



# Monthly Progressive Test

Class: XII

Subject: PCMB



Test Booklet No.: MPT-04

Test Date: 

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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 MPT04 30102025.
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

### Topic : Dual Nature of Particle, Atoms and Nuclei

1. The de Broglie wavelength of an electron accelerated through a potential difference of 100 V is approximately:  
 (A) 0.122 nm                      (b) 0.167 nm                      (c) 0.388 nm                      (d) 0.041 nm
2. The kinetic energy of an electron is equal to its rest energy. Its speed is:  
 (a) 0.5c                              (b) 0.866c                              (c) 0.707c                              (d) 0.98c
3. A photoelectric surface has a threshold wavelength of 400 nm. The maximum kinetic energy of emitted electrons for radiation of wavelength 300 nm is:  
 (a) 1.03 eV                              (b) 1.55 eV                              (c) 1.24 eV                              (d) 2.07 eV
4. The stopping potential for photoelectrons emitted from a metal surface when light of wavelength 200 nm falls on it is 4.1 V. The work function of the metal is:  
 (a) 2.1 eV                              (b) 3.1 eV                              (c) 4.1 eV                              (d) 6.3 eV
5. The ratio of de Broglie wavelengths of a proton and an  $\alpha$ -particle accelerated through the same potential difference is:  
 (a) 1 : 2                              (b) 2 : 1                              (c) 1 :  $\sqrt{2}$                               (d)  $\sqrt{2}$  : 1
6. In the Bohr model of hydrogen, the ratio of speeds of the electron in the first and third orbits is:  
 (a) 1 : 3                              (b) 3 : 1                              (c) 1 : 9                              (d) 9 : 1
7. The energy required to remove an electron from  $n = 2$  orbit of hydrogen atom is:  
 (a) 13.6 eV                              (b) 3.4 eV                              (c) 10.2 eV                              (d) 6.8 eV
8. The angular momentum of the electron in the second orbit of hydrogen is:  
 (a)  $h/2p$                               (b)  $2h/p$                               (c)  $2h/2p$                               (d)  $h/p$
9. The wavelength of the first line of Lyman series is:  
 (a) 91.2 nm                              (b) 102.5 nm                              (c) 121.6 nm                              (d) 656.3 nm
10. The ratio of kinetic energy to total energy of an electron in a Bohr orbit is:  
 (a) 1 : 1                              (b) 2 : 1                              (c) 1 : 2                              (d) 1 : 3
11. The binding energy per nucleon of a nucleus is maximum for:  
 (a) Uranium                              (b) Iron                              (c) Deuterium                              (d) Helium
12. A radioactive isotope has a half-life of 10 days. The fraction of the original activity that remains after 30 days is:  
 (a)  $\frac{1}{3}$                               (b)  $\frac{1}{4}$                               (c)  $\frac{1}{8}$                               (d)  $\frac{1}{16}$
13. The mass defect of a nucleus is 0.1 u. The binding energy of the nucleus is:  
 (a) 9.31 MeV                              (b) 93.1 MeV                              (c) 0.931 MeV                              (d) 931 MeV
14. A nucleus with mass number 220 and atomic number 86 emits one  $\alpha$ -particle and two  $\beta$ -particles. The resulting nucleus has:  
 (a)  $A = 216, Z = 84$                               (b)  $A = 216, Z = 86$                               (c)  $A = 216, Z = 88$                               (d)  $A = 220, Z = 84$

15. The average life of a radioactive sample is 10 years. Its half-life is approximately:  
 (a) 7.0 years                      (b) 6.9 years                      (c) 6.3 years                      (d) 10.0 years
16. The energy of a photon having wavelength 0.01 nm is approximately:  
 (a) 124 keV                      (b) 12.4 keV                      (c) 1.24 keV                      (d) 0.124 keV

**Assertion and Reason : (Q17 – 20)**

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

- a: Assertion and Reason both are correct and Reason is the correct explanation of Assertion.  
 b: Assertion and Reason both are correct and Reason is not the correct explanation of Assertion.  
 c: Assertion is correct but Reason is wrong.  
 d: Assertion is wrong but Reason is correct.

17. **Assertion (A):** In Young's double-slit experiment, if one of the slits is closed, the fringe pattern disappears.

