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QUESTION PAPER

with

ANSWER KEY



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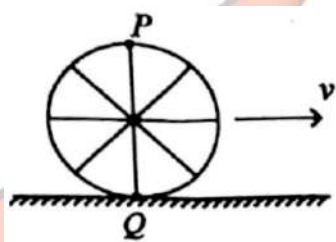


PHYSICS

SECTION-A

(All questions are compulsory)

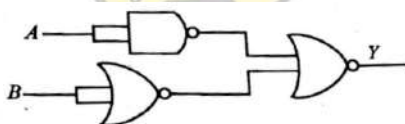
01. A wheel of a bullock cart is rolling on a level road as shown in the figure below. If its linear speed is v in the direction shown, which one of the following options is correct (P and Q are any highest and lowest points on the wheel, respectively) ?



- (1) Point P has zero speed.
(2) Point P moves slower than point Q.
(3) Point P moves faster than point Q.
(4) Both the points P and Q move with equal speed.

Ans. (3)

02. The output (Y) of the given logic gate is similar to the output of an/a :

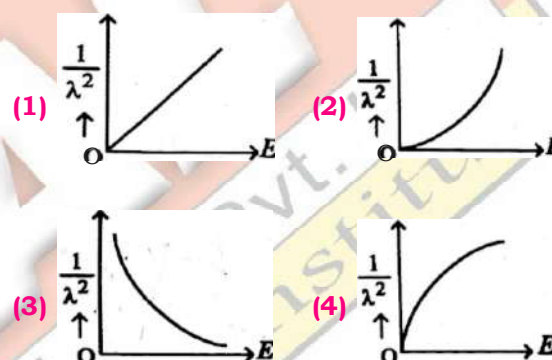


- (1) AND gate (2) NAND gate
(3) NOR gate (4) OR gate

Ans. (1)

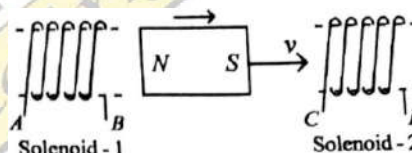
03. The graph which shows the variation of $\left(\frac{1}{\lambda^2}\right)$ and its kinetic energy, E is (where λ is de

Broglie wavelength of a free particle) :



Ans. (1)

04.

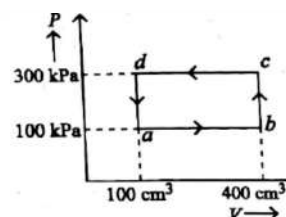


In the above diagram, a strong bar magnet is moving towards solenoid-2 from solenoid-1. The direction of induced current in solenoid-1 and that in solenoid-2, respectively, are through the directions :

- (1) BA and DC (2) AB and DC
(3) BA and CD (4) AB and CD

Ans. (2)

05. A thermodynamic system is taken through the cycle abcd. The work done by the gas along the path bc is :



- (1) -60 J (2) zero (3) 30 J (4) -90 J

Ans. (2)

06. Two bodies A and B of same mass undergo completely inelastic one dimensional collision. The body A moves with velocity v_1 while body B is at rest before collision. The velocity of the system after collision is v_2 . The ratio $v_1 : v_2$ is:
(1) 1 : 4 (2) 1 : 2 (3) 2 : 1 (4) 4 : 1

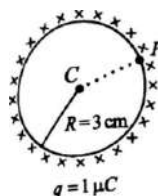
Ans. (3)

07. At any instant of time t , the displacement of any particle is given by $2t - 1$ (SI unit) under the influence of force of 5N. The value of instantaneous power is (in SI unit) :
(1) 6 (2) 10 (3) 5 (4) 7

Ans. (2)

08. A thin spherical shell is charged by some source. The potential difference between the two points C and P (in V) shown in the figure is:

(Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9$ SI units)



- (1) zero (2) 3×10^5
(3) 1×10^5 (4) 0.5×10^5

Ans. (1)

09. A tightly wound 100 turns coil of radius 10 cm carries a current of 7 A. The magnitude of the magnetic field at the centre of the coil is (Take permeability of free space as $4\pi \times 10^{-7}$ SI units):
(1) 44 T (2) 44 mT (3) 4.4 T (4) 4.4 mT

Ans. (4)

10. If the monochromatic source in Young's double slit experiment is replaced by white light, then:
(1) all bright fringes will be of equal width.
(2) interference pattern will disappear.
(3) there will be a central dark fringe surrounded by a few coloured fringes.
(4) there will be a central bright white fringe surrounded by a few coloured fringes.

Ans. (4)

11. The quantities which have the same dimensions as those of solid angle are :
(1) angular speed and stress
(2) strain and angle
(3) stress and angle
(4) strain and arc

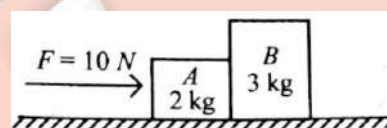
Ans. (2)

12. The mass of a planet is $\frac{1}{10}$ that of the earth and its diameter is half that of the earth. The acceleration due to gravity on the planet is :

- (1) 3.92 ms^{-2} (2) 19.6 ms^{-2}
(3) 9.8 ms^{-2} (4) 4.9 ms^{-2}

Ans. (1)

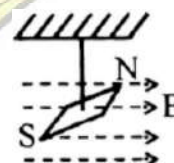
13. A horizontal force 10 N is applied to a block A as shown in figure. The mass of blocks A and B are 2 kg and 3 kg, respectively. The blocks slide over a frictionless surface. The force exerted by block A on block B is :



- (1) 10 N (2) zero
(3) 4 N (4) 6 N

Ans. (4)

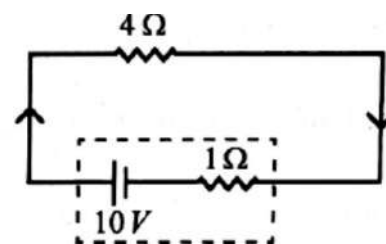
14. In a uniform magnetic field of 0.049 T, a magnetic needle performs 20 complete oscillations in 5 seconds as shown. The moment of inertia of the needle is $9.8 \times 10^{-6} \text{ kg m}^2$. If the magnitude of magnetic moment of the needle is $x \times 10^{-5} \text{ Am}^2$; then the value of 'x' is :



- (1) $1280 \pi^2$ (2) $5 \pi^2$
(3) $128 \pi^2$ (4) $50 \pi^2$

Ans. (1)

15. The terminal voltage of the battery, whose emf is 10 V and internal resistance 1Ω , when connected through an external resistance of 4Ω as shown in the figure is :



- (1) 10 V (2) 4 V
(3) 6 V (4) 8 V

Ans. (4)

16. If $x = 5 \sin\left(\pi t + \frac{\pi}{3}\right)$ m represents the motion of a particle executing simple harmonic motion, the amplitude and time period of motion, respectively, are :

- (1) 5 m, 1 s (2) 5 cm, 2 s
(3) 5 m, 2 s (4) 5 cm, 1 s

Ans. (3)

17. Match List-I with List-II.

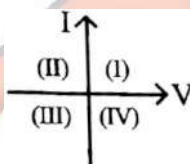
List-I (Material)	List-II (Susceptibility (χ))
A. Diamagnetic	I. $\chi = 0$
B. Ferromagnetic	II. $0 > \chi \geq -1$
C. Paramagnetic	III. $\chi \gg 1$
D. Non-magnetic	IV. $0 < \chi < \epsilon$ (a small positive number)

Choose the correct answer from the options given below :

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

Ans. (2)

18. Consider the following statements A and B and identify the correct answer :



- A. For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.
B. In a reverse biased pn junction diode, the current measured in (μ A), is due to majority charge carriers.

- (1) Both A and B are incorrect.
(2) A is correct but B is incorrect.
(3) A is incorrect but B is correct.
(4) Both A and B are correct.

Ans. (2)

19. Given below are two statements :

Statement I : Atoms are electrically neutral as they contain equal number of positive and negative charges.

Statement II : Atoms of each element are stable and emit their characteristic spectrum.

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

- (1) Statement I is incorrect but Statement II is correct.

- (2) Both Statement I and Statement II are correct.

- (3) Both Statement I and Statement II are incorrect.

- (4) Statement I is correct but Statement II is incorrect.

Ans. (4)

20. In a vernier calipers, $(N + 1)$ divisions of vernier scale coincide with N divisions of main scale. If 1 MSD represents 0.1 mm, the vernier constant (in cm) is :

- (1) $10(N + 1)$ (2) $\frac{1}{10N}$
(3) $\frac{1}{100(N + 1)}$ (4) 100 N

Ans. (3)

21. In an ideal transformer, the turns ratio is $\frac{N_p}{N_s} = \frac{1}{2}$. The ratio $V_s : V_p$ is equal to (the symbols carry their usual meaning) :

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

Ans. (3)

22. An unpolarised light beam strikes a glass surface at Brewster's angle. Then :

- (1) the reflected light will be completely polarised but the refracted light will be partially polarised.
(2) the reflected light will be partially polarised.
(3) the refracted light will be completely polarised.
(4) both the reflected and refracted light will be completely polarised.

