



Aakash

Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot No. 13, Sector-18,
Udyog Vihar, Gurugram, Haryana - 122018, **Ph.**011-47623456

MM : 720

Final Test Series(P2)-2024-25_Test-09D

Time : 180 Min.

Topics Covered:
Complete Syllabus of Class XI & XII

General Instructions :

Duration of Test is 3 hrs.

The Test consists of 180 questions. The maximum marks are 720.

There are three parts in the question paper consisting of Physics, Chemistry, Biology which have 45 questions each in Physics & Chemistry and 90 questions in Biology.

Each question carries +4 marks. For every wrong response, -1 mark shall be deducted from the total score. Unanswered/unattempted questions will be given no marks.

Use blue/black ballpoint pen only to darken the appropriate circle.

Mark should be dark and completely fill the circle.

Dark only one circle for each entry.

Dark the circle in the space provided only.

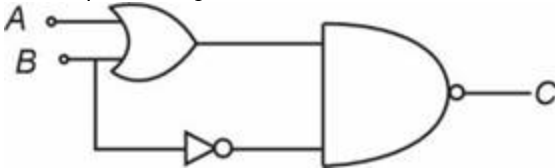
Rough work must not be done on the Answer sheet and do not use white fluid or any other rubbing material on the Answer sheet.

PHYSICS

1. In a resonance tube experiment, if two alternate resonance occurs at lengths 10 cm & 30 cm respectively. Then frequency of tuning fork is ($v_{\text{sound}} = 300 \text{ m/s}$)

- (1) 500 Hz
- (2) 60 Hz
- (3) 1000 Hz
- (4) 750 Hz

2. The output of the given circuit is



- (1) $A\bar{B}$
- (2) $A + \bar{B}$
- (3) $\bar{A} + B$
- (4) $\bar{A} + \bar{B}$

3. Free neutron decays as follows ${}^1_0\text{n} \rightarrow \text{p} + {}^0_{-1}\text{e} + x$. Here x represents

- (1) Neutrino
- (2) Antineutrino
- (3) Graviton
- (4) Proton

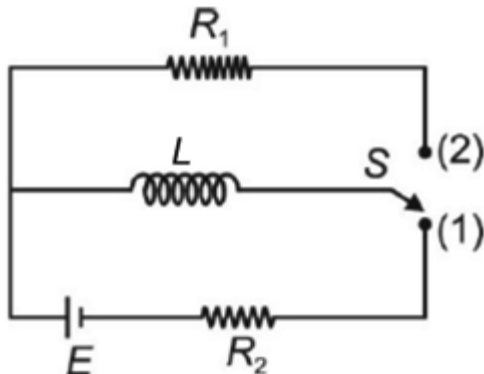
4. If the kinetic energy of free electron is doubled, its de-Broglie wavelength becomes

- (1) 2 times
- (2) $\frac{1}{2}$ times
- (3) $\sqrt{2}$ times
- (4) $\frac{1}{\sqrt{2}}$ times

5. Two coherent sources of light emitting waves of same intensity I_0 , produce fringe pattern in YDSE. At central maximum, the resultant intensity will be

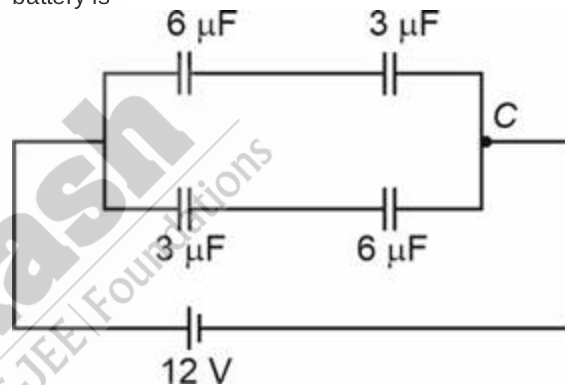
- (1) I_0
- (2) $2I_0$
- (3) $4I_0$
- (4) $16I_0$

6. The oscillating magnetic field in a plane electromagnetic wave is given as $B_y = 6 \times 10^{-7} \sin(2000\pi x - 6 \times 10^{11} \pi t)$ T, then the amplitude of electric field in the plane electromagnetic wave will be
- (1) 180 V/m
 - (2) 90 V/m
 - (3) 20 V/m
 - (4) 240 V/m
7. In the circuit as shown in figure, the switch is shifted from position 1 to position 2. The maximum amount of heat dissipated in R_1 is



- (1) $\frac{LE^2}{2R_1R_2}$
 - (2) $\frac{LE^2}{2R_2^2}$
 - (3) $\frac{LE^2}{2R_1^2}$
 - (4) Zero
8. A biconcave lens having radius of curvature 40 cm for each surface has refractive index $\frac{3}{2}$. Its focal length in air will be
- (1) 20 cm
 - (2) -20 cm
 - (3) -40 cm
 - (4) 40 cm
9. In the following questions a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.
 A : Magnetic field lines of permanent magnets are continuous.
 R : Magnetic field of a bar magnet is uniform.
- (1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
 - (2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
 - (3) Assertion is true statement but Reason is false
 - (4) Both Assertion and Reason are false statements

10. The current sensitivity of a moving coil galvanometer can be increased by decreasing
- (1) Number of turns in the coil
 - (2) Area of coil
 - (3) Magnetic field inside the galvanometer
 - (4) Torsional constant
11. Consider the following statements
Statement I : In a charge-free region, electrostatic field lines can be taken to be continuous curves without any breaks.
Statement II : Electrostatic field lines do not form any closed loops.
 Choose the correct statement(s).
- (1) Statement I only
 - (2) Statement II only
 - (3) Both statements are correct
 - (4) Both statements are incorrect
12. In the circuit shown below, the charge flown through the battery is



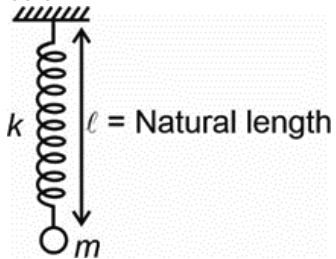
- (1) 48 μC
 - (2) 60 μC
 - (3) 82 μC
 - (4) 10 μC
13. One end of a uniform wire of length L and weight W is suspended from rigid support and a weight $2W$ is suspended from its lower end. If A is the area of cross-section of wire and Y is Young's modulus of material of wire, then elongation in wire will be
- (1) $\frac{WL}{AY}$
 - (2) $\frac{5}{2} \frac{WL}{AY}$
 - (3) $\frac{2WL}{AY}$
 - (4) $\frac{3WL}{AY}$

14. Match Column - I and Column - II and choose the correct option from the given choices. (Symbol have their usual meaning)

Column - I		Column - II	
(A)	Root mean square speed of gas molecules	(P)	$\frac{1}{3}\rho V_{rms}^2$
(B)	Pressure exerted by ideal gas	(Q)	$\sqrt{\frac{3RT}{M}}$
(C)	Average translational kinetic energy of a gas molecule	(R)	$\frac{5}{2}RT$
(D)	Total internal energy of 1 mole of a diatomic gas	(S)	$\frac{3}{2}k_B T$

- (1) (A) - (R), (B) - (Q), (C) - (P), (D) - (S)
 (2) (A) - (R), (B) - (P), (C) - (S), (D) - (Q)
 (3) (A) - (Q), (B) - (R), (C) - (S), (D) - (P)
 (4) (A) - (Q), (B) - (P), (C) - (S), (D) - (R)
15. Two vibrating tuning forks produce progressive waves given by $y_1 = 5 \sin(300\pi t + kx_0)$ and $y_2 = 3 \sin(306\pi t + kx_0)$ (where x, y in m and t is in second). Number of beats formed per minute is

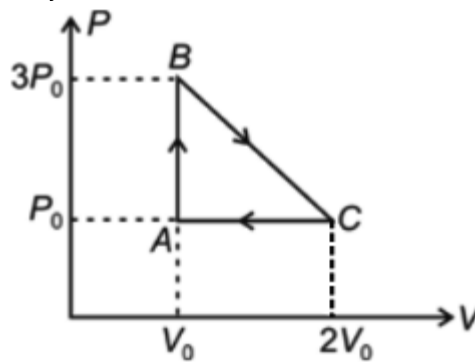
- (1) 3
 (2) 60
 (3) 180
 (4) 30
16. A spring pendulum having a small block of mass ' m ' attached to a spring of spring constant ' k ' is shown below.