**Reason (R):** Interference fringes are produced due to the superposition of light waves from coherent sources.

- A a                       B b                       C c                       D d

18. **Assertion (A):** The photoelectric effect cannot be explained by the wave theory of light.

**Reason (R):** The kinetic energy of emitted photoelectrons depends on the intensity of incident light.

- A a                       B b                       C c                       D d

19. **Assertion (A):** In diffraction due to a single slit, the width of the central maximum is twice that of the secondary maxima.

**Reason (R):** The intensity of secondary maxima is less than that of the central maximum because of destructive interference.

- A a                       B b                       C c                       D d

20. **Assertion (A):** The de Broglie wavelength of an electron decreases when it is accelerated through a potential difference.

**Reason (R):** The momentum of the electron increases with increasing accelerating potential.

- A a                       B b                       C c                       D d

**Case Based Type Questions**

A ray of monochromatic light passes through a glass prism of refracting angle  $A = 60^\circ$  the refractive index of the material  $\mu = 1.5$ . The angle of incidence is adjusted so that the ray suffers minimum deviation.

21. At minimum deviation, the angle of refraction inside the prism at both refracting surfaces is

- A  $30^\circ$                        B  $45^\circ$                        C  $60^\circ$                        D  $90^\circ$

22. Find the angle of incidence at minimum deviation

- (a)  $45^\circ$                       (b)  $40^\circ$                       (c)  $48.6^\circ$                       (d)  $50.2^\circ$

23. The minimum deviation for the prism is

- (a)  $28.7^\circ$                       (b)  $38.6^\circ$                       (c)  $42.5^\circ$                       (d)  $25^\circ$

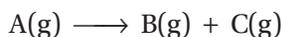
**Case Based Type Questions**

A thin convex lens of focal length +15 cm is placed coaxially with a concave lens of focal length -30 cm, separated by a distance of 10 cm. A print object is placed 30 cm in front of the convex lens.

24. The image formed by the convex lens alone  
 (a) +10 cm                      (b) +15 cm                      (c) +30 cm                      (d) +20 cm
25. The position of the final image is  
 (a) +20 cm                      (b) -20 cm                      (c) -30 cm                      (d) +10 cm

## Chemistry

26. Consider a first order gas phase decomposition reaction given below:



The initial pressure of the system before decomposition of A as  $P_i$ . After lapse of time 't' total pressure of the system increased by x units and became 'Pt'. The rate constant 'K' for the reaction is given as—

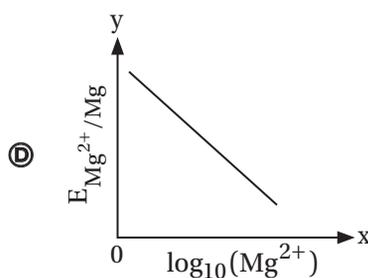
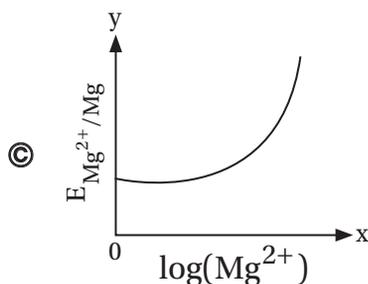
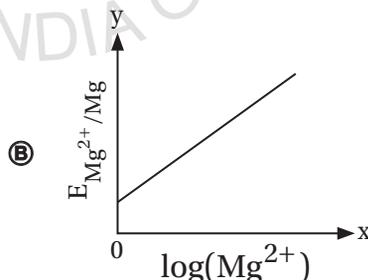
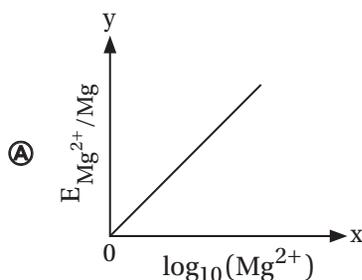
- Ⓐ  $t = \frac{2.303}{t} \log_{10} \left( \frac{P_i}{P_i - x} \right)$                       Ⓑ  $K = \frac{2.303}{t} \log_{10} \left( \frac{P_i}{2P_i - Pt} \right)$
- Ⓒ  $K = \frac{2.303}{t} \log \left( \frac{P_i}{2P_i + t} \right)$                       Ⓓ  $K = \frac{2.303}{t} \log \left( \frac{P_i}{2P_i - Pt} \right)$