Ans. (1)

23. Match List I with List II.

List I (Spectral Lines of Hydrogen for transitions from)	List II (Wavelengths (nm))
---	-------------------------------

- | | |
|---------------------------|------------|
| A. $n_2 = 3$ to $n_1 = 2$ | I. 410.2 |
| B. $n_2 = 4$ to $n_1 = 2$ | II. 434.1 |
| C. $n_2 = 5$ to $n_1 = 2$ | III. 656.3 |
| D. $n_2 = 6$ to $n_1 = 2$ | IV. 486.1 |

Choose the correct answer from the options given below :

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

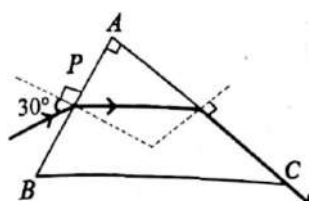
Ans. (3)

24. A wire of length ' l ' and resistance $100\ \Omega$ is divided into 10 equal parts. The first 5 parts are connected in series while the next 5 parts are connected in parallel. The two combinations are again connected in series. The resistance of this final combination is :

(1) $60\ \Omega$ (2) $26\ \Omega$ (3) $52\ \Omega$ (4) $55\ \Omega$

Ans. (3)

25. A light ray enters through a right angled prism at point P with the angle of incidence 30° as shown in figure. It travels through the prism parallel to its base BC and emerges along the face AC. The refractive index of the prism is :

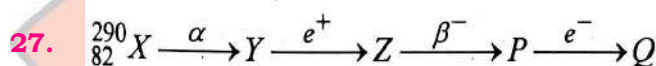


(1) $\frac{\sqrt{3}}{2}$ (2) $\frac{\sqrt{5}}{4}$ (3) $\frac{\sqrt{5}}{2}$ (4) $\frac{\sqrt{3}}{4}$

Ans. (3)

26. A particle moving with uniform speed in a circular path maintains:
- (1) varying velocity and varying acceleration.
(2) constant velocity
(3) constant acceleration
(4) constant velocity but varying acceleration

Ans. (1)



In the nuclear emission stated above, the mass number and atomic number of the product Q respectively, are

(1) 286, 81 (2) 280, 81
(3) 286, 80 (4) 288, 82

Ans. (1)

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

Assertion A : The potential (V) at any axial point, at 2m distance (r) from the centre of the dipole of dipole moment vector \vec{p} of magnitude, $4 \times 10^{-6}\ \text{Cm}$, is $\pm 9 \times 10^3\ \text{V}$.

(Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9\ \text{SI units}$)

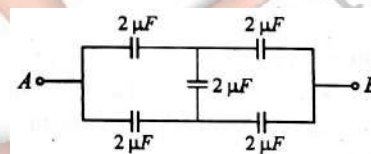
Reason R : $V = \pm \frac{2P}{4\pi\epsilon_0 r^2}$, where r is the distance of any axial point, situated at 2m from the centre of the dipole.

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

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

Ans. (4)

29. In the following circuit, the equivalent capacitance between terminal A and terminal B is:



(1) $4\mu\text{F}$ (2) $2\mu\text{F}$ (3) $1\mu\text{F}$ (4) $0.5\mu\text{F}$

Ans. (2)

30. If c is the velocity of light in free space, the correct statements about photon among the following are:

A. The energy of a photon is $E = hv$.
B. The velocity of a photon is c.

C. The momentum of a photon, $p = \frac{hv}{c}$.

D. In a photon-electron collision, both total energy and total momentum are conserved.

E. Photon possesses positive charge.

Choose the correct answer from the options given below:

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

Ans. (3)

31. A bob is whirled in a horizontal plane by means of a string with an initial speed of $\omega\ \text{rpm}$. The tension in the string is T. If speed becomes 2ω while keeping the same radius, the tension in the string becomes.

(1) $\sqrt{2}T$ (2) T

(3) $4T$ (4) $\frac{T}{4}$

Ans. (3)



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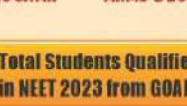
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32. A logic circuit provides the output Y as per the following truth table.

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

The expression for the output Y is:

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

Ans. (4)

33. The maximum elongation of a steel wire of 1m length if the elastic limit of steel and its Young's modulus, respectively, are $8 \times 10^8 \text{ Nm}^{-2}$ and $2 \times 10^{11} \text{ Nm}^{-2}$ is:

- (1) 8 mm (2) 4 mm (3) 0.4 mm (4) 40 mm

Ans. (2)

34. A thin flat circular disc of radius 4.5cm is placed gently over the surface of water. If surface tension of water is 0.07 Nm^{-1} , then the excess force required to take it away from the surface is:

- (1) 99 N (2) 19.8 mN
(3) 198 N (4) 1.98 mN

Ans. (2)

35. The moment of inertia of a thin rod about an axis passing through its mid point and perpendicular to the rod is 2400 g cm^2 . The length of the 400g rod is nearly:

- (1) 72.0 cm (2) 8.5 cm
(3) 17.5 cm (4) 20.7 cm

Ans. (2)

PHYSICS SECTION-B

(Candidates can choose to attempt any 10 questions only)

36. The minimum energy required to launch a satellite of mass m from the surface of earth of mass M and radius R in a circular orbit at an altitude of 2R from the surface of the earth is:

- (1) $\frac{GmM}{3R}$ (2) $\frac{5GmM}{6R}$
(3) $\frac{2GmM}{3R}$ (4) $\frac{GmM}{2R}$

Ans. (2)

37. A force defined by $F = \alpha t^2 + \beta t$ acts on a particle at a given time t. The factor which is dimensionless, if α and β are constant, is:

- (1) $\frac{\alpha\beta}{t}$ (2) $\frac{\beta t}{\alpha}$
(3) $\frac{\alpha t}{\beta}$ (4) $\alpha\beta t$

Ans. (3)

38. A sheet is placed on a horizontal surface in front of a strong magnetic pole. A force is needed to:

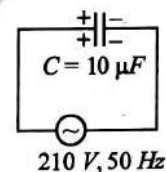
- A. hold the sheet there if it is magnetic.
B. hold the sheet there if it is non-magnetic.
C. move the sheet away from the pole with uniform velocity if it is conducting.
D. move the sheet away from the pole with uniform velocity if it is both, non-conducting and non-polar.

Choose the correct statement(s) from the options given below:

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

Ans. (3)

39. A $10\mu\text{F}$ capacitor is connected to a 210 V, 50 Hz source as shown in figure. The peak current in the circuit is nearly ($\pi = 3.14$).



- (1) 0.35 A (2) 0.58 A (3) 0.93 A (4) 1.20 A

Ans. (3)

40. A small telescope has an objective of focal length 140cm and an eye piece of focal length 5.0cm. The magnifying power of telescope for viewing a distant object is:

- (1) 32 (2) 34
(3) 28 (4) 17

Ans. (3)

41. A metallic bar of Young's modulus, $0.5 \times 10^{11} \text{ Nm}^{-2}$ and coefficient of linear thermal expansion $10^{-5} \text{ }^\circ\text{C}^{-1}$, length 1m, and area of cross-section 10^{-3} m^2 is heated from 0°C to 100°C without expansion or bending. The compressive force developed in it is:

- (1) $2 \times 10^3 \text{ N}$ (2) $5 \times 10^3 \text{ N}$
(3) $50 \times 10^3 \text{ N}$ (4) $100 \times 10^3 \text{ N}$

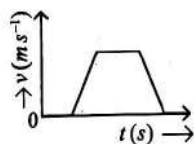
Ans. (3)

42. If the plates of parallel plate capacitor connected to a battery are moved close to each other, then
- the charge stored in it, increases.
 - the energy stored in it, decreases.
 - its capacitance increases.
 - the ratio of charge to its potential remains the same.
 - the product of charge and voltage increases.
- Choose the most appropriate answer from the options given below:

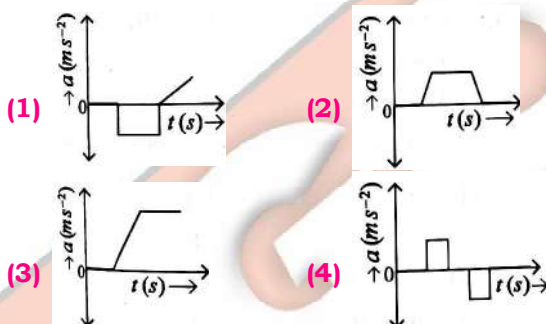
- (1) A, B and C only (2) A, B and E only
(3) A, C and E only (4) B, D and E only

Ans. (3)

43. The velocity (v)- time (t) plot of the motion of a body is shown below:



The acceleration (a)-time (t) graph that best suits this motion is



Ans. (4)

44. Two heaters A and B have power rating of 1kW and 2kW, respectively. Those two are first connected in series and then in parallel to a fixed power source. The ratio of power outputs for these two cases is:

- (1) 2 : 3 (2) 1 : 1 (3) 2 : 9 (4) 1 : 2

Ans. (3)

45. The property which is not of an electromagnetic wave travelling in free space is that:

- they originate from charges moving with uniform speed.
- they are transverse in nature.
- the energy density in electric field is equal to energy density in magnetic field.
- they travel with a speed equal to $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$

Ans. (1)

46. A parallel plate capacitor is charged by connecting it to a battery through a resistor. If I is the current in the circuit, then in the gap between the plates:

- displacement current of magnitude greater than I flows but can be in any direction.
- there is no current.
- displacement current of magnitude equal to I flows in the same direction as I .
- displacement current of magnitude equal to I flows in a direction opposite to that of I .

Ans. (3)

47. If the mass of the bob in a simple pendulum is increased to thrice its original mass and its length is made half its original length, then the

new time period of oscillation is $\frac{x}{2}$ times its original time period. Then the value of x is:

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

Ans. (3)

48. The following graph represents the T-V curves of an ideal gas (where T is the temperature and V the volume at three pressure P_1 , P_2 and P_3 compared with those of Charles' law represented as dotted lines.