If this spring pendulum is taken in a lift moving upwards with an acceleration of $\frac{g}{4}$, then its time period will be given by

- (1) $2\pi\sqrt{\frac{l}{g}}$
 (2) $2\pi\sqrt{\frac{m}{k}}$
 (3) $2\pi\sqrt{\frac{m}{k} + \frac{l}{g}}$
 (4) $\pi\sqrt{\frac{m}{k}}$

17. One mole of an ideal diatomic gas is taken round the cyclic process ABCA as shown in figure. Work done by the gas in the cycle ABCA will be



- (1) $\frac{-3P_0V_0}{2}$
 (2) P_0V_0
 (3) $\frac{-P_0V_0}{3}$
 (4) $-P_0V_0$
18. Read the assertion and reason carefully to mark the correct option out of the options given below
 A : When length of a tube is less than the height of liquid rise in capillary tube, the liquid gets overflowed.
 R : The height of liquid column in a capillary tube is directly proportional to radius of meniscus.

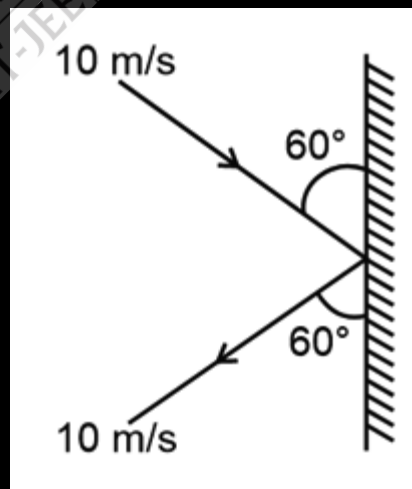
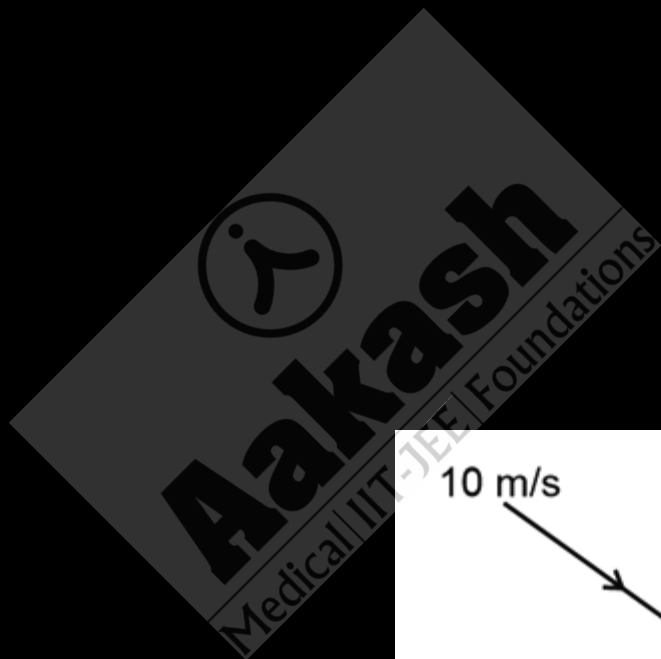
- (1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
 (2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
 (3) Assertion is true statement but Reason is false
 (4) Both Assertion and Reason are false statements

19. Two bodies of different masses of 2 kg and 4 kg start moving with velocities 2 m/s and 1 m/s towards each other due to mutual gravitational attraction. What is the velocity of centre of mass?

- (1) 4 m/s
 (2) 2 m/s
 (3) 1 m/s
 (4) Zero

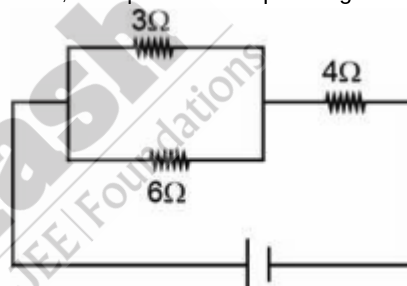
20. The displacement x of a body of mass 1 kg on horizontal smooth surface as a function of time t is given by $x = \frac{t}{3}$ where x is in metre and t is in seconds. The net work done in the first second is

- (1) 4 J
 (2) 2 J
 (3) 1 J
 (4) Zero



29. At what height from the surface of earth, the gravitational potential is -4.45×10^7 J/kg? ($R_e = 6400$ km and $M_e = 6 \times 10^{24}$ kg)
- (1) 2600 km
 - (2) 1600 km
 - (3) 400 km
 - (4) 3000 km
30. A small hole of area of cross-section 2 mm^2 is made near the bottom of a fully filled water tank open from top of height 5 m. The volumetric rate of flow of water through the open hole would be nearly ($g = 10 \text{ m/s}^2$)
- (1) $6.4 \times 10^{-6} \text{ m}^3/\text{s}$
 - (2) $12.6 \times 10^{-6} \text{ m}^3/\text{s}$
 - (3) $8.9 \times 10^{-6} \text{ m}^3/\text{s}$
 - (4) $20 \times 10^{-6} \text{ m}^3/\text{s}$
31. A black body at 227°C radiates heat at the rate of $7 \text{ cal cm}^{-2} \text{ s}^{-1}$. At a temperature of 727°C , the rate of heat radiated in the same units will be
- (1) $28 \text{ cal cm}^{-2} \text{ s}^{-1}$
 - (2) $\frac{7}{16} \text{ cal cm}^{-2} \text{ s}^{-1}$
 - (3) $112 \text{ cal cm}^{-2} \text{ s}^{-1}$
 - (4) $\frac{16}{7} \text{ cal cm}^{-2} \text{ s}^{-1}$
32. An ideal gas is compressed to half of its initial volume by means of several different thermodynamic processes. Which of the process results in the maximum work done on the gas?
- (1) Isothermal
 - (2) Isochoric
 - (3) Adiabatic
 - (4) Isobaric
33. The ratio of number of translational degrees of freedom to number of rotational degrees of freedom for a diatomic gas is
- (1) $\frac{2}{3}$
 - (2) $\frac{3}{2}$
 - (3) $\frac{1}{1}$
 - (4) $\frac{1}{3}$
34. The value of inductance L for which the current is maximum in a series LCR circuit with $C = 10 \mu\text{F}$ and $\omega = 1000 \text{ s}^{-1}$ is
- (1) 1 mH
 - (2) 10 mH
 - (3) 100 mH
 - (4) 1000 mH
35. The electromagnetic radiation primarily responsible for maintaining the earth's warmth or average temperature through the greenhouse effect is
- (1) x-rays
 - (2) γ -rays
 - (3) Infrared
 - (4) UV rays
36. A bubble in glass slab having refractive index ($\mu = 1.5$) when viewed from one side appears at 5 cm and at 3 cm from other side, then thickness of slab is
- (1) 8 cm
 - (2) 6.5 cm
 - (3) 12 cm
 - (4) 4.5 cm
37. Photoelectric work function of a metal is 1 eV. A light of wavelength $\lambda = 3000 \text{ \AA}$ falls on it. The photoelectrons come out with a maximum velocity nearly is equal to
- (1) 10 m/s
 - (2) 10^2 m/s
 - (3) 10^4 m/s
 - (4) 10^6 m/s
38. Given below are two statements:
Statement (I): Plane mirror always forms real image.
Statement (II): Virtual image formed by a lens can be obtained on screen.
 In the light of the above statements, choose the most appropriate answer from the options given below.
- (1) Both statements (I) and (II) are correct
 - (2) Both statements (I) and (II) are incorrect
 - (3) Statement I is correct but Statement II is incorrect
 - (4) Statement I is incorrect but Statement II is correct
39. A short bar magnet of magnetic moment 0.4 J/T is placed in a uniform magnetic field of 0.24 T . The magnet is in stable equilibrium when the potential energy is
- (1) 0.006 J
 - (2) 0.001 J
 - (3) -0.096 J
 - (4) -0.048 J

40. A step-down transformer connected to an AC mains supply of 220 V is made to operate at 11V, 44 W lamp. Ignoring power losses in the transformer, what is the current in the primary circuit?
- (1) 4 A
 - (2) 0.2 A
 - (3) 0.4 A
 - (4) 2 A
41. A battery of emf 10 V and internal resistance 0.5 Ω is connected across a variable resistance R . The value of R for which the power delivered in it is maximum is given by
- (1) 0.4 Ω
 - (2) 0.5 Ω
 - (3) 1 Ω
 - (4) 0.25 Ω
42. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**.
Assertion (A): Sound waves cannot travel through vacuum but light waves can.
Reason (R): Sound waves cannot be polarised but light waves can be.
 In the light of the above statements, choose the correct answer from the options given below:
- (1) Both **A** and **R** are true and **R** is the correct explanation of **A**
 - (2) Both **A** and **R** are true but **R** is not the correct explanation of **A**
 - (3) **A** is true but **R** is false
 - (4) **A** is false but **R** is true
43. Two charged spherical conductors of radius R_1 and R_2 are connected by a wire. Then the ratio of surface charge densities $\left(\frac{\sigma_1}{\sigma_2}\right)$ of the spheres is.
- (1) $\frac{R_1^2}{R_2^2}$
 - (2) $\frac{R_1}{R_2}$
 - (3) $\frac{R_2}{R_1}$
 - (4) $\sqrt{\frac{R_1}{R_2}}$
44. A man can throw a ball to a maximum horizontal distance of 80 m from ground and it rises to a maximum height of 20 m, then the angle of projection with the horizontal is
- (1) $\theta = 30^\circ$
 - (2) $\theta = 60^\circ$
 - (3) $\theta = 45^\circ$
 - (4) $\theta = \sin^{-1}\left(\frac{3}{5}\right)$
45. Consider the given circuit, if current through 3 Ω resistor is 0.8 A, then potential drop through 4 Ω resistor is