27. 'A first-order reaction was completed 70% in 20 minutes. What is the rate constant of the reaction?  
 Ⓐ  $0.07 \text{ min}^{-1}$                       Ⓑ  $0.08 \text{ min}$                       Ⓒ  $0.06 \text{ min}^{-1}$                       Ⓓ  $0.09 \text{ min}^{-1}$

28. Electrode potential for Mg electrode varies according to the equation:

$$E_{\text{Mg}^{2+}/\text{Mg}} = E_{\text{Mg}^{2+}/\text{Mg}}^{\ominus} - \frac{0.059}{2} \log_{10} \frac{1}{[\text{Mg}^{2+}]}$$

The graph of  $E_{\text{Mg}^{2+}/\text{Mg}}$  Vs  $\log_{10}(\text{Mg}^{2+})$  is:



29. The complex,  $[\text{Pt}(\text{P}_y)(\text{NH}_3)(\text{Br})\text{Cl}]$  will have how many geometrical isomers?

- Ⓐ 4                      Ⓑ 0                      Ⓒ 2                      Ⓓ 3

30. Calculate the e.m.f of the cell:



- (A) 0.1 V                      (B) 0.36V                      (C) 0.3305 V                      (D) 3.305 V

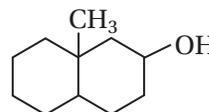
31. Calculate the freezing point of a solution containing 60 g of glucose [Molar mass = 180 g (mole)<sup>-1</sup>] in 250 g of water. [K<sub>f</sub> of water = 1.86 K Kg(mole)<sup>-1</sup>]

- (A) 27.065 K                      (B) 270.65 K                      (C) 2.7065 K                      (D) 7.0265 K

32. Calculate the degree of dissociation ( $\alpha$ ) of acetic acid if its molar conductivity ( $\wedge_m$ ) is 39.05 S cm<sup>2</sup> (mol)<sup>-1</sup>. Given  $\wedge_{\text{H}^+}^0 = 349.6 \text{ S cm}^2 (\text{mole})^{-1}$  and  $\wedge_{\text{CH}_3\text{COO}^-}^0 = 40.9 \text{ S cm}^2 (\text{mole})^{-1}$

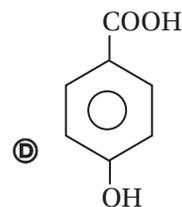
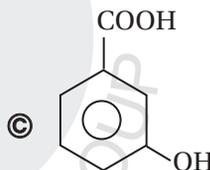
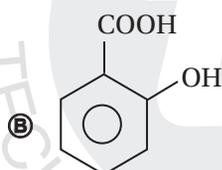
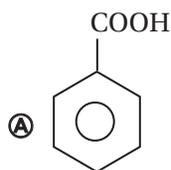
- (A) 0.1                      (B) 0.01                      (C) 0.03                      (D) 0.4

33. How many chiral carbons are present in the following structure?



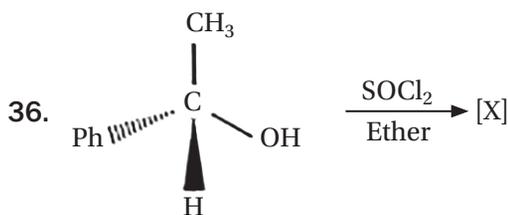
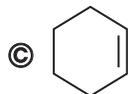
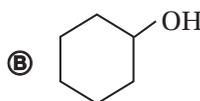
- (A) 1                      (B) 2                      (C) 3                      (D) 4

34. Which of the following aromatic acids is most acidic?



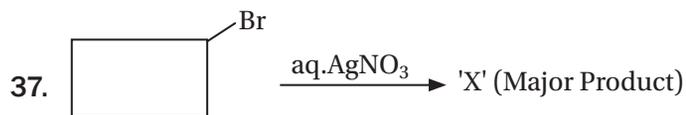
35. P (Major Product):

The product (P) is:

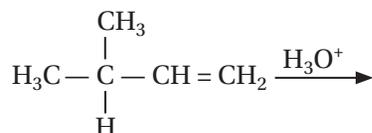


Compound (X) is obtained with:

- (A) Retention of configuration                      (B) Inversion of configuration  
(C) Racemic mixture                      (D) All of these



38. In the following hydration :



The major alcohol product formed is:



39. The compound  $\text{C}_2(\text{F})(\text{Cl})(\text{Br})\text{I}$  has :

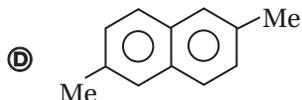
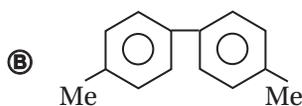
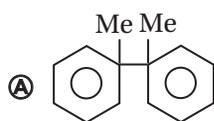
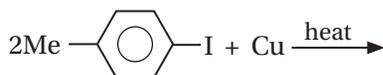
(A) 4 isomers

(B) 2-optical isomers

(C) 2-geometrical isomers

(D) 6-geometrical isomers

40. The product in the reaction is:



#### Assertion and Reason: (Q41 - 44)

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

- a: Assertion and Reason both are correct and Reason is the correct explanation of Assertion.  
 b: Assertion and Reason both are correct and Reason is not the correct explanation of Assertion.  
 c: Assertion is correct but Reason is wrong.  
 d: Assertion is wrong but Reason is correct.

41. **Assertion (A):** Reaction of an alcohol with acid chloride is done in presence of pyridine.

**Reason (R):** Pyridine is basic in nature.

(A) a

(B) b

(C) c

(D) d

42. **Assertion (A):** A bright silver mirror is produced during the warming of an aldehyde with freshly prepared ammoniacal silver nitrate solution.

**Reason (R):** A bright silver mirror is produced due to formation of silver metal.

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

43. **Assertion (A):** Acetophenone and benzophenone can be distinguished by iodoform test.

**Reason (R):** Acetophenone and benzophenone both are carbonyl compounds.

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

44. **Assertion (A):** Phenols are acidic than carboxylic acids.

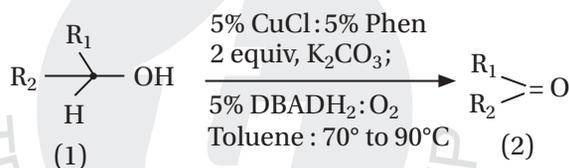
**Reason (R):** Phenoxide ion is more stable than carboxylate ion.

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

#### Case Based Questions (Q45 – 47):

Read the passage given below and answer the following questions:

An efficient, aerobic catalytic system for the transformation of alcohols into carbonyl compounds under mild conditions, copper-based catalyst has been discovered. This copper-based catalytic system utilises oxygen or air as the ultimate, stoichiometric oxidant, producing water as the only by product.



A wide range of primary, secondary, allylic, and benzylic alcohols can be smoothly oxidised to the corresponding aldehydes or ketones in good to excellent yields. Air can be conveniently used instead of oxygen without affecting the efficiency of the process. However, the use air requires slightly longer reaction times.

This process is not only economically viable and applicable to large-scale reactions, but it is also environmentally friendly.

45. The copper based catalyst mentioned in the study above can be used to convert:

- (A) propanol to propanonic acid                                      (B) propanone to propanoic acid  
(C) propanone to propan-2-ol                                      (D) propan-2-ol to propanone

46. The carbonyl compound formed when ethanol gets oxidised using this copper-based catalyst can also be obtained by ozonolysis of:

- (A) But-1-ene                                      (B) but-2-ene                                      (C) ethene                                      (D) pent-1-ene

47. Which of the following is a secondary allylic alcohol?

- (A) But-3-en-2-ol                                      (B) Prop-2-enol                                      (C) But-2-en-2-ol                                      (D) Butan-2-ol

#### Case Based Questions (Q48 – 50):

Read the passage given below and answer the following questions:

Ketones play a prominent role in organic chemistry. The ketone moiety is extremely common in natural products and pharmaceuticals and in dyes, fragrances and flavours. It is also a versatile reaction center in organic synthesis. Many frequently used reactions, including the Mannich reaction, Wittig reaction, Grignard reaction, Passerini reaction, Baeyer-Villiger oxidation, and Wolff-Kishner-Huang reduction describe a wide array of transformations of ketones. The development of a practical route to ketones from feedstock chemicals has long been a subject of interest.



