** Read the following questions and choose any one of the following four responses.

- Assertion and Reason both are correct and Reason is the correct explanation of Assertion.
- Assertion and Reason both are correct and Reason is not the correct explanation of Assertion.
- Assertion is correct but Reason is wrong.
- Assertion is wrong but Reason is correct.

**41. Assertion (A) :** Ores of metals are not found in the form of their nitrate salts.

**Reason (R) :** nitrates of metals are water soluble.

- (A) a                       (B) b                       (C) c                       (D) d

**42. Assertion (A) :** All minerals are ores but all ores are not minerals.

**Reason (R) :** Ores are the minerals from which the metal is extracted economically and conveniently.

- (A) a                       (B) b                       (C) c                       (D) d

**43. Assertion (A) :** Rusting iron can be prevented by galvanisation.

**Reason (R) :** Zinc coating of iron is called galvanisation.

- (A) a                       (B) b                       (C) c                       (D) d

**44. Assertion (A) :** The solutions of ionic compounds are good conductor of electricity.

**Reason (R) :** Movement of atoms of elements take place in the solution.

- (A) a                       (B) b                       (C) c                       (D) d

**Case Base Question (Q.45 to Q.47) : From : Smithsonian Magazine; June 20, 2017**

Before baking powder hit the scene in 1856, making cake was not a piece of cake. The first modern version of baking powder was discovered and manufactured by Alfred Bird (1811-1878), British chemist and founder of **Bird and Sons Ltd.** His improved version of baking powder was created so he could make yeastfree bread for his wife Elizabeth, who had allergies to eggs and yeast.

Baking powder is a mixture of sodium hydrogen carbonate and a weak organic acid. It is used to increase the volume and lighten the texture of baked goods. Baking soda is the name given to sodium hydrogen carbonate with chemical formula  $\text{NaHCO}_3$ ; it is a fine powdered crystalline solid. Baking soda is manufactured by Belgian chemist Earnest Solvay during the 1860s. Solvay process is also called as ammonia soda process. In this process, ammoniacal brine is treated with carbon dioxide so that residue of sodium hydrogen carbonate is separated. Baking powder has three components : Baking soda; organic weak acid; corn starch as filler. Baking powder has two actions :

- Single-acting baking powder produces all of its bubbles when it gets wet.
- Double-acting baking powder produces bubbles again when it gets hot.

It is worth to mention here that baking soda on thermal decomposition gives sodium carbonate ( $\text{Na}_2\text{CO}_3$ ). The recrystallisation of sodium carbonate gives washing soda.

**45.** Baking soda is produced by which of the following process?

- (A) Chlor-alkali process     (B) Solvay process                       (C) Soda process                       (D) Haber's process

**46.** What is the formula of washing soda?

- (A)  $\text{NaHCO}_3$                        (B)  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$                        (C)  $\text{Na}_2\text{CO}_3$                        (D)  $\text{Na}_2\text{SiO}_3$

47. If a person adds baking soda at the place of baking powder in the cake-mixture. What would his cake be like?
- (A) It would taste bitter (B) It would not solidify completely  
(C) It would explode (D) It would get burnt quickly

**Case Base Question (Q.48 to Q.50) : Reactivity Series of Metals**

**Source : The reactivity series of metals : France, Colin, 2008**

In chemistry, reactivity series or activity series is an empirical, calculated and structurally analytical progression of a series of metals arranged by their "reactivity" from highest to lowest. It is used to summarise information about the reactions of metals with acids, water, single displacement reactions and the extraction of metals from their ores.

The activity series is used to determine the products of single displacement reactions, where by metal 'A' will replace another metal B in a solution if 'A' is higher in the series. Thus, only a metal higher in the activity series will displace another.

The reactivity of metals is due to the difference in stability of their electron configurations as atoms and as ions. Metals that require the loss of only one electron to form stable ions are more reactive than similar metals which require the loss of more than one electron. Group 1A metals are the most reactive for that reasons. The relative reactivity of metals is linked with the reactivity series in which potassium placed at the top is most reactive while platinum is placed at the bottom is least reactive.