- (1) 9.6 V
- (2) 2.6 V
- (3) 4.8 V
- (4) 1.2 V

CHEMISTRY

46. The mass of precipitate formed when 100 mL of 34% $\left(\frac{W}{V}\right)$ solution of AgNO_3 is mixed with 100 mL of 11.7% $\left(\frac{W}{V}\right)$ NaCl solution (Atomic masses: Ag = 108 u, N = 14 u, O = 16 u, Na = 23 u, Cl = 35.5 u) is
- (1) 15.6 g
 - (2) 20.5 g
 - (3) 28.7 g
 - (4) 35.1 g

47. Match list-I with list-II.

	List-I (Species)		List-II (Shape)
a.	SF ₄	(i)	Tetrahedral
b.	NH ₄ ⁺	(ii)	Square planar
c.	BrF ₃	(iii)	See-saw
d.	XeF ₄	(iv)	Bent T-shape

Choose the correct answer from the options given below.

- (1) a(iv), b(iii), c(ii), d(i)
 (2) a(i), b(iii), c(ii), d(iv)
 (3) a(iii), b(i), c(ii), d(iv)
 (4) a(iii), b(i), c(iv), d(ii)

48. The correct order of bond order of the given species is

- (1) O₂⁺ > O₂ > O₂⁻
 (2) O₂⁻ > O₂⁺ > O₂
 (3) O₂ > O₂⁻ > O₂⁺
 (4) O₂⁻ > O₂ > O₂⁺

49. Reaction for which difference of ΔH and ΔU is maximum at 27°C is

- (1) N₂O₅(s) → 2NO₂(g) + $\frac{1}{2}$ O₂(g)
 (2) TiI₄(g) → Ti(s) + 2I₂(g)
 (3) N₂O₄(g) → 2NO₂(g)
 (4) N₂(g) + 3H₂(g) → 2NH₃(g)

50. Three moles of an ideal gas undergoes expansion isothermally and reversibly from 10 litre to 100 litre at 27°C. The work done by the gas is

- (1) Zero
 (2) 2.07 × 10³R
 (3) -2.07 × 10³R
 (4) -6.9 × 10²R

51. In closed system : P(s) ⇌ 2Q(g) + 3R(g)
if the partial pressure of R is tripled then partial pressure of Q will become

- (1) Half of its original pressure
 (2) Twice of the original pressure
 (3) $\frac{1}{3\sqrt{3}}$ times the original pressure
 (4) 2√2 times its original pressure

52. Match List I with List II and choose the correct option.

List I	List II
a. 2HI(g) ⇌ H ₂ (g) + I ₂ (g)	(i) $\frac{K_p}{K_c} = RT$
b. 4NH ₃ (g) + 5O ₂ (g) ⇌ 4NO(g) + 6H ₂ O(g)	(ii) $\frac{K_p}{K_c} = 1$
c. N ₂ (g) + 3H ₂ (g) ⇌ 2NH ₃ (g)	(iii) $\frac{K_p}{K_c} = (RT)^{-1}$
d. 2NO(g) + Cl ₂ (g) ⇌ 2NOCl(g)	(iv) $\frac{K_p}{K_c} = (RT)^{-2}$

The correct option is

- (1) a(iii), b(ii), c(i), d(iv)
 (2) a(ii), b(i), c(iv), d(iii)
 (3) a(ii), b(iv), c(i), d(iii)
 (4) a(iii), b(iv), c(ii), d(i)

53. Given

- (i) Cu⁺ + e⁻ → Cu, E° = 0.52 V
 (ii) Cu²⁺ + 2e⁻ → Cu, E° = 0.337 V
 Electrode potential E° for the reaction,
 Cu²⁺ + e⁻ → Cu⁺, will be
 (1) -0.17 V
 (2) 0.15 V
 (3) 0.3 V
 (4) 0.4 V

54. E_{cell} of the cell Mg|Mg²⁺(0.1 M) || Ag⁺(0.001 M) | Ag at 25°C is nearly • E°_{cell} = 3.17 v•

- (1) 1.5 V
 (2) 3 V
 (3) 3.5 V
 (4) 4 V

55. Mechanism of a hypothetical reaction 2A₃ → 3A₂ is given below

- (i) A₃ ⇌ A₂ + A (fast)
 (ii) A₃ + A → 2A₂ (slow)

The overall order of the reaction will be

- (1) 0
 (2) 3
 (3) 1
 (4) 2

56. Given below are the two statements.

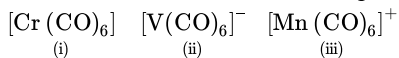
Statement-I: Complex $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ shows geometrical isomerism.

Statement-II: $\text{trans-}[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ is optically active species.

In light of the above statements, choose the correct answer.

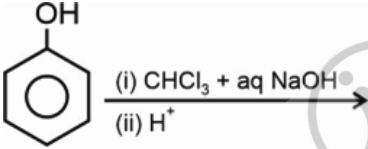
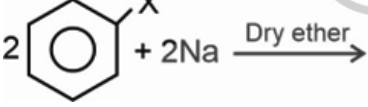
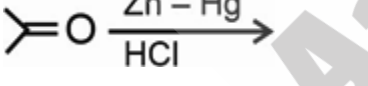
- (1) Statement-I is correct but statement-II is incorrect
- (2) Both statement-I and statement-II are correct
- (3) Both statement-I and statement-II are incorrect
- (4) Statement-I is incorrect but statement-II is correct

57. Correct order of C–O bond strength for the given species is



- (1) (ii) > (iii) > (i)
- (2) (ii) > (i) > (iii)
- (3) (i) > (ii) > (iii)
- (4) (iii) > (i) > (ii)

58. Match List I with List II and choose the correct option.

List I	List II
a. Fittig reaction	i. 
b. Reimer-Tiemann reaction	ii. 
c. Williamson synthesis	iii. 
d. Clemmensen reduction	iv. $\text{R-X} + \text{R-O}^- \text{Na}^+ \rightarrow$

- (1) a(i), b(ii), c(iii), d(iv)
- (2) a(iv), b(iii), c(ii), d(i)
- (3) a(ii), b(i), c(iv), d(iii)
- (4) a(iii), b(ii), c(i), d(iv)

59. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R** :

Assertion (A) : When alkyl halide is reacted with AgCN then alkyl isocyanide is formed.

Reason (R) : AgCN is a covalent compound and only the site of nitrogen is available for the reaction.

In the light of the above statements, choose the **correct** answer from the options given below :

Both assertion (A) and reason (R) are correct (1) statements, and reason is the correct explanation of the assertion

Both assertion (A) and reason (R) are correct (2) statements, but reason is not the correct explanation of the assertion.

Assertion (A) is correct, but reason (R) is incorrect statement.

Assertion (A) is incorrect, but reason (R) is correct statement.

60. Given below are two statements.

Statement I: Picric acid is weaker acid than phenol.

Statement II: Picric acid evolves CO_2 gas on reaction with NaHCO_3 while phenol does not.

In light of the above statements, choose the correct answer.

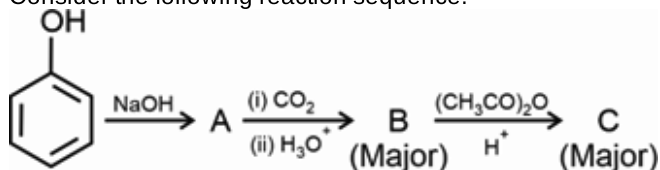
(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

61. Consider the following reaction sequence.



The product C is

- (1)
- (2)
- (3)
- (4)

62. Given below are the two statements

Statement I: Benzoic acid does not undergo Friedel - Crafts reaction.

Statement II: Benzoic acid on reaction with $\text{Br}_2/\text{FeBr}_3$ gives p-bromobenzoic acid as major product.

In light of the above statements, choose the correct answer.