58. The projection of vector  $\hat{i} + \hat{j} + \hat{k}$  on the vector  $\hat{i} - \hat{j} + \hat{k}$  is -
- (A)  $\sqrt{3}$  (B)  $\frac{1}{\sqrt{3}}$  (C)  $\frac{2}{\sqrt{3}}$  (D)  $2\sqrt{3}$
59. Find the area of  $\Delta ABC$  if position vectors of its vertices A, B, C are  $\hat{i} + \hat{j}$ ,  $\hat{j} + \hat{k}$ , and  $\hat{k} + \hat{i}$  respectively.
- (A)  $\sqrt{3}$  (B)  $\frac{\sqrt{3}}{2}$  (C)  $\frac{2}{\sqrt{3}}$  (D)  $\frac{1}{\sqrt{3}}$
60. Find S.D between two lines whose vector equations are given by :  
 $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k})$  and  $\vec{r} = 2\hat{i} + 4\hat{j} + 5\hat{k} + \mu(3\hat{i} + 4\hat{j} + 5\hat{k})$
- (A)  $\frac{1}{\sqrt{6}}$  (B)  $\frac{2}{\sqrt{6}}$  (C)  $\frac{3}{\sqrt{6}}$  (D)  $\frac{4}{\sqrt{6}}$
61. A man 1.6 m high walks at the rate of 30 metre per minute away from a lamp which is 4 m above ground. How fast does the man's shadow lengthen ?
- (A) 5m/min (B) 10m/min (C) 15m/min (D) 20m/min
62. Find the interval where the function  $f(x) = \frac{x}{\ln x}$  is strictly increasing.
- (A) (0, 1) (B) (1,  $\infty$ ) (C) (e,  $\infty$ ) (D) none of these
63. Choose the correct option :
- (A)  $\pi^e < e^\pi$  (B)  $\pi^e > e^\pi$  (C)  $\pi^e = e^\pi$  (D) none of these
64. Let  $f(x) = x^2 + \frac{1}{x^2}$  then find the point of minima.
- (A) 0 (B) 1 (C)  $\frac{1}{2}$  (D) none of these
65.  $I = \int_{-3}^1 |x+1| dx = ?$
- (A) 4 (B) 3 (C) 2 (D) 1

#### Assertion and Reason: (Q. 65 – 69)

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

- A: Assertion and Reason both are correct and Reason is the correct explanation of Assertion.  
 B: Assertion and Reason both are correct and Reason is not the correct explanation of Assertion.  
 C: Assertion is correct but Reason is wrong.  
 D: Assertion is wrong but Reason is correct.

66. **Assertion (A):** The value of  $\lambda$  for which  $2x + 3y = 8$ ,  $7x - 5y + 3 = 0$  and  $4x - 6y + \lambda = 0$  are consistent is  $-8$ .  
**Reason (R):** Here the equations are linear. We have 3 equations in 2 unknowns so for consistency the corresponding determinant is zero.
- (A) A (B) B (C) C (D) D
67. **Assertion (A):** Maximum number of cyphers in a diagonal matrix of order 4 is 15.  
**Reason (R):** Maximum number of cyphers in a diagonal matrix of order n is  $n^2 - 1$ .
- (A) A (B) B (C) C (D) D
68. **Assertion (A):**  $\tan^{-1} 1 + \tan^{-1} 2 + \tan^{-1} 3 = \pi$   
**Reason (R):**  $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \frac{x+y}{1-xy}$ ;  $x > 0, y > 0, xy < 1$
- (A) A (B) B (C) C (D) D

69. Assertion (A):  $\int_0^1 (-1)^x dx = \frac{2}{\pi}$

Reason (R):  $\int a^x dx = \frac{a^x}{\log_e a} + c, a > 0, c \in \mathbb{R}.$

(A) A

(B) B

(C) C

(D) D

### Case Base Question (Q70 to Q75)

Case I : Wall's Theorem :

$$\int_0^{\frac{\pi}{2}} \sin^n x \cdot \cos^m x = \frac{[(n-1)(n-3)\dots 1 \text{ or } 2][(m-1)(m-3)\dots 1 \text{ or } 2]}{(m+n)(m+n-2)\dots 1 \text{ or } 2} k$$

m, n are non-negative integers.

where  $k = \begin{cases} \frac{\pi}{2}, & \text{if } m, n \text{ both even} \\ 1, & \text{otherwise.} \end{cases}$

On the basis of this answer the following questions.