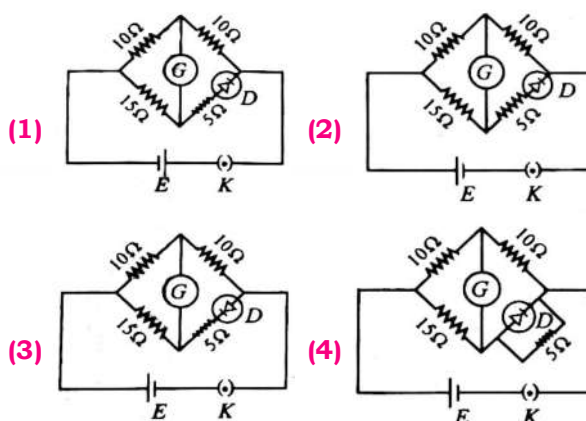


Then the correct relation is

- (1) $P_1 > P_2 > P_3$ (2) $P_3 > P_2 > P_1$
(3) $P_1 > P_3 > P_2$ (4) $P_2 > P_1 > P_3$

Ans. (1)

49. Choose the correct circuit which can achieve the bridge balance.



Ans. (2)

50. An iron bar of length L has magnetic moment M . It is bent at the middle of its length such that the two arms make an angle 60° with each other. The magnetic moment of this new magnet is:

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

Ans. (3)

CHEMISTRY

SECTION-A

(All questions are compulsory)

51. For the reaction $2A \rightleftharpoons B + C$, $K_c = 4 \times 10^{-3}$. At a given time, the composition of reaction mixture is : $[A] = [B] = [C] 2 \times 10^{-3} M$. Then, which of the following is correct ?

(1) Reaction has gone to completion in forward direction.
(2) Reaction is at equilibrium.
(3) Reaction has a tendency to go in forward direction
(4) Reaction has a tendency to go in backward direction.

Ans. (4)

52. The highest number of helium atoms is in

(1) 2.271098 L of helium at STP
(2) 4 mol of helium
(3) 4 u helium
(4) 4 g of helium

Ans. (2)

53. A compound with a molecular formula of C_6H_{14} has two tertiary carbons. Its IUPAC name is :

(1) 2, 2-dimethylbutane (2) n-hexane
(3) 2-methylpentane (4) 2, 3-dimethylbutane

Ans. (4)

54. Match List-I with List-II

List-I

(Conversion)

List-II

(Number of Faraday required)

- A. 1 mol of H_2O to O_2 I. 3F
B. 1 mol of MnO_4^- to Mn^{2+} II. 2F
C. 1.5 mol of Ca from molten $CaCl_2$ III. 1F
D. 1 mol of FeO to Fe_2O_3 IV. 5F

Choose the correct answer from the options given below :

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

Ans. (2)

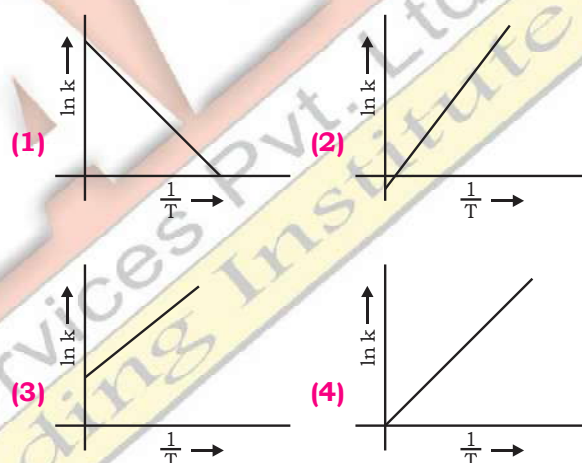
55. Arrange the following elements in increasing order of electronegativity :

Choose the correct answer from the options given below :

(1) $F < O < N < C < Si$ (2) $Si < C < N < O < F$
(3) $Si < C < O < N < F$ (4) $O < F < N < C < Si$

Ans. (2)

56. Which of plot of $\ln k$ vs $\frac{1}{T}$ is consistent with Arrhenius equation ?



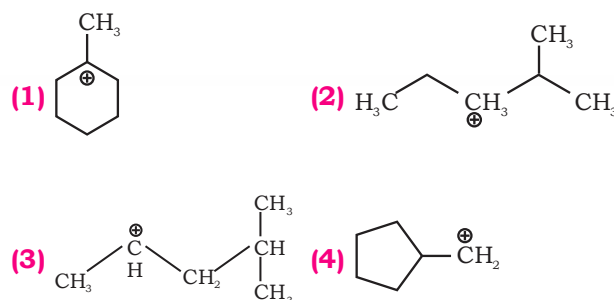
Ans. (1)

57. In which of the following equilibria, K_p and K_c are **NOT** equal ?

(1) $2BrCl(g) \rightleftharpoons Br_2(g) + Cl_2(g)$
(2) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
(3) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$
(4) $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$

Ans. (2)

58. The most stable carbocation among the following



Ans. (1)

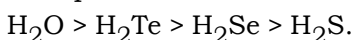
59. Activation energy of any chemical reaction can be calculated if one knows the value of

- (1) rate constant at two different temperatures.
- (2) rate constant at standard temperature
- (3) probability of collision.
- (4) Orientation of reactant molecules during collision.

Ans. (1)

60. Given below are two statements.

Statements-I : The boiling point of hydrides of Group 16 elements follow the order.



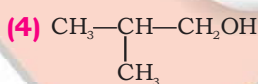
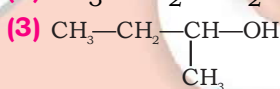
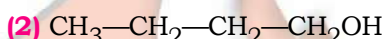
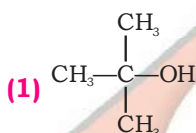
Statement-II : On the basis of molecular mass, H_2O is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in H_2O , it has higher boiling point.

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

- (1) Statement I is false but Statement II is true.
- (2) Both Statement I and Statement II are true.
- (3) Both Statement I and Statement II are false.
- (4) Statement I is true but Statement II is false.

Ans. (2)

61. Which one of the following alcohols reacts instantaneously with Lucas reagent ?



Ans. (1)

62. Given below are two statements :

Statement-I : Aniline does not undergo Friedel-Crafts alkylation reaction.

Statement-II : Aniline cannot be prepared through Gabriel synthesis.

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

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

Ans. (2)

63. Match List-I with List-II

List-I (Compound)	List-II (Shape/Geometry)
A. NH_3	I. Trigonal Pyramidal
B. BrF_5	II. Square Planar
C. XeF_4	III. Octahedral
D. SF_6	IV. Square Pyramidal

Choose the correct answer from the options given below :

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

Ans. (2)

64. Match List-I with List-II

List-I Quantum Number	List-II Information provided
A. m_l	I. shape of orbital
B. m_s	II. size of orbital
C. l	III. orientation of orbital
D. n	IV. orientation of spin of electron

Choose the correct answer from the options given below :

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

Ans. (3)

65. The E° value for the $\text{Mn}^{3+}/\text{Mn}^{2+}$ couple is more positive than that of $\text{Cr}^{3+}/\text{Cr}^{2+}$ or $\text{Fe}^{3+}/\text{Fe}^{2+}$ due to change of

- (1) d^3 to d^5 configuration
- (2) d^5 to d^4 configuration
- (3) d^5 to d^2 configuration
- (4) d^4 to d^5 configuration

Ans. (4)

66. In which of the following process entropy increases ?

- A. A liquid evaporates to vapour.
- B. Temperature of a crystalline solid lowered from 130 K to 0 K.
- C. $2\text{NaHCO}_3(\text{s}) \rightarrow \text{Na}_2\text{CO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$
- D. $\text{Cl}_2(\text{g}) \rightarrow 2\text{Cl}(\text{g})$

Choose the correct answer from the options given below :

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

Ans. (4)

67. The energy of an electron in the ground state ($n = 1$) for He^+ ion is $-xJ$, then that for an electron in $n = 2$ state for Be^{3+} ion in J is :

- (1) $-\frac{4}{9}x$ (2) $-x$ (3) $-\frac{x}{9}$ (4) $-4x$

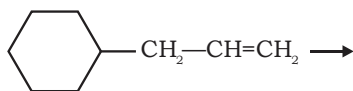
Ans. (2)

68. Which reaction is **NOT** a redox reaction ?

- (1) $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
(2) $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
(3) $2\text{KClO}_3 + \text{I}_2 \rightarrow 2\text{KIO}_3 + \text{Cl}_2$
(4) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$

Ans. (1)

69. Identify the correct reagents that would bring about the following transformation.



- (1) (i) $\text{H}_2\text{O}/\text{H}^+$ (2) (i) $\text{H}_2\text{O}/\text{H}^+$
(ii) PCC (ii) CrO_3
(3) (i) BH_3 (4) (i) BH_3
(ii) $\text{H}_2\text{O}_2/\text{OH}^-$ (ii) $\text{H}_2\text{O}_2/\text{OH}^-$
(iii) PCC (iii) alk. KMnO_4
(iv) H_3O^+

Ans. (3)

70. On heating, some solid substance change from solid to vapour state without passing through liquid state. The technique used for the purification of such solid substance based on the above principle is known as

- (1) Chromatography (2) Crystallization
(3) Sublimation (4) Distillation

Ans. (3)

71. Match List I with List-II.

- | List-I
(Complex) | List-II
(Type of Isomerism) |
|---|--------------------------------|
| A. $[\text{Co}(\text{NH}_3)_5(\text{NO}_2)]\text{Cl}_2$ | I. Solvate isomerism |
| B. $[\text{Co}(\text{NH}_3)_5(\text{SO}_4)]\text{Br}$ | II. Linkage isomerism |
| C. $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$ | III. Ionization isomerism |
| D. $[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_3$ | IV. Coordination isomerism |

Choose the correct answer from the options given below :

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

Ans. (2)

72. Given below are two statements :

Statement-I : Both $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoF}_6]^{3-}$ complexes are octahedral but differ in their magnetic behaviour.