- (1) Both statement I and statement II are correct
 (2) Both statement I and statement II are incorrect
 (3) Statement I is correct but statement II is incorrect
 (4) Statement I is incorrect but statement II is correct

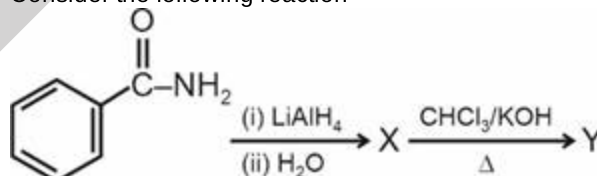
63. Compound which forms an orange red precipitate with 2, 4 – DNP reagent and gives yellow precipitate on heating with iodine in the presence of sodium hydroxide is

- (1)
- (2)
- (3) $\text{CH}_3 - \text{CH}_2 - \text{OH}$
- (4)

64. Which among the following molecules has highest dipole moment?

- (1) CH_3Cl
 (2) CH_3F
 (3) CH_3Br
 (4) CH_3I

65. Consider the following reaction



Identify Y in the reaction

- (1)
- (2)
- (3)
- (4)

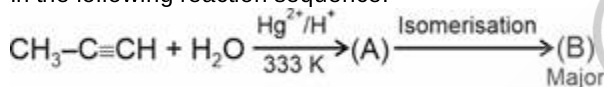
66. If mass percentage of carbon, oxygen and hydrogen in an organic compound are 26.67%, 71.11% and 2.22% respectively then empirical formula of the organic compound will be

- (1) CH_2O
- (2) CHO_2
- (3) C_2HO_2
- (4) CHO

67. The orbital diagram in which both the Pauli's exclusion principle and Hund's rule are violated is

- (1) $\begin{array}{c} 2s \quad 2p \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\uparrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$
- (2) $\begin{array}{c} 2s \quad 2p \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\uparrow} \quad \boxed{\uparrow} \quad \boxed{} \end{array}$
- (3) $\begin{array}{c} 2s \quad 2p \\ \boxed{\uparrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$
- (4) $\begin{array}{c} 2s \quad 2p \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow} \quad \boxed{\downarrow} \quad \boxed{\uparrow} \end{array}$

68. In the following reaction sequence.



Product 'B' is

- (1) Propan-2-ol
 - (2) Propan-1-ol
 - (3) Propanal
 - (4) Propanone
69. Consider the following statements
- (a) Methanal is liquid at room temperature.
 - (b) The boiling point of acetone is more than propanal.
 - (c) The boiling points of aldehydes and ketones are higher than hydrocarbons and ethers of comparable molecular masses.

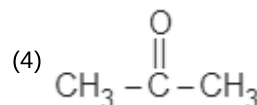
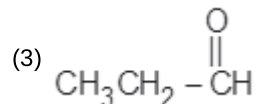
The correct statements are

- (1) (a) and (b) only
- (2) (b) and (c) only
- (3) (a) and (c) only
- (4) (a), (b) and (c)

- 70.

On reductive ozonolysis of $\text{CH}_3\text{CH}=\overset{\text{CH}_3}{\text{C}}-\text{CH}_2-\text{CH}_3$, one of product obtained is

- (1) $\text{CH}_3\text{CH}_2\text{OH}$
- (2) CH_3CHO



71. Match list-I with list-II

	List-I Atomic number		List-II IUPAC official name
(a)	101	(i)	Lawrencium
(b)	103	(ii)	Mendelevium
(c)	105	(iii)	Dubnium
(d)	107	(iv)	Bohrium

Choose the correct option.

- (1) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)
- (2) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)
- (3) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
- (4) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

72. In hydrogen atom, the de-Broglie's wavelength of an electron in 3rd Bohr orbit is: [Bohr radius, = 52.9 pm]

- (1) 317.4 pm
- (2) 31.7 pm
- (3) 317.4 π pm
- (4) 31.7 π pm

73. Given below are two statements

Statement I: The charge to mass ratio of canal rays depends on the gas from which they originate.

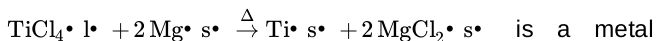
Statement II: Penetrating power follows the order $\gamma\text{rays} > \beta\text{rays} > \alpha\text{rays}$.

In the light of above statements, choose the correct option.

- (1) Both statement I and statement II are correct
- (2) Both statement I and statement II are incorrect
- (3) Statement I is correct but statement II is incorrect
- (4) Statement I is incorrect but statement II is correct

74. Given below are two statements

Statement I:



is a metal displacement reaction.

Statement II: $\text{Mg}(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{MgCl}_2(\text{aq}) + \text{H}_2(\text{g})$ is a non-metal displacement reaction.

In the light of above statements, choose the correct option.

- (1) Both statement I and statement II are correct
- (2) Both statement I and statement II are incorrect
- (3) Statement I is correct but statement II is incorrect
- (4) Statement I is incorrect but statement II is correct

75. Match compounds given in list-I with their respective colours given in list-II.

	List I		List II
(a)	PbS	(i)	Violet
(b)	$\text{Fe}_4[\text{Fe}(\text{CN})_6]_3 \cdot x\text{H}_2\text{O}$	(ii)	Black
(c)	$[\text{Fe}(\text{CN})_5\text{NOS}]^{4-}$	(iii)	Blood red
(d)	$[\text{Fe}(\text{SCN})]^{2+}$	(iv)	Prussian blue

Choose the correct option:

- (1) (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv)
- (2) (a)–(ii), (b)–(iv), (c)–(i), (d)–(iii)
- (3) (a)–(ii), (b)–(i), (c)–(iv), (d)–(iii)
- (4) (a)–(i), (b)–(iii), (c)–(iv), (d)–(ii)

76. During estimation of nitrogen present in an organic compound by Kjeldahl's method, the ammonia evolved from 0.56g of the compound, neutralized 20 mL of 0.6 M H_2SO_4 . Find out the percentage of nitrogen in the compound.

- (1) 50%
- (2) 60%
- (3) 45%
- (4) 32%

77. Identify the incorrect statement regarding the Kolbe's electrolysis of sodium ethanoate.

- (1) The reaction involves free radical intermediate
- (2) Both CO_2 and ethane are evolved at cathode
- (3) Along with CO_2 , H_2 gas is also evolved in the reaction mixture
- (4) The resultant reaction mixture is basic in nature

78. Given below are two statements

Statement I: The tanks used by scuba divers to avoid bends are filled with 11.7% helium, 56.2% nitrogen and 32.1% oxygen.

Statement II: 68% nitric acid and 32% water by mass, with a boiling point of 393.5 K is a maximum boiling azeotrope. In the light of above statements, choose the correct option.

- (1) Both statement I and statement II are correct
- (2) Both statement I and statement II are incorrect
- (3) Statement I is correct but statement II is incorrect
- (4) Statement I is incorrect but statement II is correct

79. 1.8 mL of acetic acid, having density 1.06 g mL^{-1} , is dissolved in 1 litre of water. The depression in freezing point observed for this strength of acid was 0.0615°C .

Calculate the van't Hoff factor of acid. (K_f for water = $1.86 \text{ K kg mol}^{-1}$)

- (1) 1.04
- (2) 2.08
- (3) 0.5
- (4) 3.2

80. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A): Many copper (I) compounds are unstable in aqueous solution and undergo disproportionation.

Reason (R): Stability of $\text{Cu}^{2+}(\text{aq})$ is more due to its more negative $\Delta_{\text{hyd}}H^\circ$ which more than compensates for the second ionisation enthalpy of Cu.

In the light of the above statements, choose the **correct** answer from the options given below:

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

81. The number of moles of potassium iodide oxidised by two moles of KMnO_4 in acidic and neutral medium respectively will be:

- (1) 10 and 5
- (2) 5 and 10
- (3) 10 and 2
- (4) 10 and 1

82. Match list-I with list-II

	List I Cations		List II Group reagent
(a)	As ³⁺	(i)	NH ₄ OH + (NH ₄) ₂ CO ₃
(b)	Fe ³⁺	(ii)	NH ₄ OH + H ₂ S
(c)	Sr ²⁺	(iii)	NH ₄ OH + NH ₄ Cl
(d)	Mn ²⁺	(iv)	H ₂ S + dil. HCl

Choose the correct option.

- (1) (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv)
 (2) (a)–(iv), (b)–(ii), (c)–(iii), (d)–(i)
 (3) (a)–(iv), (b)–(iii), (c)–(i), (d)–(ii)
 (4) (a)–(i), (b)–(iii), (c)–(iv), (d)–(ii)

83. Given below are two statements

Statement I: On passing ammonia gas through the Nessler's reagent, a brown precipitate of basic mercury (II) amido-iodine is formed.

Statement II: Both AgCl and AgI are soluble in ammonium hydroxide solution.