70. Evaluate :  $\int_0^{\frac{\pi}{2}} \sin^5 x dx$

(A)  $\frac{8}{15}$

(B)  $\frac{5\pi}{32}$

(C)  $\frac{3\pi}{512}$

(D) none of these

71. Evaluate :  $\int_0^{\frac{\pi}{2}} \cos^6 x \cos^4 x dx.$

(A)  $\frac{8}{15}$

(B)  $\frac{5\pi}{32}$

(C)  $\frac{3\pi}{512}$

(D) none of these

72. Evaluate :  $\int_0^{\frac{\pi}{2}} \sin^6 x \cos^4 x dx.$

(A)  $\frac{8}{15}$

(B)  $\frac{5\pi}{32}$

(C)  $\frac{3\pi}{512}$

(D) none of these

Case II : L' Hospital's Rule is a method in calculus used to evaluate Limits that yield indeterminate forms like  $\frac{0}{0}$  or  $\frac{\infty}{\infty}$  by differentiating the numerator and denominator separately and then taking the limit again.

Rule : If  $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$  takes  $\frac{0}{0}$  or  $\frac{\infty}{\infty}$  form, then

$\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$ . Based on this answer the following questions.

73.  $\lim_{x \rightarrow 0} \frac{\sin^{-1} x - \tan^{-1} x}{x^3} = ?$

(A) 0

(B) 1

(C)  $\frac{1}{2}$

(D)  $\frac{1}{4}$

74.  $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} = ?$

(A) 0

(B) 1

(C)  $\frac{1}{2}$

(D)  $\frac{1}{4}$

75.  $\lim_{x \rightarrow 0} \log_{\tan^2 x} (\tan^2 2x)$

(A) 0

(B) 1

(C)  $\frac{1}{2}$ (D)  $\frac{1}{3}$ 

## Biology

76. Which of the following pairs have haploid structures?

(A) Nucellus and antipodal cells

(B) Antipodal cells and egg cells

(C) Antipodal cells and megaspore mother cell

(D) Nucellus and primary endosperm nucleus

77. Location and secretion of Leydig cells are:

(A) Liver - Cholesterol

(B) Ovary - Oestrogen

(C) Testis - Testosterone

(D) Pancreas - Glucagon

78. GIFT is recommended for those females:

(A) whose cervical canal is too narrow for the passage of sperms

(B) who cannot provide suitable environment for fertilisation.

(C) who cannot produce ovum.

(D) who cannot retain the foetus inside the uterus.

79. Select the wrong statement:

(A) Chromosomal Theory of Inheritance was put forward by Sutton.

(B) Law of Dominance and Law of Independent Assortment were proposed by Mendel.

(C) Linkage and recombination were discovered by Sutton.

(D) Three scientists independently rediscovered Mendel's laws in 1900

80. During DNA replication, Okazaki fragments are used to elongate-----

(A) The lagging strand towards replication fork.

(B) The leading strand towards replication fork.

(C) The leading strand away from the replication fork.

(D) The lagging strand away from the replication fork.

81. Given are two statements regarding the origin of life:

a. The earliest organisms that appeared on earth were non green and presumably anaerobes.

b. The first autotrophic organisms were the chemoautotrophs that never released oxygen.

Regarding the given statements, which of the following options are correct?

(A) a is correct but b is false

(B) b is correct but a is false

(C) Both a and b are correct

(D) Both a and b are false.

82. Which one of the following is not a property of cancerous cells whereas the remaining three are shown?

(A) They show contact inhibition.

(B) They compete with normal cells for vital nutrients.

(C) They do not remain confined in the area of formation.

(D) They divide in an uncontrolled manner.

83. Which one of the following statements is correct?

(A) Legumes fix nitrogen only through the specialised bacteria that live in their roots.