Statement-II : $[\text{Co}(\text{NH}_3)_6]^{3+}$ is diamagnetic whereas $[\text{CoF}_6]^{3-}$ is paramagnetic.

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

- (1) Statement-I is false but Statement II is true.
(2) Both Statement I and Statement II are true.
(3) Both Statement I and Statement II are false.
(4) Statement I is true but Statement II is false.

Ans. (2)

73. Fehling's solution 'A' is

- (1) aqueous sodium citrate
(2) aqueous copper sulphate
(3) alkaline copper sulphate
(4) alkaline solution of sodium potassium tartrate (Rochelle's salt)

Ans. (2)

74. Intramolecular hydrogen bonding is present in

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

Ans. (2)

75. Given below are two statements :

Statement-I : The boiling point of three isomeric pentanes follows the order.

$n\text{-pentane} > \text{isopentane} > \text{neopentane}$

Statement-II : When branching increases, the molecule attains a shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point.

In the light of the above statements, choose the most appropriate answer from the options given below :

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

Ans. (2)

76. Among Group 16 elements, which one does NOT show -2 oxidation state?

- (1) Po (2) O (3) Se (4) Te

Ans. (1)

77. The Henry's law constant (K_H) values of three gases (A, B, C) in water are 145, 2×10^{-5} and 35 kbar, respectively. The solubility of these gases in water follow the order:

- (1) $A > B > C$ (2) $B > A > C$
(3) $B > C > A$ (4) $A > C > B$

Ans. (3)

78. 1 gram of sodium hydroxide was treated with 25 mL of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to

- (1) 200 mg (2) 750 mg
(3) 250 mg (4) Zero mg

Ans. (3)

79. 'Spin only' magnetic moment is same for which of the following ions?

- A. Ti^{3+} B. Cr^{2+} C. Mn^{2+} D. Fe^{2+}
E. Sc^{3+}

Choose the most appropriate answer from the options given below:

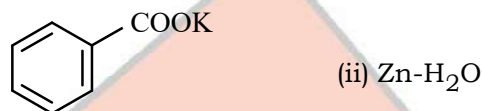
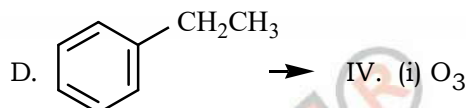
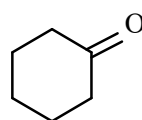
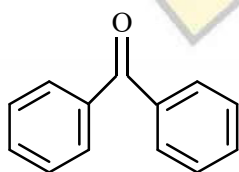
- (1) A and D only (2) B and D only
(3) A and E only (4) B and C only

Ans. (2)

80. Match List I with List II.

List I (Reaction)

List II (Reagents/
Condition)



Choose the correct answer from the options given below:

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

Ans. (4)

81. Match List I with List II.

List I
(Molecule)

List II
(Number and types of
bond/s between two
carbon atoms)

- A. ethane
B. ethene
C. carbon
molecule, C_2
D. ethyne

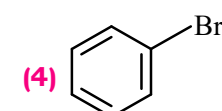
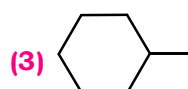
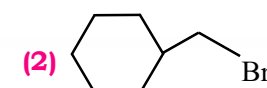
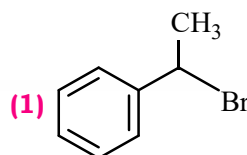
- I. one σ -bond and
two π -bonds
II. two π -bonds
III. one σ -bond
IV. one σ -bond and
one π -bond

Choose the correct answer from the options given below:

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

Ans. (4)

82. The compound that will undergo S_N1 reaction with fastest rate is



Ans. (1)

83. Arrange the following elements in increasing order of first ionization enthalpy :

Li, Be, B, C, N

Choose the correct answer from the options given below :

- (1) $Li < Be < N < B < C$
(2) $Li < Be < B < C < N$
(3) $Li < B < Be < C < N$
(4) $Li < Be < C < B < N$

Ans. (3)

84. The reagents with which glucose does not react to give the corresponding tests/products are

- A. Tollen's reagent
B. Schiff's reagent
C. HCN
D. NH_2OH
E. $NaHSO_3$

Choose the correct options from the given below:

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

Ans. (4)

85. Match List I with List II.

List I (Process)	List II (Conditions)
A. Isothermal process	I. No heat exchange
B. Isochoric process	II. Carried out at constant temperature
C. Isobaric process	III. Carried out at constant volume
E. Adiabatic process	IV. Carried out at constant pressure

Choose the correct answer from the options given below:

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

Ans. (1)

CHEMISTRY SECTION-B

(Candidates can choose to attempt any 10 questions only)

86. During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis of Fe^{2+} ion?

- (1) dilute sulphuric acid
(2) dilute hydrochloric acid
(3) concentrated sulphuric acid
(4) dilute nitric acid

Ans. (1)

87. Identify the correct answer.

- (1) Three canonical forms can be drawn for CO_3^{2-} ion.
(2) Three resonance structures can be drawn for ozone.
(3) BF_3 has non-zero dipole moment.
(4) Dipole moment of NF_3 is greater than that of NH_3 .

Ans. (1)

88. A compound X contains 32% of A, 20% of B and remaining percentage of C. Then, the empirical formula of X is :

(Given atomic masses of A = 64; B = 40; C = 32u)

- (1) ABC_4 (2) A_2BC_2
(3) ABC_3 (4) AB_2C_2

Ans. (3)

89. Given below are certain cations. Using inorganic qualitative analysis, arrange them in increasing group number from 0 to VI.

- A. Al^{3+} B. Cu^{2+}
C. Ba^{2+} D. Co^{2+}
E. Mg^{2+}

Choose the correct answer from the options given below :

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

Ans. (2)

90. The work done during reversible isothermal expansion of one mole of hydrogen gas at $25^\circ C$ from pressure of 20 atmosphere to 10 atmosphere is :

(Given $R = 2.0 \text{ cal K}^{-1} \text{ mol}^{-1}$)

- (1) 100 calories (2) 0 calorie
(3) -413.14 calories (4) 413.14 calories

Ans. (3)

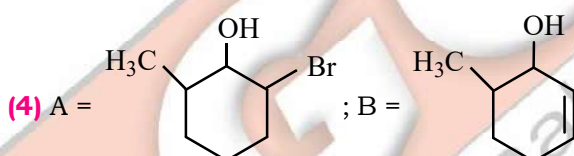
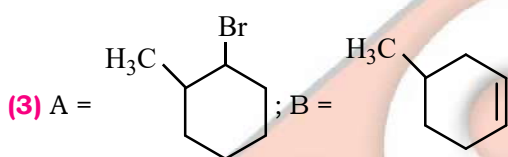
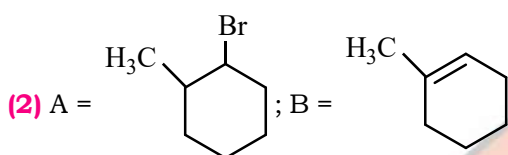
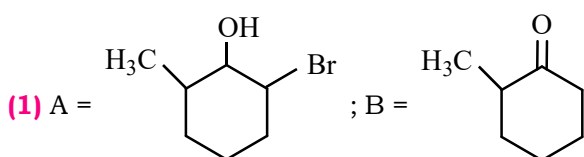
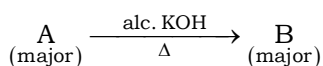
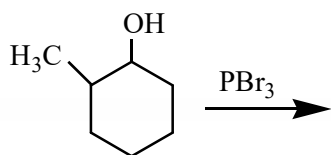
91. The plot of osmotic pressure (π) vs concentration (mol L^{-1}) for a solution gives straight line with slope $25.73 \text{ L bar mol}^{-1}$. The temperature at which the osmotic pressure measurement is done is:

(Use $R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$)

- (1) 12.05° (2) $37^\circ C$
(3) $310^\circ C$ (4) $25.73^\circ C$

Ans. (2)

92. Major products A and B formed in the following reaction sequence, are



Ans. (2)

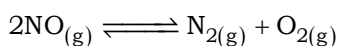
93. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is :

(Given : Molal mass of Cu : 63 g mol⁻¹, 1F = 96487 C)

- (1) 0.0315 g (2) 3.15 g
(3) 0.315 g (4) 31.5 g

Ans. (3)

94. Consider the following reaction in a sealed vessel at equilibrium with concentrations of N₂ = 3.0 × 10⁻³ M, O₂ = 4.2 × 10⁻³ M and NO = 2.8 × 10⁻³ M.



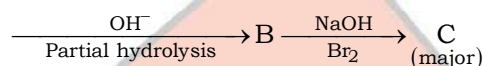
If 0.1 mol L⁻¹ of NO_(g) is taken in a closed vessel,

what will be degree of dissociation (α) of NO_(g) at equilibrium?