In the light of above statements, choose the correct option.

- (1) Both statement I and statement II are correct
 (2) Both statement I and statement II are incorrect
 (3) Statement I is correct but statement II is incorrect
 (4) Statement I is incorrect but statement II is correct

84. Identify the incorrect statement among the following

- (1) The pentaacetate of glucose does not react with hydroxylamine
 (2) Glucose does not form the hydrogensulphite addition product with NaHSO₃.
 (3) Glucose gets oxidised to gluconic acid on reaction with nitric acid.
 (4) Glucose is an aldohexose and also known as dextrose

85. Match List I with List II.

	List I Vitamins		List II Deficiency disease
(a)	Riboflavin	(i)	Convulsions
(b)	Pyridoxine	(ii)	Beri-Beri
(c)	Ascorbic acid	(iii)	Cheilosis
(d)	Thiamine	(iv)	Scurvy

Choose the correct option.

- (1) (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv)
 (2) (a)–(iv), (b)–(iii), (c)–(ii), (d)–(i)
 (3) (a)–(iii), (b)–(iv), (c)–(i), (d)–(ii)
 (4) (a)–(iii), (b)–(i), (c)–(iv), (d)–(ii)

86. The correct order of basic strength for the following alkyl substituted amines in aqueous solution is:

- (1) (CH₃)₂NH > (CH₃)₃N > CH₃NH₂ > NH₃
 (2) (CH₃)₂NH > CH₃NH₂ > (CH₃)₃N > NH₃
 (3) (CH₃)₃N > NH₃ > (CH₃)₂NH > CH₃NH₂
 (4) (CH₃)₃N > (CH₃)₂NH > CH₃NH₂ > NH₃

87. Which among the following oxoacids of halogen does not exist.

- (1) HOClO
 (2) HOF
 (3) HOBrO
 (4) HOIO₃

88. Given below are two statements

Statement I: XeOF₄ is a colourless volatile liquid and has a square pyramidal molecular structure.

Statement II: Partial hydrolysis of XeF₆ gives XeO₂F₂ and XeO₃ only

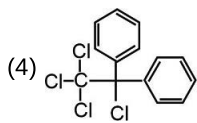
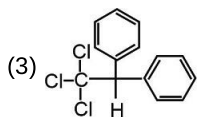
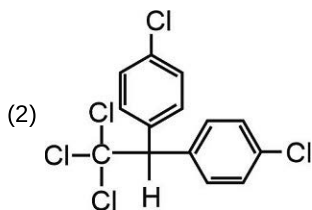
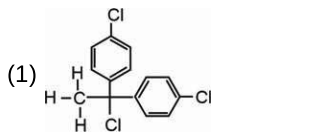
In the light of above statements, choose the correct option.

- (1) Both the statements I and II are correct
 (2) Both the statements I and II are incorrect
 (3) Statement I is incorrect but statement II is correct
 (4) Statement I is correct but statement II is incorrect

89. Choose the correct order of boiling point for group 15 hydrides.

- (1) $\text{SbH}_3 > \text{AsH}_3 > \text{PH}_3 > \text{NH}_3$
- (2) $\text{SbH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{NH}_3$
- (3) $\text{SbH}_3 > \text{NH}_3 > \text{AsH}_3 > \text{PH}_3$
- (4) $\text{SbH}_3 > \text{PH}_3 > \text{NH}_3 > \text{AsH}_3$

90. The correct structure of DDT is



BIOLOGY

91. Buttercup and coriander differ from each other in terms of development as in the former

- (1) The plant follow different pathway in response to phases of life to form different kinds of structures
- (2) The leaves of the juvenile plants are different in shape from those of mature plants.
- (3) The sequence of the development process ultimately lead to senescence and then death
- (4) There is difference in shape of leaves produced in air with those produced in water

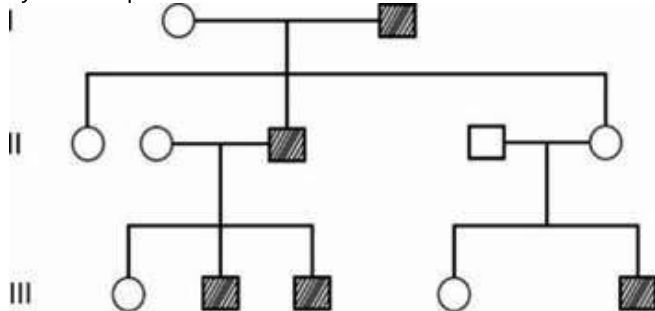
92. Multicarpellary, syncarpous gynoecium is found in

- (1) *Papaver*
- (2) *Michelia*
- (3) Gram
- (4) Pea

93. Select the **odd** one out w.r.t. albuminous seeds.

- (1) Maize
- (2) Wheat
- (3) Groundnut
- (4) Castor

94. Consider the following pedigree chart in which the shaded symbols represent the affected ones.



Which of the following **cannot** be concluded from the given pedigree?

- (1) The trait can be autosomal recessive
 - (2) The unaffected individuals can be heterozygous for the character
 - (3) The trait is Y-linked and thus expressed in males only
 - (4) The affected individuals are homozygous for the character
95. Match the following organisms and their types of sex determination :

Column-I

Column-II

- | | |
|-----------------|-------------------------|
| a. Human beings | (i) Female heterogamety |
| b. Birds | (ii) XY-type |
| c. Grasshopper | (iii) Haplo-diploidy |
| d. Honey bee | (iv) XO-type |

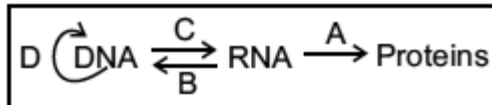
Select the **correct** option.

- (1) a(i), b(ii), c(iii), d(iv)
 - (2) a(ii), b(i), c(iv), d(iii)
 - (3) a(iv), b(iii), c(ii), d(i)
 - (4) a(iii), b(i), c(ii), d(iv)
96. How many amino acids will be coded by the given sequence of mRNA if its 15th base is substituted by A?
5' AUG GUG UAG CAG UAC GUA 3'
- (1) Four
 - (2) Two
 - (3) Six
 - (4) Five
97. Rho factor is a protein in bacteria which is responsible for
- (1) Initiation of DNA replication
 - (2) Termination of transcription
 - (3) DNA synthesis
 - (4) Protein synthesis

98. Choose the **incorrect** statement regarding HGP.

- (1) Human genome project was launched in 1990
- (2) This project was completed in 2003
- (3) The project was coordinated by the U.S. Department of Energy and the National Institute of Health
- (4) Entire sequence of chromosome-1 was completed in May 2001

99. Which of the following events [labelled as A, B, C and D] is performed by DNA dependent DNA polymerase?



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

100. Immunosuppressive agent "Cyclosporin A" is produced by

- (1) *Monascus purpureus*
- (2) *Lactobacillus*
- (3) *Trichoderma polysporum*
- (4) *Streptococcus*

101. *Paramecium caudatum* and *Paramecium aurelia* in same culture will show

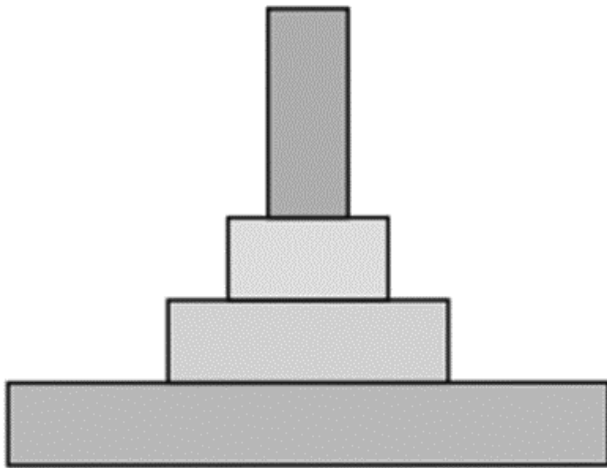
- (1) Competitive co-existence
- (2) Parasitism
- (3) Commensalism
- (4) Competitive exclusion

102. Darwinian fitness can directly be represented by which of the following factors of the Verhulst-Pearl logistic growth equation given below?

$$\frac{dN}{dt} = rN \left(\frac{K-N}{K} \right)$$

- (1) 'r'
- (2) 'N'
- (3) 'K'
- (4) 't'

103.



Which ones of the following do **not** hold true for the given ecological pyramid?

- Represents the flow of energy in a pond ecosystem.
- Represents the amount of biomass at each trophic level in a lake ecosystem when producers are phytoplanktons.
- Represents the number of individuals in a grassland ecosystem.
- Cannot represent number of individuals in a tree ecosystem.
- Cannot represent the flow of energy in a parasitic food chain.