**Assertion and Reason Based Questions:**

**Directions:** 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 (A):** Allergy is the exaggerated response of the immune system to certain antigens present in the environment.

**Reason (R):** In metropolitan cities, life style is responsible for lowering immunity and sensitivity to allergens.

- A                       B                       C                       D

**92. Assertion (A):** A small part of the activated sludge is pumped back into the aeration tank.

**Reason (R):** Activated sludge absorbs colloidal organic matter.

- A                       B                       C                       D

**93. Assertion (A):** In gel electrophoresis, the DNA fragments move towards the anode under an electric field through a medium.

**Reason (R):** DNA fragments are positively charged.

- A                       B                       C                       D

**94. Assertion (A):** Both LH and FSH attain a peak level in the middle of the menstrual cycle.

**Reason (R):** The corpus luteum secretes large amounts of progesterone which is essential for the maintenance of the endometrium

- A                       B                       C                       D

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

The repeated use of alcohol or drugs increases the tolerance level of the receptors present in our body.

Therefore, the receptors respond to only higher doses of alcohol or drugs. This leads to greater intake and addiction. Addiction drives the people to consume more, even after knowing overuse makes them destructive. Hence, it is difficult to get rid of this habit.

- 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.

**95. Assertion (A):** Morphine is useful for patients under depression.

**Reason (R):** Morphine is a sedative pain killer.

- A                       B                       C                       D

**96. Assertion (A):** Tobacco contains nicotine which stimulates the adrenal gland.

**Reason (R):** Nicotine increases blood pressure and heart rate.

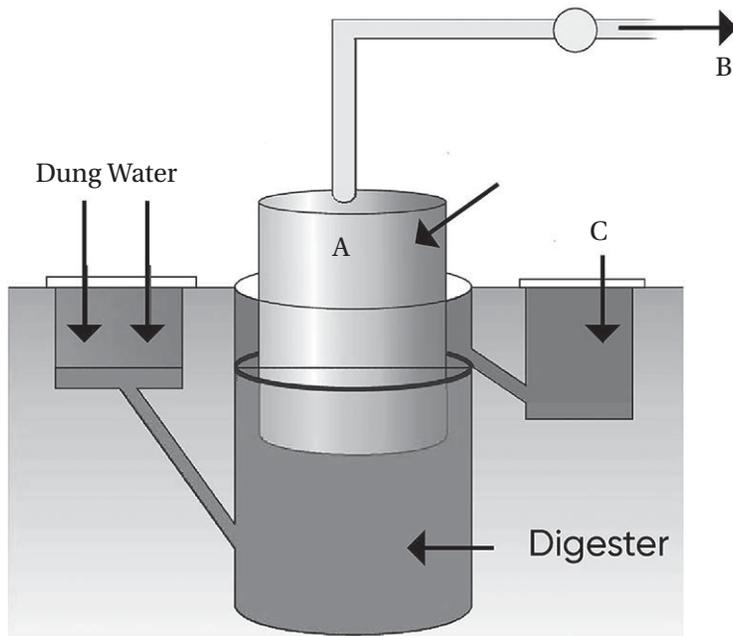
- A                       B                       C                       D

97. **Assertion (A)** : Opioids help to enhance respiratory activity.

**Reason (R)** : Opioids bind to the receptors in the CNS and gastrointestinal tract.

- Ⓐ A                      Ⓑ B                      Ⓒ C                      Ⓓ D

Study the given figure of a biogas plant and answer the following questions (98-100) :



98. Identify the correct statement:

- Ⓐ Biogas is produced by the aerobic digestion of biomass by *E. coli*.  
 Ⓑ Biogas is produced by the anaerobic digestion of biomass by methanogens.  
 Ⓒ Biogas is produced by the aerobic digestion of cow dung by yeast.  
 Ⓓ Biogas is produced by the anaerobic digestion of activated sludge by methanogenic bacteria..

99. Identify 'A' in the given figure.

- Ⓐ Biogas                      Ⓑ Sludge                      Ⓒ Sewage                      Ⓓ None of the above

100. Which of the following is not a constituent of biogas?

- Ⓐ  $\text{CH}_4$                       Ⓑ  $\text{CO}_2$                       Ⓒ  $\text{H}_2$                       Ⓓ  $\text{H}_2\text{O}$