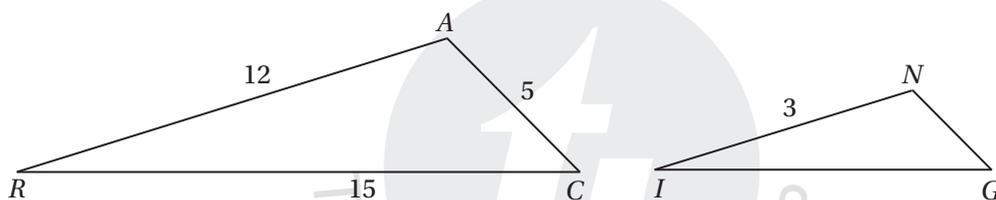
Read the above passage carefully & answer the following questions :

48. The correct products when active metal reacts with liquid water are ...
- (A) Metal hydroxide and oxygen gas (B) Metal hydroxide and hydrogen gas  
(C) Metal oxide and oxygen gas (D) Metal oxide and hydrogen gas
49. Which of the following is the correct order of reactivity of metals in increasing order ?
- (A)  $K < Mg < Na$  (B)  $Na < Mg < K$  (C)  $Mg > Na > K$  (D)  $Mg < Na < K$
50. Name a metal in the activity series, whose oxide do not occur naturally ?
- (A) copper (B) gold (C) lead (D) aluminium

## Mathematics

51. The maximum value of  $\sin x \cdot \cos y$  is
- (A) 0 (B) 1 (C)  $\frac{1}{2}$  (D) none of these
52. One root of the quadratic equation  $(q - r)x^2 + (r - p)x + (p - q) = 0$  is
- (A)  $\frac{r-p}{q-r}$  (B)  $\frac{p-r}{q-r}$  (C)  $\frac{p-q}{q-r}$  (D)  $\frac{q-p}{q-r}$
53. Let  $S_1, S_2, S_3$  be the sum of first  $n$  terms, next  $n$  terms and again next  $n$  terms of the consecutive numbers. Then
- (A)  $S_1 + S_3 = 2S_2$  (B)  $S_1 + 3S_3 = 4S_2$  (C)  $S_3 + 3S_1 = 4S_2$  (D) none of these
54. In a scalene triangle  $ABC$ ,  $D$  is the midpoint of side  $AC$ . If triangles  $BDC$  and  $ABC$  are similar, then  $\frac{BD}{AB} =$
- (A)  $\frac{1}{2}$  (B)  $\frac{1}{\sqrt{2}}$  (C) 1 (D) none of these
55. Let  $x, y, z$  be the length of perpendiculars dropped from a point inside an equilateral triangle of side  $a$  on its sides. Then  $x + y + z =$
- (A)  $\frac{a}{2}$  (B)  $\frac{\sqrt{3}a}{2}$  (C)  $a$  (D) none of these

56.  $\sec^2 A = 1 + \tan^2 A$  is true when  
 (A)  $0 \leq A \leq 90^\circ$  (B)  $0 < A < 90^\circ$  (C)  $0 \leq A < 90^\circ$  (D)  $0 < A \leq 90^\circ$
57. The number of real solution of  $\sin^2 x + 1 = \sin x$ , (where  $x$  is acute angle) is  
 (A) 0 (B) 1 (C) 2 (D) 3
58. Let,  $x = x_0 + r \cos \theta$  and  $y = y_0 + r \sin \theta$ , where  $\theta$  is parameter. After elimination  $\theta$  we have  
 (A)  $(x - x_0)^2 + (y - y_0)^2 = r^2$  (B)  $(x + x_0)^2 + (y - y_0)^2 = r^2$  (C)  $(x - x_0)^2 + (y + y_0)^2 = r^2$  (D)  $(x + x_0)^2 + (y + y_0)^2 = r^2$
59. If  $2 \cos^2(x^3 + x) = 2^x + 2^{-x}$  then the number of solution is  
 (A) 0 (B) 1 (C) 2 (D) 3
60. Let  $P, Q, R$  be the midpoints of the sides  $AB, BC, CA$  of a triangle  $ABC$ . If the area of the triangle  $ABC$  is 20, then the area of the triangle  $PQR$  is  
 (A) 4 (B) 5 (C) 6 (D) 8
61. If  $\Delta RAC \sim \Delta ING$ , find the perimeter of  $\Delta ING$ .