- Statement b and d
- Statement c, d and e
- Statement a, b and d
- Statement b and e

104. Species area relationship pioneered by Alexander von Humboldt explains that within a region

- Larger species occupy larger habitat
- Majority of species are endemic
- Species richness increased with increasing explored area but only upto a limit
- Extinction rate of species increases with increased area

105. Read the following statements of Assertion and Reason.

Assertion : Test cross is the tool for confirming the presence of recessive allele in hybrid.

Reason : In a typical test cross an organism showing a dominant phenotype is self-crossed.

In the light of above statements choose the correct answer from the options given below.

- Both Assertion and Reason are true statements and the reason is correct explanation of the assertion
- Both Assertion and Reason are true statements but the reason is not a correct explanation of the assertion
- Assertion is true statement but Reason is false
- Both Assertion and Reason are false statements

106. How many 'N' atoms are present in the structure of uracil and adenine respectively?

- 4, 4
- 2, 5
- 5, 4
- 3, 4

107. Enzyme trypsin can be differentiated from an inorganic catalyst as

- Former can retain catalytic power even at high temperatures (upto 90°C)
- Latter gets damaged at high pressure
- Latter is more specific and efficient than the former
- Former gets damaged at temperature above the optimum value due to disruption of active sites

108. Respiration is helpful in all, **except**

- Removing wastes from the body
- Producing energy within the body
- Maintaining oxygen supply to body cells
- Increase in blood glucose levels

109. Arrange the following in increasing order w.r.t. their values in an adult healthy man.

- Tidal volume
- Residual volume
- Inspiratory reserve volume
- Vital capacity

Choose the option with correct order.

- $A < C < B < D$
- $A < D < B < C$
- $A < D < C < B$
- $A < B < C < D$

110. Choose the correct statement.

- All connective tissues are composed of semi-fluid matrix, cells and fibres.
- Both areolar and adipose tissues contain adipocytes.
- All involuntary muscle fibres are unbranched and possess central nuclei.
- Both tendons and ligaments are inelastic in nature.

111. How many double circulations are completed in a healthy human in one minute under resting conditions?

- 36
- 72
- 144
- 18

112. Choose the incorrect statement w.r.t. humans.

- (1) Conditional reabsorption of Na^+ and water takes place in DCT.
- (2) Reabsorption is minimum in the limb of loop of Henle which is impermeable to water.
- (3) Selective secretion of hydrogen and bicarbonate ions takes place only in PCT and loop of Henle.
- (4) Large amounts of water could be reabsorbed from collecting duct to produce a concentrated urine.

113. Match the Column I with Column II w.r.t. humans and choose the correct option.

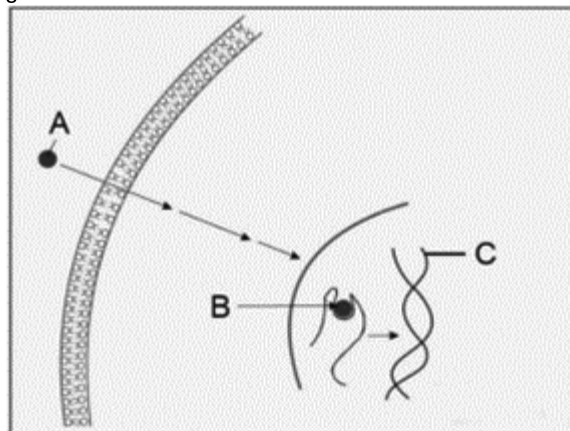
	Column I		Column II
A.	Ball and socket joint	i.	Between carpals
B.	Hinge joint	ii.	Between carpal and metacarpal of thumb
C.	Saddle joint	iii.	Shoulder joint
D.	Gliding joint	iv.	Knee joint

- (1) A-ii, B-i, C-iv, D-iii
- (2) A-iii, B-iv, C-ii, D-i
- (3) A-iv, B-iii, C-i, D-ii
- (4) A-iii, B-iv, C-i, D-ii

114. Choose the correct statement.

- (1) At electrical synapses, the membrane of pre and post-synaptic neurons are not in very close proximity.
At a chemical synapse, the membranes of the pre and post-synaptic neurons are separated by a fluid-filled space called synaptic cleft.
- (2) post-synaptic neurons are separated by a fluid-filled space called synaptic cleft.
- (3) The dendritic terminal of a neuron contains vesicles filled with neurotransmitters.
- (4) The specific receptors for neurotransmitters are present on pre-synaptic membrane.

115. Identify (A), (B) and (C) mentioned in the diagrammatic representation of the mechanism of a hormonal action given below.



Choose the option with correct identifications.

- (1) A = Protein hormone, B = Uterine cell membrane, C = mRNA
- (2) A = Protein hormone, B = Hormone-receptor complex, C = Hormone
- (3) A = Steroid hormone, B = Hormone-receptor complex, C = Genome
- (4) A = Steroid hormone, B = Cyclic AMP, C = Proteins

116. State the following statements as true (T) or false (F) and select the correct option.

- A. Genetic diversity enables a population to adapt to its environment.
- B. Among the animals, insects are the most species rich taxonomic group.
- C. Tropical amazonian rain forest has the greatest biodiversity on earth.

	A	B	C
(1)	F	T	F
(2)	T	F	T
(3)	T	T	T
(4)	F	F	F

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)

117. Select the mismatched pair

- (1) Man – Hominidae
- (2) Housefly – Diptera
- (3) Mango – Anacardiaceae
- (4) Wheat – Sapindales

118. All single-celled eukaryotes

- (1) Are the chief 'producers' in the oceans
- (2) Forms fruiting bodies bearing spores at their tips
- (3) Are placed under kingdom Protista according to Whittaker's classification
- (4) Behave like heterotrophs by preying on other smaller organisms

119. The causative agents of mumps are usually characterised by

- (1) The presence of nucleic acid protected by protein coat
- (2) Lack of proteins
- (3) Presence of a well defined nucleus
- (4) Having a cell wall composed of chitin

120. *Gracilaria* stores food in the form of

- (1) Floridean starch
- (2) Mannitol
- (3) Laminarin
- (4) Cellulose

121. Read the given statements:

- (A) In monocotyledons, the leaf base expands into a sheath covering the stem partially or wholly.
 (B) In banyan tree and wheat plant, the roots originate from the base of stem and constitute fibrous root system.
 (C) Mango fruits develop from monocarpellary superior ovaries and have stony hard endocarp.
 (D) Flowers of *Canna* cannot be divided into two similar halves by any vertical plane passing through centre.


The correct ones are

- (1) All (A), (B), (C) and (D)
- (2) (A), (C) and (D) only
- (3) (C) and (D) only
- (4) (A) and (B) only

122. Find the **incorrectly** matched pair w.r.t. symbols used in floral formula.

- (1) C_n : Gamopetalous corolla
- (2) G_n : Apocarpous ovary

(3)  : Epitpalous stamens

(4)  : Epiphylous stamens

123. Bicarpellary, syncarpous, superior ovary with swollen placenta are characteristic features of

- (1) *Aloe*
- (2) *Ashwagandha*
- (3) *Trifolium*
- (4) Soyabean

124. Dicot root differs from monocot root, as in the former

- (1) Pith is large and well developed
- (2) Secondary growth does not occur
- (3) Usually less than six xylem bundles are present
- (4) The cortex consists of several layers of thin walled parenchyma cells with intercellular spaces

125. In leaves the ground tissues consist of

- (1) Cortex
- (2) Mesophyll cells
- (3) Pith
- (4) Medullary rays

126. Match column-I with column-II and select the correct option.

Column-I		Column-II	
I.	Robert Brown	A.	He discovered the granular structure which is a ribonucleoprotein
II.	George Palade	B.	He discovered a densely stained reticular structure near the nucleus, which consist of disc-shaped sacs
III.	Camillo Golgi	C.	He firstly identified the organelle that has site for active rRNA synthesis
IV.	Singer and Nicolson	D.	Proposed that the quasi-fluid nature of lipid enables lateral movement of proteins within the overall bilayer

- (1) I-A, II-D, III-C, IV-B
- (2) I-B, II-A, III-D, IV-C
- (3) I-C, II-A, III-B, IV-D
- (4) I-C, II-B, III-A, IV-D

127. The primary constriction of chromosome

- (1) Lacks any protein
- (2) Has disc shaped structures known as centrosome on their sides
- (3) Holds the two chromatids of chromosome
- (4) Is always found at the end of the chromosome

128. Which of the following organelles/structures divides the intracellular space into luminal and extra luminal distinct compartments?