- (1) 0.717 (2) 0.00889
(3) 0.0889 (4) 0.8889

Ans. (1)

95. Identify the major product C formed in the following reaction sequence :



- (1) α-bromobutanoic acid
(2) propylamine
(3) butylamine
(4) butanamide

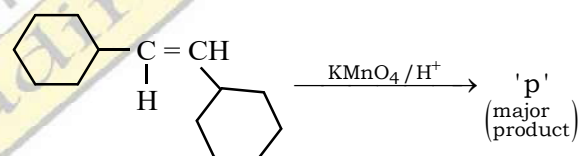
Ans. (2)

96. The pair of lanthanoid ions which are diamagnetic is

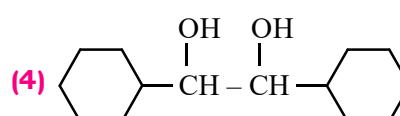
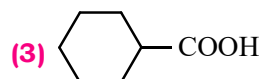
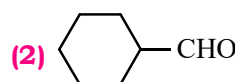
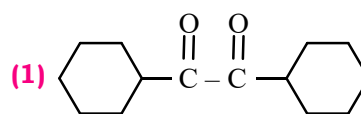
- (1) Pm³⁺ and Sm³⁺
(2) Ce⁴⁺ and Yb²⁺
(3) Ce³⁺ and Eu²⁺
(4) Gd³⁺ and Eu³⁺

Ans. (2)

97. For the given react on :



'p' is



Ans. (3)

98. Statement I : $[\text{Co}(\text{NH}_3)_6]^{3+}$ is a homoleptic complex whereas $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ is a heteroleptic complex.

Statement II : Complex $[\text{Co}(\text{NH}_3)_6]^{3+}$ has only one kind of ligands but $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ has more than one kind of ligands.

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

- (1) Statement I is false but Statement II is true.
(2) Both Statement I and Statement II are true.
(3) Both Statement I and Statement II are false.
(4) Statement I is true but Statement II is false.

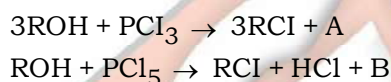
Ans. (2)

99. The rate of a reaction quadruples when temperature changes from 27°C to 57°C . Calculate the energy of activation. Given $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$, $\log 4 = 0.6021$

- (1) 3804 kJ/mol (2) 38.04 kJ/mol
(3) 380.4 kJ/mol (4) 3.80 kJ/mol

Ans. (2)

100. The products A and B obtained in the following reactions, respectively, are



- (1) H_3PO_3 and POCl_3
(2) POCl_3 and H_3PO_3
(3) POCl_3 and H_3PO_4
(4) H_3PO_4 and POCl_3

Ans. (1)

BOTANY SECTION-A

(All questions are compulsory)

101. The lactose present in the growth medium of bacteria is transported to the cell by the action of

- (1) Polymerase
(2) Beta-galactosidase
(3) Acetylase
(4) Permease

Ans. (4)

102. Lecithin, a small molecular weight organic compound found in living tissues, is an example

is :

- (1) Carbohydrates (2) Amino acids
(3) Phospholipids (4) Glycerides

Ans. (3)

103. Match List I with List II

List I

A. *Clostridium butylicum*

B. *Saccharomyces Cerevisiae*

C. *Trichoderma polysporum*

D. *Streptococcus sp.*

List II

I. Ethanol

II. Streptokinase

III. Butyric acid

IV. Cyclosporin-A

Choose the correct answer from the options given below :

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

Ans. (4)

104. The equation of Verhulst-Pearl logistic growth

$$\text{is } \frac{dN}{dt} = rN \left[\frac{K - N}{K} \right]$$

From this equation, K indicates :

- (1) Population density
(2) Intrinsic rate natural increase
(3) Biotic potential
(4) Carrying capacity

Ans. (4)

105. Hind II always cuts DNA molecules at a particular point called recognition sequence and it consists of

- (1) 10 bp (2) 8 bp (3) 6 bp (4) 4 bp

Ans. (3)

106. Formation of interfascicular cambium from fully developed parenchyma cells is an example for

- (1) Maturation (2) Differentiation
(3) Redifferentiation (4) Dedifferentiation

Ans. (4)

107. Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of

- (1) Enzyme activation
(2) Cofactor inhibition
(3) Feedback inhibition
(4) Competitive inhibition

Ans. (4)

- 108.** List of endangered species was released by
(1) IUCN (2) GEAC (3) WWF (4) FOAM

Ans. (1)

- 109.** Spindle fibers attach to kinetochores of chromosomes during
(1) Telophase (2) Prophase
(3) Metaphase (4) Anaphase

Ans. (3)

- 110.** How many molecules of ATP and NADPH are required for every molecule of CO_2 fixed in the Calvin cycle ?
(1) 3 molecules of ATP and 2 molecules of NADPH
(2) 2 molecules of ATP and 3 molecules of NADPH
(3) 2 molecules of ATP and 2 molecules of NADPH
(4) 3 molecules of ATP and 3 molecules of NADPH

Ans. (1)

- 111.** Match List I with List II

List I

List II

- | | |
|--|----------------|
| A. Two or more alternative forms of a gene | I. Back cross |
| B. Cross of F_1 progeny with homozygous recessive parent | II. Ploidy |
| C. Cross F_1 progeny with any of the parents | III. Allele |
| D. Number of chromosome sets in plant | IV. Test cross |

Choose the correct answer from the options given below :

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

Ans. (4)

- 112.** Match List I with List II

List I

List II

- | | |
|--------------------|------------------|
| A. <i>Rhizopus</i> | I. Mushroom |
| B. <i>Ustilago</i> | II. Smut fungus |
| C. <i>Puccinia</i> | III. Bread mould |
| D. <i>Agaricus</i> | IV. Rust fungus |

Choose the correct answer from the options given below :

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

Ans. (2)

- 113.** Given below are two statements :

Statement-I : Chromosomes become gradually visible under light microscope during leptotene stage.

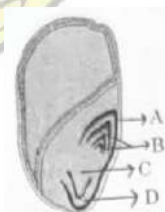
Statement-II : The beginning of diplotene stage is recognized by dissolution of synaptonemal complex

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

- (1) **Statement-I** is false but **Statement-II** is true
(2) **Statement-I** and **Statement-II** are true
(3) **Statement-I** and **Statement-II** are false
(4) **Statement-I** is true but **Statement-II** is false

Ans. (2)

- 114.** Identify the part of the seed from the given figure which is destined to form root when the seed germinates.



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

Ans. (4)

- 115.** In a plant, black seed colour (BB/Bb) is dominant over white seed colour (bb). In order to find out the genotype of the black seed plant, which of the following genotype will you cross it ?

- (1) BB/Bb (2) BB
(3) bb (4) Bb

Ans. (3)

- 116.** Bulliform cells are responsible for

- (1) Providing large spaces for storage of sugars.
(2) Inward curling of leaves in monocots.
(3) Protecting the plant from salt stress.
(4) Increased photosynthesis in monocots.

Ans. (2)

117. Which one of the following can be explained on the basis of Mendel's Law of Dominance ?

- A. Out of one pair of factors one is dominant and the other is recessive
- B. Alleles do not show any expression and both the characters appears as such in F_2 generation.
- C. Factors occur in pairs in normal diploid plants
- D. The discrete unit controlling a particular character is called factor.
- E. The expression of only one of the parental characters is found in a monohybrid cross.

Choose the correct answer from the options give below :

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

Ans. (3)

118. The cofactor of the enzyme carboxypeptidase is

- (1) Haem (2) Zinc
- (3) Niacin (4) Flavin

Ans. (2)

119. A transcription unit in DNA is defined primarily by the three regions in DNA and these are with respect to upstream and down stream end

- (1) Promotor, Structural gene, Terminator
- (2) Repressor, Operator gene, Structural gene
- (3) Structural gene, Transposons, Operator gene
- (4) Inducer, Repressor, Structural gene

Ans. (1)

120. Tropical regions show greatest level of species richness because

- A. Tropical latitudes have remained relatively undisturbed for millions of years, hence more time was available for species diversification.
- B. Tropical environments are more seasonal.
- C. More solar energy is available promote niche specialization.
- D. Constant environments promote niche specialization.
- E. Tropical environments are constant and predictable.

Choose the correct answer from the options given below.

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

Ans. (2)

121. Given below are two statements :

Statement-I : Parenchyma is living but collenchyma is dead tissue.

Statement-II : Gymnosperms lack xylem vessels but presence of xylem vessels is the characteristic of angiosperms.

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

- (1) **Statement-I** is false but **Statement-II** is true
- (2) **Statement-I** and **Statement-II** are true
- (3) **Statement-I** and **Statement-II** are false
- (4) **Statement-I** is true but **Statement-II** is false

Ans. (1)

122. The type of conservation in which the threatened species are taken out from their natural habitat and placed in special where they can be protected and given special care is called

- (1) Sustainable development
- (2) *in-situ* conservation
- (3) Biodiversity conservation
- (4) Semi-conservative method

Ans. (3)

123. Which of the following are required for the dark reaction of photosynthesis ?

- A. Light B. Chlorophyll
- C. CO_2 C. ATP
- D. NADPH

Choose the correct answer from the options given below :

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

Ans. (4)

124. Given below are two statements :

Statement-I : Bt toxins are insect group specific and coded by a gene *cry* IAc.