- (A) 4 (B) 6 (C) 8 (D) 10
62. Let  $a \neq b$  and  $a, b \in \mathbb{R}^+$  and  $A = \frac{a+b}{2}$ ,  $G = (ab)^{1/2}$  then choose the correct option  
 (A)  $A = G$  (B)  $A < G$  (C)  $A > G$  (D) none of these
63. Given that a circle touches three given intersecting lines, how many different possibilities of circle are there?  
 (A) 1 (B) 2 (C) 3 (D) 4
64. In  $\left(0, \frac{\pi}{2}\right)$  which one increasing fastest?  
 (A)  $\sin x$  (B)  $\cos x$  (C)  $\tan x$  (D) can not be determined
65. Which one is correct?  
 (A)  $\sin x = 1.5$  (B)  $\cos x = 2$  (C)  $\tan x = 2.5$  (D)  $\sec x = 0.5$

### Assertion Reasoning Based Questions [Q. 65–69]

#### Directions:

Each of these questions contains two statements Assertion (A) and Reason (R). Each of the questions has four alternative choices, any one of the which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

- (a) A is true, R is true, R is a correct explanation of A  
 (b) A is true, R is true, R is not correct explanation of A  
 (c) A is true, R is false  
 (d) A is false R is true

66. **Assertion (A)** : Consider the set of first 20 positive integers. Then the sum of 18 numbers from the set can not be 170.

**Reason (R)** :  $S_n = 1 + 2 + \dots + n = \frac{n(n+1)}{2}$

- Ⓐ (a)                      Ⓑ (b)                      Ⓒ (c)                      Ⓓ (d)

67. **Assertion (A)** : Let the distance covered by a body in  $t$  seconds (from start) be given as  $t^3 - t^2 + ct$  where  $c$  is a constant. The minimum possible value of  $c$  will be  $\frac{1}{2}$ .

**Reason (R)** : Let  $ax^2 + bx + c = 0$  be given. Then for real roots  $D \geq 0$ .

- Ⓐ (a)                      Ⓑ (b)                      Ⓒ (c)                      Ⓓ (d)

68. **Assertion (A)** : If  $x$  is a prime number and  $(x^2 + 3)$  is also a prime number. The number of values that  $x$  can assume is 1.

**Reason (R)** : Every composite number has exactly two different positive factors.

- Ⓐ (a)                      Ⓑ (b)                      Ⓒ (c)                      Ⓓ (d)

69. **Assertion (A)** : If angle  $C$  of triangle  $ABC$  is  $90^\circ$  then  $\tan A + \tan B = \frac{AB^2}{BC \times AC}$ .

**Reason (R)** : Sum of three interior angles of a triangle on Euclidean plane is  $180^\circ$ .

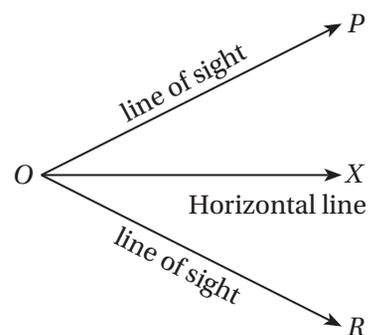
- Ⓐ (a)                      Ⓑ (b)                      Ⓒ (c)                      Ⓓ (d)

### Case Study Based Questions (Q. 70–72)

#### Case I (Q.20–Q.22) :

If 'O' be the observers' eye and OX be the horizontal line through O. If object P is at a higher level than eye then  $\angle POX$  is called angle of elevation. And if object R is at a lower level than eye then  $\angle ROX$  is called the angle of depression.

$F_1$  &  $F_2$  two flagstaffs stand on a horizontal plane. A and B are two points on the line joining their feet and between them. The angles of elevation of the tops of the flagstaffs  $F_1$  and  $F_2$  as seen from A are  $30^\circ$  and  $60^\circ$  and as seen from B are  $60^\circ$  and  $45^\circ$ . Length of  $F_2$  is greater than that of  $F_1$ . If AB is 30 m, then answer the following questions.