- (1) Endoplasmic reticulum
- (2) Centrosome
- (3) Ribosome
- (4) Centriole

- 129.**The exchange of genetic material between two homologous chromosomes in meiosis
- (1) Is mediated by synaptonemal complex
 - (2) Is completed by the end of pachytene
 - (3) Occurs after the terminalisation of chiasmata
 - (4) Begins during leptotene
- 130.**All of the following are the phases of resting phase of cell cycle, **except**
- (1) G₁ phase
 - (2) G₂ phase
 - (3) S phase
 - (4) M phase
- 131.**How many of the features listed below are correct for adult *Ophiura* and *Balanoglossus* respectively?
- (i) Bilaterally symmetrical, triploblastic and coelomate.
 - (ii) Water vascular system is present.
 - (iii) Digestive tract is complete.
 - (iv) Body is divided into anterior proboscis, a collar and a long trunk.
- Select the correct option.
- (1) Two, two
 - (2) Two, three
 - (3) One, four
 - (4) Four, one
- 132.**Read the following characteristics :
- a. Endoskeleton is fully ossified
 - b. Scales on hind limbs
 - c. Air sacs connected to lungs
- Select the class whose members generally exhibit the above mentioned features.
- (1) Aves
 - (2) Reptilia
 - (3) Amphibia
 - (4) Mammalia
- 133.**Which of the following set of characteristics are present in all chordates in embryonic or other stages of life?
- (1) Mammary glands, hair and gill slits
 - (2) Notochord, gill slits and dorsal tubular nerve cord
 - (3) Notochord, scales and dorsal tubular nerve cord
 - (4) Gill slits, vertebral column and notochord
- 134.**Read the following statements and state them as **true** (T) or **false** (F).
- A. Cyclostomes are devoid of scales and paired fins.
 - B. Members of superclass Pisces possess streamlined body.
 - C. In the members of class Osteichthyes, the males bear claspers.
- Choose the **correct** option.
- (1) A-(T), B-(T), C-(F)
 - (2) A-(T), B-(T), C-(T)
 - (3) A-(F), B-(T), C-(T)
 - (4) A-(F), B-(F), C-(T)
- 135.**RNAi, which is employed in making tobacco plant resistant to nematode is involved in preventing the process of
- (1) Transcription
 - (2) Translation of the mRNA
 - (3) Replication of the DNA
 - (4) Extension of the DNA
- 136.**During bacterial transformation, insulin producing gene was ligated to a plasmid vector. After successful transformation, an exonuclease was accidentally added to the bacterial culture. What will be the possible outcome of the above stated experiment?
- (1) Ligated alien DNA will not produce mRNA for translation.
 - (2) rDNA will be cleaved off.
 - (3) Insulin will not be synthesised at all.
 - (4) Insulin will be produced by the recombinants.
- 137.**Transgenic models exist for how many diseases given in the box below?
- Alzheimer's disease, Cystic fibrosis, Rheumatoid arthritis, Cancer
- Choose the **correct** option.
- (1) One
 - (2) Two
 - (3) Three
 - (4) Four
- 138.**A gene of interest is inserted at *lac-Z* gene of a plasmid and after transformation allowed to grow in the culture medium in presence of a chromogenic substrate. The colonies of non-recombinant bacteria appear blue in contrast to white colonies of recombinant bacteria because
- (1) Non-recombinant bacteria do not show insertional inactivation of β -galactosidase encoding gene
 - (2) Recombinant bacteria show insertional activation of β -galactosidase
 - (3) Recombinant bacteria show insertional activation of α -galactosidase
 - (4) There is insertional activation of α -galactosidase in non-recombinant bacteria

139. Secretions of seminal vesicle, prostate gland and a paired accessory gland 'X' in human males constitute the seminal plasma which is rich in fructose, calcium and certain enzymes. Which of the following is true w.r.t. 'X'?

- (1) 'X' receives duct from seminal vesicle and opens into urethra as ejaculatory duct
- (2) LH acts on 'X' and stimulates the synthesis and secretion of androgens
- (3) Secretions of 'X' help in lubrication of the penis
- (4) FSH acts on 'X' and stimulates the secretion of some factors which help in spermiogenesis.

140. Consider the following statements w.r.t. evolution and select the **correct** option.

Statement (A): Genetic variability is the raw material for operation of natural selection.

Statement (B): Adaptive ability is inherited and has a genetic basis.

- (1) Only statement (A) is correct
- (2) Only statement (B) is correct
- (3) Both statements (A) and (B) are correct
- (4) Both statements (A) and (B) are incorrect

141. Which part of nephron reabsorbs maximum water even in the presence of anti-diuretic hormone?

- (1) Distal convoluted tubule
- (2) Proximal convoluted tubule
- (3) Henle's loop
- (4) Bowman's capsule

142. Which of the following is a common terminal passage for both reproductive and urinary system in human male?

- (1) Urethra
- (2) Epididymis
- (3) Ureter
- (4) Vas deferens

143. A primary metabolite 'X' is a monomer of 'Y' which is a storage polysaccharide in animals. Identify and choose the correct option w.r.t 'X' and 'Y' respectively.

- (1) Glucose, Starch
- (2) Fructose, Cellulose
- (3) Glucose, Glycogen
- (4) Glucose, Cellulose

144. The type of tissue which faces either the body fluid or the outside environment and thus provides lining or covering for the hollow visceral organs is

- (1) Epithelial tissue
- (2) Connective tissue
- (3) Muscular tissue
- (4) Nervous tissue

145. Match column I with column II.

Column I		Column II	
(a)	Morphine	(i)	Hallucinations
(b)	Marijuana	(ii)	In treatment of insomnia
(c)	Barbiturates	(iii)	Stimulant
(d)	Cocaine	(iv)	Strong analgesic

Choose the correct option

- (1) a(i), b(ii), c(iii), d(iv)
- (2) a(ii), b(iii), c(iv), d(i)
- (3) a(iv), b(i), c(ii), d(iii)
- (4) a(iv), b(i), c(iii), d(ii)

146. Choose the option that is not true w.r.t "Saheli".

- (1) It is once a week pill
- (2) Prevents implantation
- (3) Inhibits ovulation
- (4) Developed by CDRI, Lucknow

147. Select the **incorrect** option w.r.t. *Dryopithecus*.

- (1) They were more ape-like
- (2) They were hairy
- (3) Walked up right
- (4) Existed 15 mya

148. The enzymes associated with digestion of zona pellucida layer of oocyte, is present in which part of the human sperm?

- (1) Tail
- (2) Middle piece
- (3) Axial filament
- (4) Acrosome

149. **Assertion (A):** IUT can be a possible mode of conceiving in adult females who have bilateral blockage of fallopian tubes with normal uterine conditions.

Reason (R): In IUT, zygote or early embryo (upto 8 blastomeres) could be transferred into the fallopian tubes. In the light of above statements choose the correct option.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) Both (A) and (R) are false
- (4) (A) is true but (R) is false

150. Choose the incorrect statement w.r.t cockroach.

- (1) The next to last nymphal stage has wing pads but only adult cockroaches have wings.
- (2) The female cockroach has two large ovaries, lying ventrally in the 2nd – 8th abdominal segments.
- (3) 12 pairs of alary muscles are present.
- (4) Heart of cockroach lies along the mid dorsal line of thorax and abdomen.

151. The ventricle of frog opens into ____ on the ____ side of heart.

Select the correct option to fill the blanks respectively

- (1) Sinus venosus, dorsal
- (2) Conus arteriosus, ventral
- (3) Conus arteriosus, dorsal
- (4) Sinus venosus, ventral

152. How many of the diseases given in the box below is/are vector-borne diseases?

Malaria, Filariasis, Typhoid, Ringworms, Pneumonia, Dengue

Choose the correct option

- (1) One
- (2) Two
- (3) Three
- (4) Four

153. Ramachandran plot is used to explain the structure of

- (1) Cellulose
- (2) Collagen
- (3) Steroid
- (4) Nucleic acid

154. Isolation of genetic material from fungal cells involves the use of all the following, **except**

- (1) Chitinase
- (2) Lysozyme
- (3) Ribonuclease
- (4) Protease

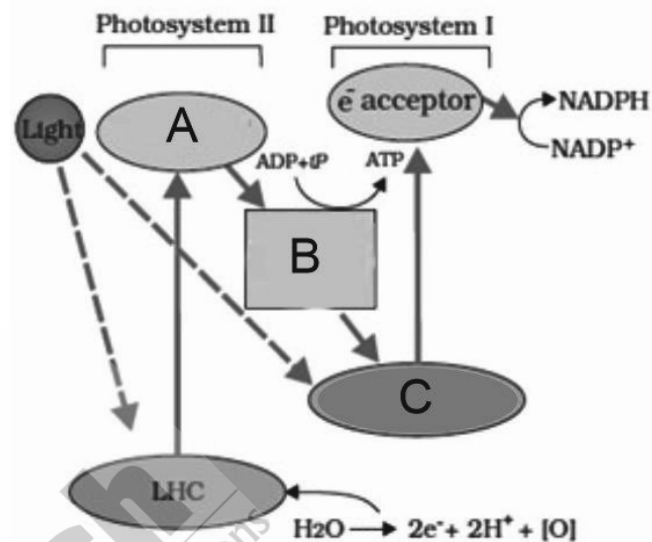
155. Select the **incorrect** statement w.r.t. restriction endonucleases.