Statement-II : Bt toxin exists as inactive protoxin in *B. thuringiensis*. However, after ingestion by the insect the inactive protoxin gets converted in to active from due to acidic pH of the insect gut.

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

- (1) **Statement-I** is false but **Statement-II** is true
- (2) **Statement-I** and **Statement-II** are true
- (3) **Statement-I** and **Statement-II** are false
- (4) **Statement-I** is true but **Statement-II** is false

Ans. (4)

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125. These are regarded as major causes of biodiversity loss

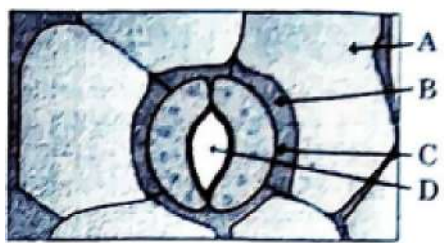
- A. Over exploitation
- B. Co-extinction
- C. Mutation
- D. Habitat loss and fragmentaion
- E. Migration

Choose the correct option :

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

Ans. (1)

126. In the given figure, which component has thin outer walls and highly thickened inner walls



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

Ans. (2)

127. The capacity to generate a whole plant from any cell of the plant is called:

- (1) Somatic hybridization
- (2) Totipotency
- (3) Micropropagation
- (4) Differentiation

Ans. (2)

128. A pink flowered Snapdragon plant was cross with a red flowered Snapdragon plant. What type of phenotype/s is/are expected in the progeny?

- (1) Red, Pink as well as white flowered plant
- (2) Only red flowered plants
- (3) Red flowered as well as white flowered plant
- (4) Only pink flowered plants

Ans. (3)

129. Match List I With List II

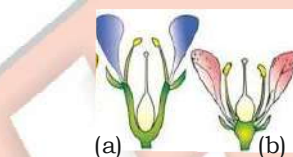
List I	List II
(A) Nucleous	(I) Site of formation of glycolipid
(B) Centriole	(II) Site for active
(C) Leucoplasts	(III) Site for active ribosomal RNA synthesis
(D) Golgi apparatus	(IV) For storing nutrients

Choose the correct answer from the options given below:

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

Ans. (2)

130. Identify the type of flowers based on the position of calyx, corolla and androecium with respect to the ovary from the given figure (a) and (b)



- (1) (a) Perigynous; (b) Perigynous
- (2) (a) Epigynous; (b) Hypogynous
- (3) (a) Hypogynous; (b) Epigynous
- (4) (a) Perigynous; (b) Epigynous

Ans. (1)

131. Identify the set of correct statements:

- (A) The flowers of *vallisneria* are colourful and produce nectar.
- (B) The flowers of waterlily are not pollinated by water.
- (C) In most of water-pollinated species, the pollen grains are protected from wetting.
- (D) Pollen grains of some hydrophytes are long and ribbon like.
- (E) In some hydrophytes, the pollen grains are carried possibly inside water.

Choose the correct answer from the option given below.

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

Ans. (1)

132. Auxin is use by gardeners to prepare weed-free lawns. But no damage is caused to grass as auxin

- (1) can help in cell division in grasses, to produce growth.
- (2) Promotes apical dominance.
- (3) promotes abscission of mature leaves only.
- (4) does not affect mature monocotyledonous plants.

Ans. (4)

133. What is the fate of a piece of DNA carrying only gene of interest which is transferred into an alien organism?

- A. The piece of DNA would be able to multiply itself independently in the progeny cells of the organism.
- B. It may get integrated into the genome of the recipient.
- C. It may multiply and be inherited along with the host DNA.
- D. The alien piece of DNA is not an integral part of chromosome.
- E. It shows ability to replicate.

Choose the correct answer from the options given below:

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

Ans. (4)

134. Which one of the following is not a criterion for classification of fungi?

- (1) Fruiting body
- (2) Morphology of mycelium
- (3) Mode of nutrition
- (4) Mode of spore formation

Ans. (3)

135. Which of the following is an example of actinomorphic flower?

- (1) *Sesbania* (2) *Datura*
- (3) *Cassia* (4) *Pisum*

Ans. (2)

BOTANY

SECTION-B

(Candidates can choose to attempt any 10 questions only)

136. Match List I with List II

- | List I | List II |
|-----------|---------------------------|
| A. Rose | I. Twisted nestivation |
| B. Pen | II. Perigynous flower |
| C. Cotton | III. Drupe |
| D. Mango | IV. Marginal placentation |

Choose the correct answer from the options given below:

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

Ans. (2)

137. Identify the correct description about the given figure.



- (1) Compact inflorescence showing complete autogamy.
- (2) Wind pollinated plant inflorescence showing flowers with well exposed stamens.
- (3) Water pollinated flowers showing stamens with mucilaginous covering.
- (4) Cleistogamous flowers showing autogamy.

Ans. (2)

138. Match List I with List II

- | List I | List II |
|-------------|--|
| A. GLUT-4 | I. Hormone |
| B. Insulin | II. Enzyme |
| C. Trypsin | III. Intercellular ground substance |
| D. Collagen | IV. Enables glucose transport into cells |

Choose the correct answer fro the options given below:

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

Ans. (2)

139. Spraying sugarcane crop with which of following plant growth regulators, increases the length of stem, thus increasing the yield?

- (1) Absciscic acid (2) Auxin
- (3) Gibberellin (4) Cytokinin

Ans. (3)

140. Which of the following are fused in somatic hybridization involving two varieties of plants?

- (1) Pollens
- (2) Callus
- (3) Somatic embryos
- (4) Protoplasts

Ans. (4)

- 141.** Given below are two statement:
Statement I : In C_3 plants, some O_2 binds to RuBiCO, hence CO_2 fixation is decreased.
Statement: II In C_4 plants, mesophyll cells show very little photorespiration while bundle sheath cells do not show photorespiration.
In the light of the above statements, choose the correct answer from the options given below:
(1) Statement I is false but statement II is true
(2) Both Statement I and Statement II are true
(3) Both Statement I and Statement II are false
(4) Statement I is true but statement II is false

Ans. (4)

- 142.** Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae,

- A. Asexual reproduction occurs usually by biflagellate zoospores.
B. Sexual reproduction is by oogamous method only.
C. Stored food is in the form of carbohydrates which is either mannito or laminarin.
D. The major pigments found are chlorophyll a,c and carotenoids and xanthophyll.
E. Vegetative cells have a cellulosic wall, usually covered on the outside by gelatinous coating of algin.

Choose the correct answer from the options given below:

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

Ans. (4)

- 143.** Match List I with List II

List I	List II
A. Robert May	I. Species-Area relationship
B. Alexander von Humboldt	II. Long term ecosystem experiment using out door plot
C. Paul Ehrlich	III. Global species diversity at about 7 million
D. David Tilman	IV. River poper hypothesis

Choose the correct answer from the options given below :

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

Ans. (3)

- 144.** Match List I with List II

List I	List II
A. Frederick Griffith	I. Genetic code
B. Francois Jacob & Jacques Monod	II. Semi-conservative mode of DNA replication
C. Har Gobind	III. Transformation
D. Meselson & Stahl	IV. <i>Lac</i> operon

Choose the correct answer from the options given below :

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

Ans. (3)

- 145.** Match List I with List II

List I (Types of Stamens)	List II (Example)
A. Monadelphous	I. Citrus
B. Diadelphous	II. Pea
C. Polyadelphous	III. Lily
D. Epiphydelphous	IV. China-rose

Choose the correct answer from the options given below :

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

Ans. (2)

- 146.** The DNA present in chloroplast is

- (1) Circular, single stranded
(2) Linear, double stranded
(3) Circular, double stranded
(4) Linear, single stranded

Ans. (3)

- 147.** In an ecosystem if the Net Primary Productivity (NPP) of first trophic level is $100x(kcal\ m^{-2})yr^{-1}$, what would be the GPP (Gross Primary Productivity) of the third trophic level of the same ecosystem ?

- (1) $\frac{100x}{3x}(kcal\ m^{-2})yr^{-1}$ (2) $\frac{x}{10}(kcal\ m^{-2})yr^{-1}$
(3) $x(kcal\ m^{-2})yr^{-1}$ (4) $10x(kcal\ m^{-2})yr^{-1}$

Ans. (4)

148. Identify the step in tricarboxylic acid cycle, which does not involve oxidation of substrate.

- (1) Isocitrate \rightarrow α -ketoglutaric acid
- (2) Malic acid \rightarrow Oxaloacetic acid
- (3) Succinic acid \rightarrow Malic acid
- (4) Succinyl-CoA \rightarrow Succinic acid

Ans. (4)

149. Which of the following statement is correct regarding the process of replication in *E. Coli*?

- (1) The DNA dependent DNA polymerase catalyses polymerization in $5' \rightarrow 3'$ direction.
- (2) The DNA dependent DNA polymerase catalyses polymerization in one direction that is $3' \rightarrow 5'$.
- (3) The DNA dependent RNA polymerase catalyses polymerization in one direction, that is $5' \rightarrow 3'$.
- (4) The DNA dependent DNA polymerase catalyses polymerization in $5' \rightarrow 3'$ as well as $5' \rightarrow 3'$ direction.

Ans. (1)

150. Match List I with List II

List I	List II
A. Citric acid cycle	I. Cytoplasm
B. Glycolysis	II. Mitochondrial matrix
C. Electron transport system	III. Intermembrane space of mitochondria
D. Proton gradient	IV. Inner mitochondrial membrane

Choose the correct answer from the options given below :

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

Ans. (3)

ZOOLOGY

SECTION-A

(All questions are compulsory)

151. Given below are two statements:

Statement I : In the nephron, the descending limb of loop of Henle is impermeable to water

and permeable to electrolytes.