70. The length of  $F_2$  is

- Ⓐ  $(15\sqrt{3} + 1)$  m                      Ⓑ  $(15\sqrt{3} + 2)$  m                      Ⓒ  $(15\sqrt{3} + 3)$  m                      Ⓓ  $(15\sqrt{3} + 4)$  m

71. The length of  $F_1$  is

- Ⓐ  $15\sqrt{3}$  m                      Ⓑ  $(15\sqrt{3} + 1)$  m                      Ⓒ  $(15\sqrt{3} + 2)$  m                      Ⓓ  $10\sqrt{3}$  m

72. The distance between  $F_1$  &  $F_2$  is

- Ⓐ  $(60 + 15\sqrt{3})$  m                      Ⓑ  $(55 + 15\sqrt{3})$  m                      Ⓒ  $(50 + 15\sqrt{3})$  m                      Ⓓ  $(65 + 15\sqrt{3})$  m

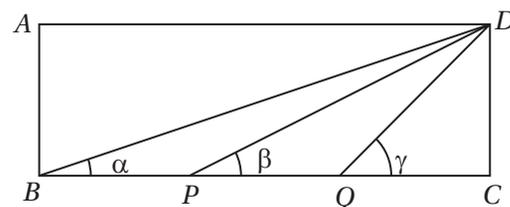
#### Case II (Q.73–Q.75) :

Let ABCD be a rectangle such that  $BC = 3AB$ . P and Q are points on the side BC such that  $BP = PQ = CQ$ .

On the basis of this answer the following questions.

73. The value of  $\tan \alpha$  is

- Ⓐ  $\frac{1}{3}$                       Ⓑ  $\frac{1}{2}$                       Ⓒ 1                      Ⓓ none of these



74. The value of  $\tan \beta$  is  
 (A)  $\frac{1}{3}$  (B)  $\frac{1}{2}$  (C) 1 (D) none of these
75. The value of  $\sin \gamma$  is  
 (A)  $\frac{1}{3}$  (B)  $\frac{1}{2}$  (C) 1 (D) none of these

## Biology

76. Organisms which reproduce by budding are \_\_\_\_\_.  
 (A) unicellular (B) multicellular  
 (C) both unicellular and multicellular (D) fungi
77. How many male gametes take part in fertilisation in flowering plants?  
 (A) 1 (B) 2 (C) 3 (D) 4
78. The number of spinal nerves in humans is \_\_\_\_\_.  
 (A) less than the number of cranial nerves (B) more than the number of cranial nerves  
 (C) equal to the number of cranial nerves (D) 31
79. The functions of salivation, tear, urination, digestion and defaecation are controlled by  
 (A) CNS (B) ANS (C) PNS (D) None of the above
80. The two cerebral hemispheres are connected by:  
 (A) Corpus callosum (B) Olfactory lobes (C) Midbrain (D) Cerebellum
81. Nodes of Ranvier are :  
 (A) the myelinated portion of the axon  
 (B) the non myelinated portion of myelinated neurons  
 (C) the terminal branches of axon  
 (D) the finer branches of dendrites
82. Where is the adrenal gland located?  
 (A) At the base of the brain (B) One on top of each kidney  
 (C) One behind each kidney (D) One beside each ureter
83. What is the function of the pulmonary veins?  
 (A) They carry deoxygenated blood to the lungs from the heart  
 (B) They carry oxygenated blood from the lungs to the heart  
 (C) They carry deoxygenated blood to the heart from the lungs  
 (D) They carry oxygenated blood to the lungs from the heart
84. What is the nature of bile?  
 (A) More acidic than gastric juice (B) Alkaline due to the presence of bicarbonates  
 (C) Depends on the kind of food (D) Neutral

85. When glucose is broken down completely \_\_\_\_\_.
- (A) water is produced (B) water is not produced  
 (C) 10 molecules of ATP are generated (D) Energy is produced only in the cytoplasm
86. Which STD is caused by HPV ?
- (A) AIDS (B) Syphilis (C) Gonorrhoea (D) Genital warts
87. What is the name of the surgical procedure which prevents the passage of sperms from testes into semen?
- (A) MTP (B) Vasectomy (C) Tubectomy (D) Both (B) and (C)
88. The onset and permanent termination of the menstrual cycle in women, is respectively called:
- (A) Menarche and menopause (B) Menopause and menarche  
 (C) Menstruation and ovulation (D) Puberty and menstruation
89. Name the hormones produced by islets of Langerhans.
- (A) TSH and thyroxine (B) Adrenaline and nor adrenaline  
 (C) Oestrogen and progesterone (D) Insulin and glucagon
90. Where are Schwann cells found?
- (A) In the petiole of leaves (B) In the ventricles of brain  
 (C) On the axon (D) In the cranium

**The questions 91 to 94 have two statements - Assertion (A) and Reason (R). Of the two statements, mark the correct answer from the options given below:**

- A. Both A and R are true and R is the correct explanation of A.  
 B. Both A and R are true but R is not the correct explanation of A.  
 C. A is true but R is false.  
 D. A is false but R is true.