- (1) They function by inspecting the length of a DNA sequence
- (2) They bind to the DNA and cut each of the two strands of double helix
If a restriction enzyme cuts the DNA a little away from the centre of recognition site, blunt ends will be produced
- (3) If a restriction enzyme cuts the DNA a little away from the centre of recognition site, blunt ends will be produced
- (4) They cut at specific points in the sugar-phosphate backbones

156. The untangling of chromatin material occurs during the phase of cell division called

- (1) Metaphase
- (2) Telophase
- (3) Prophase
- (4) Anaphase

157. Observe the following diagram



Based on the above diagram, select the **correct** option.

- (1) 'A' transfers its electron to an H carrier
- (2) The enzyme that facilitates the reduction of NADP^+ is located on the lumen side of thylakoid membrane
- (3) The molecule that transfers electrons from B to C lies in the stroma of the chloroplast
- (4) The protons produced by the water splitting accumulate in stroma outside the thylakoids

158. Chlorophyll *a* and *b* are similar as both of them

- (1) Show same colour in chromatogram after separation
- (2) Show maximum absorption of light in blue and red regions of the visible spectrum
- (3) Can be found in the reaction centre of photosystems
- (4) Have similar structure and function as shield pigment

159. During, conversion of phosphoenolpyruvate to pyruvate in glycolysis

- (1) There is yield of a molecule of GDP
- (2) Substrate level phosphorylation occurs
- (3) There is the removal of two redox-equivalents that are transferred to a molecule of NAD^+
- (4) Endothermic reaction occurs

160. Combination of which of the given plant hormones can be used to increase yield of pineapple plants?

- (1) Auxin, Cytokinin
- (2) Ethylene, Gibberellins
- (3) Auxin, Ethylene
- (4) Cytokinin, Ethylene

161. All of the following features of flowers are in favour of hydrophily, **except**

- (1) Light, unwettable pollen grain
- (2) Long, sticky unwettable stigma
- (3) Pollen grain surrounded by mucilaginous covering
- (4) Nectaries present.

162. The organism that was used by Taylor and colleagues in 1958 to prove that DNA in chromosomes also replicate semi-conservatively, is

- (1) *E. coli*
- (2) *Streptococcus pneumoniae*
- (3) *Vicia faba*
- (4) QB bacteriophage

163. Match List I with List II.

List I

List II

- | | |
|---------------------------------------|-----------------------------------|
| (a) Atmospheric N ₂ -fixer | (i) <i>Glomus</i> |
| (b) Mycorrhiza | (ii) <i>Azospirillum</i> |
| (c) Baculoviruses | (iii) <i>Nucleopolyhedrovirus</i> |
| (d) Free-living fungus | (iv) <i>Trichoderma</i> |

Choose the **correct** option.

- (1) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)
- (2) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
- (3) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
- (4) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

164. Amount of biomass or organic matter produced per unit area over a time period by plant during photosynthesis is called

- (1) Primary production
- (2) Net primary productivity
- (3) Gross primary productivity
- (4) Secondary productivity

165. Which of the following is not a component of complex IV of ETS of mitochondria?

- (1) Cytochrome *a*
- (2) Cytochrome *a*₃
- (3) Cytochrome *b*
- (4) Copper centres

166. Which of the following organisms lack flagella?

- (1) *Euglena*
- (2) *Paramoecium*
- (3) *Trypanosoma*
- (4) *Gonyaulax*

167. *Selaginella* differs from *Equisetum*, as the former

- (1) Belongs to class Lycopsidea
- (2) Form distinct compact structures called cones
- (3) Possess only macrophylls
- (4) Shows the presence of prothallus in its life cycle

168. Select the **mismatched** pair

- (1) Axile placentation – Tomato
- (2) Parietal placentation – *Argemone*
- (3) Free central placentation – Marigold
- (4) Basal placentation – Sunflower

169. Observe the following features of the tissues found in dicot stem

- a. This tissue is present in the form of semi-lunar patches of sclerenchyma.
 - b. Cells of this layer are rich in starch grains and the layer is referred to as starch sheath.
 - c. This layer is covered with cuticle and bear a few stomata.
 - d. This part consists of a few layers of collenchymatous cells.
 - e. This tissue is found in endarch condition.
- Choose the option that **correctly** depicts the position of these tissue outside to inside.

- (1) c → d → a → e → b
- (2) c → d → b → a → e
- (3) c → b → d → a → e
- (4) a → c → b → d → e

170. The plastid that is specialised to store protein is

- (1) Elaioplasts
- (2) Aleuroplasts
- (3) Amyloplasts
- (4) Chromoplasts

171. Oral administration of insulin is not recommended to diabetic patients because

- (1) It is genetically engineered and may cause allergic reaction
- (2) It is proteinaceous in nature and gets digested in the GIT before reaching the bloodstream
- (3) Its rate of action is very fast
- (4) It is found in the form of proinsulin

172. Bryophytes originated from _____ while the ancestors of psilophyton were _____.

Choose the correct option to fill in the blanks respectively.

- (1) Tracheophyte ancestors, Zosterophyllums
- (2) Chlorophyte ancestors, Rhynia-type plants
- (3) Tracheophyte ancestors, Lycopods
- (4) Psilophytons, Chlorophyte ancestors

173. **Assertion (A)** : IUDs are one of the most widely accepted method of contraception in India.

Reason (R) : IUDs are highly effective but their reversibility rate is very poor.

- (1) Both Assertion & Reason are true and reason is the correct explanation of the assertion
- (2) Both Assertion & Reason are true but reason is not the correct explanation of the assertion
- (3) Assertion is true statement but Reason is false
- (4) Both Assertion and Reason are false statements

174. Some animals are mentioned here with their respective characters and classes

	Genus name	Characters	Class
1.	<i>Scoliodon</i>	Persistent notochord throughout its life, cartilaginous endoskeleton	Chondrichthyes
2.	<i>Exocoetus</i>	Four pairs of gills, operculum present	Osteichthyes
3.	<i>Rana</i>	Eyes have eyelids, tympanum represents the ear	Amphibia
4.	<i>Testudo</i>	Oviparous and indirect development	Reptilia

Select the option with incorrect match.

- (1) 1
- (2) 2
- (3) 3
- (4) 4

175. Read the following statements

Statement (A): A thick fibrous wall called the inter-atrial septum separates the right and the left atria.

Statement (B) : The atrium and the ventricle of the same side are separated by a thin muscular tissue called the atrio-ventricular septum.

Choose the correct option.

- (1) Both statement (A) and statement (B) are correct
- (2) Both statement (A) and statement (B) are incorrect
- (3) Only statement (A) is correct
- (4) Only statement (B) is correct

176. In an adult human, the total number of facial bones is equal to the total number of

- (1) Carpals of right forelimb
- (2) Ear ossicles and girdle bones
- (3) Palm bones
- (4) Cranial bones and ear ossicles

177. Read the following statements w.r.t. neural system of humans:

(a) The neural system coordinates and integrates functions of organs.

(b) Limbic system is concerned with olfaction, autonomic responses, expression of emotional reactions and motivation.

(c) The midbrain receives and integrates visual, tactile and auditory inputs.

(d) The cerebellum integrates information received from auditory system

Choose the option with all the correct statements.

- (1) a, b and c only
- (2) b, c and d only
- (3) a, c and d only
- (4) a, b, c and d

178. Consider the symptoms mentioned below.

(a) Enlargement of thyroid gland

(b) Decreased metabolic rate

(c) Weight loss

(d) Mental retardation

How many of them is/are true w.r.t. the disease caused due to hyperthyroidism in adults?

- (1) One
- (2) Four
- (3) Three
- (4) Two

179. A principal mineralocorticoid acts mainly at the renal tubules and cause excretion of _____ and _____.

Choose the option to fill the blanks, respectively.

- (1) Na^+ , phosphate
- (2) K^+ , phosphate
- (3) Ca^{2+} , H_2O
- (4) Na^+ , H_2O

180. In an adult human, under normal physiological conditions, what is the partial pressure of oxygen (in mm Hg) in venous blood if haemoglobin is fifty percent saturated with O_2 ?

- (1) Less than 30 mmHg
- (2) More than 40 mmHg
- (3) 45 mmHg
- (4) 50 mmHg