Statement II: The proximal convoluted tubule is lined by simple columnar brush border epithelium and increases the surface area for reabsorption.

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

- (1) Statement I is false but Statement II is true
- (2) Both Statement I and Statement II are true
- (3) Both Statement I and Statement II are false
- (4) Statement I is true but Statement II is false.

Ans. (3)

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

Assertion A : FSH acts upon ovarian follicles in female and Leydig cells in male.

Reason R : Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

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

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

Ans. (1)

153. Which one of the following factors will not affect the Hardy-Weinberg equilibrium?

- (1) Constant gene pool
- (2) Genetic recombination
- (3) Genetic drift
- (4) Gene migration

Ans. (1)

154. Which of the following are Autoimmune disorders?

- A. Myasthenia gravis
- B. Rheumatoid arthritis
- C. Gout
- D. Muscular dystrophy
- E. Systemic Lupus Erythematosus (SLE)

Choose the most appropriate answer from the options given below:

- (1) C, D & E only
- (2) A, B & D only
- (3) A, B & E only
- (4) B, C & E only

Ans. (3)

155. Given below are some stages of human evolution. Arrange them in correct sequence. (Past to Recent)

- A. *Homo habilis*
- B. *Homo sapiens*
- C. *Homo neanderthalensis*
- D. *Homo erectus*

Choose the correct sequence of human evolution from the options given below:

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

Ans. (1)

156. Given below are two statements:

Statement I: The presence or absence of hymen is not a reliable indicator of virginity.

Statement II: The hymen is torn during the first coitus only.

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

- (1) Statement I is false but Statement II is true
- (2) Both Statement I and Statement II are true
- (3) Both Statement I and Statement II are false
- (4) Statement I is true but Statement II is false

Ans. (4)

157. Match List I with List II:

- | List I | List II |
|--------------------------|------------------|
| A. Non-medicated IUD | I. Multiload 375 |
| B. Copper releasing IUD | II. Progestogens |
| C. Hormone releasing IUD | III. Lippes loop |
| D. Implants | IV. LNG-20 |

Choose the correct answer from the options given below:

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

Ans. (1)

158. Consider the following statements:

- A. Annelids are true coelomates
 - B. Poriferans are pseudocoelomates
 - C. Aschelminthes are acoelomates
 - D. Platyhelminthes are pseudocoelomates
- Choose the correct answer from the options given below:

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

Ans. (3)

159. Which of the following factors are favourable for the formation of oxyhaemoglobin in alveoli?

- (1) Low $p\text{CO}_2$ and High temperature
- (2) High $p\text{O}_2$ and High $p\text{CO}_2$
- (3) High $p\text{O}_2$ and Lesser H^+ concentration
- (4) Low $p\text{CO}_2$ and High H^+ concentration

Ans. (3)

160. Match List I with List II:

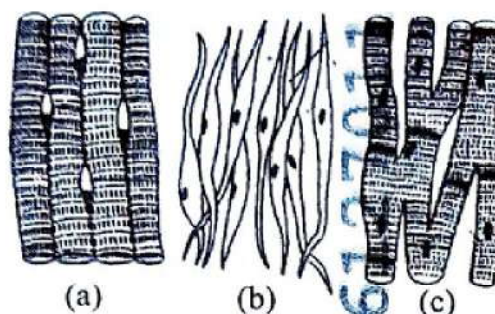
List I		List II	
A.	Expiratory capacity	I.	Expiratory reserve volume + Tidal volume + Inspiratory reserve volume
B.	Functional residual capacity	II.	Tidal volume + Expiratory reserve volume
C.	Vital capacity	III.	Tidal volume + Inspiratory reserve volume
D.	Inspiratory capacity	IV.	Expiratory reserve volume + Residual volume

Choose the correct answer from the options given below:

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

Ans. (2)

161. Three types of muscles are given as a, b and c. Identify the correct matching pair along with their location in human body:



Name of muscle/location

- (1) (a) Involuntary - Nose tip
(b) Skeletal - Bone
(c) Cardiac - Heart.
- (2) (a) Smooth - Toes
(b) Skeletal - Legs
(c) Cardiac - Heart

- (3) (a) Skeletal – Triceps
(b) Smooth – Stomach
(c) Cardiac – Heart
(4) (a) Skeletal – Biceps
(b) Involuntary – Intestine
(c) Smooth – Heart

Ans. (3)

162. The flippers of the Penguins and dolphins are the example of the

- (1) Divergent evolution
(2) Adaptive radiation
(3) Natural selection
(4) Convergent evolution

Ans. (4)

163. Match List I with List II:

List I	List II
A. Typhoid	I. Fungus
B. Leishmaniasis	II. Nematode
C. Ringworm	III. Protozoa
D. Filariasis	IV. Bacteria

Choose the correct answer from the options given below:

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

Ans. (3)

164. Following are the stages of pathway for conduction of an action potential through the heart:

- A. AV bundle
B. Purkinje fibres
C. AV node
D. Bundle branches
E. SA node

Choose the correct sequence of pathway from the options given below:

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

Ans. (2)

165. Match List I with List II:

List I	List II
A. Lipase	I. Peptide bond
B. Nuclease	II. Ester bond
C. Protease	III. Glycosidic bond
D. Amylase	IV. Phosphoester bond

Choose the correct answer from the options given below:

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

Ans. (4)

166. Which of the following statements is incorrect?

- (1) Bio-reactors have an agitator system, an oxygen delivery system and foam control system.
(2) A bio-reactor provides optimal growth conditions for achieving the desired product.
(3) Most commonly used bio-reactors are of stirring type.
(4) Bio-reactors are used to produce small scale bacterial cultures

Ans. (4)

167. The "Ti plasmid" of *Agrobacterium tumefaciens* stands for

- (1) Temperature independent plasmid
(2) Tumour inhibiting plasmid
(3) Tumor independent plasmid
(4) Tumor inducing plasmid

Ans. (4)

168. Match List I with List II:

List I	List II
A. Common cold	I. Peptide Plasmodium
B. Haemozoin	II. Typhoid
C. Widal test	III. Rhinoviruses
D. Allergy	IV. dust mites

Choose the correct answer from the options given below:

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

Ans. (4)

169. Following are the stages of cell division:

- A. Gap 2 phase
B. Cytokinesis
C. Synthesis phase
D. Karyokinesis
E. Gap 1 phase

Choose the correct sequence of stages from the options given below:

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

Ans. (1)

170. Which of the following is not a natural/traditional contraceptive method?

- (1) Vaults
- (2) Coitus interruptus
- (3) Periodic abstinence
- (4) Lactational amenorrhea

Ans. (1)

171. Match List I with List II:

List I	List II
A. Pleurobrachia	I. Mollusca
B. Raula	II. Ctenophora
C. Stomochord	III. Osteichthyes
D. Air bladder	IV. Hemichordata

Choose the correct answer from the options given below:

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

Ans. (3)

172. Which one is the correct product of DNA dependent RNA polymerase to the given template?

3'TACATGGCAAATATCCATTCA5'

- (1) 5'ATGTACCGTTTATAGGTAAGT3'
- (2) 5'AUGUACCGUUUAUAGGUAAGU3'
- (3) 5'AUGUAAAGUUUAUAGGUAAGU3'
- (4) 5'AUGUACCGUUUAUAGGGAAGU3'

Ans. (2)

173. Match List I with List II:

List I	List II
A. α -1 antitrypsin	I. Cotton bollworm
B. Cry IAb	II. ADA deficiency
C. Cry IAc	III. Emphysema
D. Enzyme replacement therapy	IV. Corn borer

Choose the correct answer from the options given below:

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

Ans. (4)

174. Match List I with List II:

List I	List II
A. <i>Pterophyllum</i>	I. Hag fish
B. <i>Myxine</i>	II. Saw fish
C. <i>Pristis</i>	III. Angel fish
D. <i>Exocoetus</i>	IV. Flying fish

Choose the correct answer from the options given below:

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

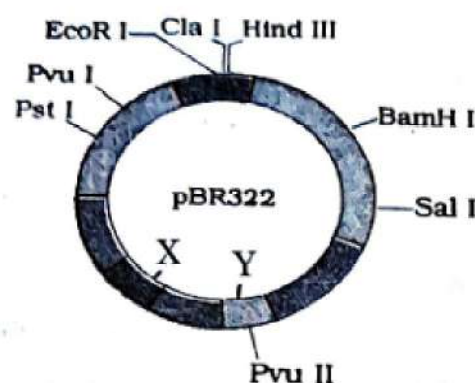
Ans. (3)

175. Which of the following is not a component of Fallopian tube?

- (1) Ampulla
- (2) Uterine fundus
- (3) Isthmus
- (4) Infundibulum

Ans. (2)

176. The following diagram showing restriction sites in *E. coli* cloning vector pBR322. Find the role of 'X' and 'Y' genes:



- (1) Gene 'X' is responsible for recognition sites and 'Y' is responsible for antibiotic resistance
- (2) The gene 'X' is responsible for resistance to antibiotics and 'Y' for protein involved in the replication of Plasmid
- (3) The gene 'X' is responsible for controlling the copy number of the linked DNA and 'Y' for protein involved in the replication of Plasmid.
- (4) The gene 'X' is for protein involved in replication of Plasmid and 'Y' for resistance to antibiotics.