91. **Assertion:** Chlorophyll is essential for photosynthesis.

**Reason:** Chlorophyll is present in the mesophyll tissue of leaves.

- (A) A (B) B (C) C (D) D

92. **Assertion:** A reflex arc is the path in the body through which the brain and spinal cord are connected.

**Reason:** The reflex arc includes the spinal cord, and brain in some cases.

- (A) A (B) B (C) C (D) D

93. **Assertion:** A nephron is the structural and functional unit of the kidneys.

**Reason:** Nephrons cannot filter urea from blood.

- (A) A (B) B (C) C (D) D

94. **Assertion:** Veins have thinner and less muscular walls than arteries.

**Reason:** Veins have valves to prevent the backflow of blood.

- (A) A (B) B (C) C (D) D

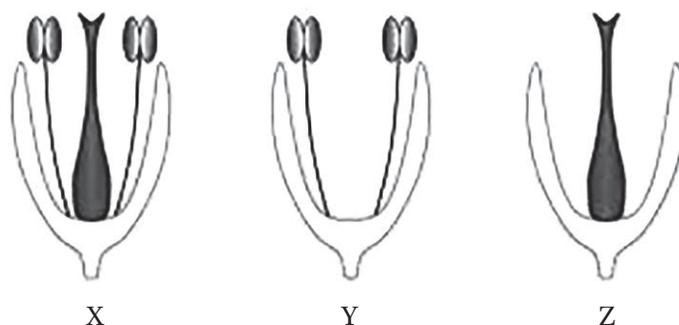
**Read the following passage and answer the following questions (95-97):**

Terrestrial organisms use atmospheric oxygen for respiration. This oxygen is absorbed by different organs in different

animals. Like other animals, respiratory system in human beings serves to provide fresh oxygen to all body cell and removes harmful carbon dioxide from the body. It consists of several organs.

95. Which is the correct sequence of air passage during inhalation?
- Ⓐ Nostrils → Larynx → Bronchi → Pharynx → Trachea → Lungs  
 Ⓑ Nostrils → Nasal passage → Pharynx → Larynx → Trachea → Bronchi → Lungs  
 Ⓒ Nostrils → Pharynx → Nasal passage → Larynx → Trachea → Bronchi → Lungs  
 Ⓓ Lungs → Trachea → Bronchi → Larynx → Pharynx → Nose
96. The function of the lining of mucous in the nasal passage of human beings is to \_\_\_\_\_.  
 Ⓐ increase the temperature of inhaled air                      Ⓑ move the air in and out  
 Ⓒ filter the inhaled air    Ⓓ absorb carbon dioxide from air
97. Which of the following statements is true about respiration?
- I. During inhalation, ribs move inwards and diaphragm is raised.  
 II. In the alveoli, exchange of respiratory gases take place between blood and inhaled air.  
 III. Haemoglobin has greater affinity for  $\text{CO}_2$  than  $\text{O}_2$ .  
 IV. Alveoli increase the surface area for exchange of gases.
- Ⓐ Only I                      Ⓑ Only IV                      Ⓒ II, III and IV                      Ⓓ Only II and III

Study the given diagrams and answer the following questions (98-100):



98. Which of the given flowers can develop into a fruit?  
 Ⓐ X only                      Ⓑ Z only                      Ⓒ Both X and Z                      Ⓓ All the flowers
99. Which of the flowers would usually not need an agent for pollination?  
 Ⓐ X    Ⓑ Y  
 Ⓒ Z    Ⓓ All the flowers would need an agent for pollination
100. Which of the flowers can show both self pollination and cross pollination?  
 Ⓐ X    Ⓑ Y    Ⓒ Z    Ⓓ None of the flowers