Ans. (3)

177. Match List I with List II:

List I		List II	
A.	Fibrous joints	I.	Adjacent vertebrae, limited movement
B.	Cartilaginous joints	II.	Humerus and Pectoral girdle, rotational movement
C.	Hinge joints	III.	Skull, don't allow any movement
D.	Ball and socket joints	IV.	Knee, help in locomotion

Choose the correct answer from the options given below:

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

Ans. (1)

178. Which of the following is not a steroid hormone?

- (1) Glucagon
(2) Cortisol
(3) Testosterone
(4) Progesterone

Ans. (1)

179. Match List I with List II:

List I		List II	
A.	Axoneme	I.	Centriole
B.	Cartwheel pattern	II.	Cilia and flagella
C.	Crista	III.	Chromosome
D.	Satellite	IV.	Mitochondria

Choose the correct answer from the options given below:

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

Ans. (1)

180. Match List I with List II:

List I	List II
A. Cocaine	I. Effective sedative in surgery
B. Heroin	II. <i>Cannabis sativa</i>
C. Morphine	III. <i>Erythroxylum</i>
D. Marijuana	IV. <i>Papaver somniferum</i>

Choose the correct answer from the options given below:

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

Ans. (1)

181. In both sexes of cockroach, a pair of jointed filamentous structures called anal cerci are present on:

- (1) 11th segment
(2) 5th segment
(3) 10th segment
(4) 8th and 9th segment

Ans. (3)

182. Match List I with List II:

List I (Sub Phase of Prophase I)		List II (Specific characters)	
A.	Diakinesis	I.	Synaptonemal complex formation
B.	Pachytene	II.	Completion of terminalisation of chiasmata
C.	Zygotene	III.	Chromosomes look like thin threads
D.	Leptotene	IV.	Appearance of recombination nodules

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

Ans. (4)

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

Assertion A : Breast-feeding during initial period of infant growth is recommended by doctors for bringing a healthy baby.

Reason R: Colostrum contains several antibodies absolutely essential to develop resistance for the new born baby.

In the light of the above statements, choose the most appropriate answer from the options given below:

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

Ans. (2)

184. Match List I with List II:

List I	List II
A. Down's syndrome	I. 11 th chromosome
B. α -Thalassemia	II. 'X' chromosome
C. β -Thalassemia	III. 21 st chromosome
D. Klinefelter's syndrome	IV. 16 th chromosome

Choose the correct answer from the options given below:

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

Ans. (4)

185. Match List I with List II:

List I	List II
A. Pons	I. Provides additional space for Neurons, regulates posture and balance
B. Hypothalamus	II. Controls respiration and gastric secretions.
C. Medulla	III. Connects different regions of the brain
D. Cerebellum	IV. Neuro secretory cells

- (1) A-II; B-I, C-III, D-IV

- (2) A-II; B-III, C-I, D-IV

- (3) A-III; B-IV, C-II, D-I

- (4) A-I; B-III, C-II, D-IV

Ans. (3)

ZOOLOGY

SECTION-B

(Candidates can choose to attempt any 10 questions only)

186. As per ABO blood grouping system, the blood group of father is B⁺, mother is A⁺ and child is O⁺. Their respective genotype can be :

- A. I^Bi / I^Ai / ii
B. I^BI^B / I^AI^A / ii
C. I^AI^B / ii^A / I^Bi
D. I^Ai / I^Bi / I^Ai
E. ii^B / ii^A / I^AI^B

Choose the most appropriate answer from the options given below :

- (1) D & E only (2) A only
(3) B only (4) C & B only

Ans. (2)

187. Match List I with List II :

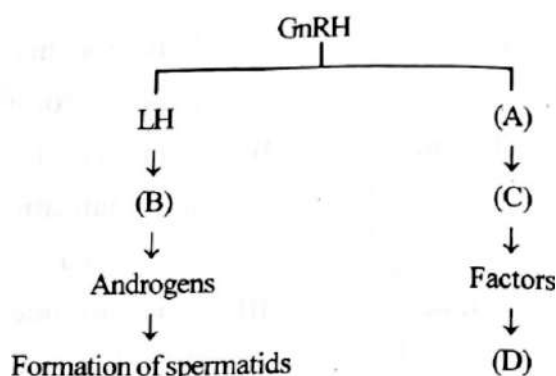
List I	List II
A. Unicellular glandular epithelium	I. Salivary glands
B. Compound epithelium	II. Pancreas
C. Multicellular glandular epithelium	III. Goblet cells of alimentary canal
D. Endocrine glandular epithelium	IV. Moist surface of buccal cavity

Choose the correct answer from the options given below :

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

Ans. (4)

188. Identify the correct option (A), (B), (C), (D) with respect to spermatogenesis.



- (1) ICSH, Leydig cells, Sertoli cells, spermatogenesis.
 (2) FSH, Leydig cells, Sertoli cells, spermiogenesis
 (3) ICSH, Interstitial cells, Leydig cells, spermiogenesis.
 (4) FSH, Sertoli cells, Leydig cells, spermatogenesis.

Ans. (2)

189. Given below are two statements :

Statement I : Gause's competitive exclusion principle states that two closely related species competing for different resources cannot exist indefinitely.

Statement II : According to Gause's principle, during competition, the inferior will be eliminated. This may be true if resources are limiting.

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

- (1) Statement I is false but Statement II is true.
 (2) Both Statement I and Statement II are true.
 (3) Both Statement I and Statement II are false.
 (4) Statement I is true but Statement II is false.

Ans. (1)

190. Match List I with List II related to digestive system of cockroach.

- | | |
|---|-------------------------|
| A. The structures used for storing off food. | I. Gizzard |
| B. Ring of 6-8 blind tubules at junction of foregut and midgut. | II. Gastric Caeca |
| C. Ring of 100-150 yellow coloured thin filaments at junction | III. Malpighian tubules |

of midgut and hindgut.

- D. The structures used for grinding the food.

Choose the correct answer from the options given below :

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

Ans. (2)

191. Match List I with List II :

- | List I | List II |
|--------------------|------------------------|
| A. Mesozoic Era | I. Lower invertebrates |
| B. Proterozoic Era | II. Fish & Amphibia |
| C. Cenozoic Era | III. Birds & Reptiles |
| D. Paleozoic Era | IV. Mammals |

Choose the correct answer from the options given below :

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

Ans. (1)

192. Match List I with List II :

- | List-I | List II |
|----------------|---|
| A. P wave | I. Heart muscles are electrically silent. |
| B. QRS complex | II. Depolarisation of ventricles. |
| C. T wave | III. Depolarisation of atria. |
| D. T-P gap | IV. Repolarisation of ventricles |

Choose the correct answer from the options given below :

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

Ans. (3)

193. The following are the statements about non-chordates :

- A. Pharynx is perforated by gill slits.
 B. Notochord is absent.
 C. Central nervous system is dorsal.
 D. heart is dorsal if present.
 E. Post anal tail is absent.

Choose the most appropriate answer from the options given below :

- (1) B, C & D only (2) A & C only
 (3) A, B & D only (4) B, D & E only

Ans. (4)

194. Regarding catalytic cycle of an enzyme action, select the correct sequential steps :

- A. Substrate enzyme complex formation.
- B. Free enzyme ready to bind with another substrate.
- C. Release of products.
- D. Chemical bonds of the substrate broken.
- E. Substrate binding to active site.

Choose the correct answer from the options given below :

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

Ans. (2)

195. Given below are two statements :

Statement I : Bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.

Statement II : Both bone marrow and thymus provide micro environments for the development and maturation of T-lymphocytes.

In the light of the above statements, choose the most appropriate answer from the options given below :

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

Ans. (2)

196. Match **List I** with **List II** :

- | List I | List II |
|---------------------------------|------------------|
| A. RNA polymerase III | I. snRNPs |
| B. Termination of transcription | II. Promotor |
| C. Splicing of Exons | III. Rho factor |
| D. TATA box | IV. SnRNAs, tRNA |

Choose the correct answer from the options given below :

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

Ans. (1)

197. Match List I with List II.

- | List I | List II |
|------------------------|---|
| A. Exophthalmic goiter | I. Excess secretion of cortisol, moon face & hyperglycemia |
| B. Acromegaly | II. Hypo-secretion of thyroid hormone and stunted growth. |
| C. Cushing's syndrome | III. Hyper-secretion of thyroid hormone & protruding eye balls. |
| D. Cretinism | IV. Excessive secretion of growth hormone. |

Choose the correct answer from the options given below :

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

Ans. (1)

198. Choose the correct statement given below regarding juxta medullary nephron.

- (1) Juxta medullary nephrons outnumber the cortical nephrons.
- (2) Juxta medullary nephrons are located in the columns of Bertini.
- (3) Renal corpuscle of juxta medullary nephron lies in the outer portion of the renal medulla.
- (4) Loop of Henle of juxta medullary nephron runs deep into medulla.

Ans. (4)

199. Given below are two statements :

Statement I : The cerebral hemispheres are connected by nerve tract known as corpus callosum.

Statement II : The brain stem consists of the medulla oblongata, pons and cerebrum.

In the light of the above statements, choose the most appropriate answer from the options given below :

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

Ans. (4)

200. Given below are two statements :

Statement I : Mitochondria and chloroplasts are both double membrane bound organelles.

Statement II : Inner membrane of mitochondria is relatively less permeable, as compared to chloroplast.

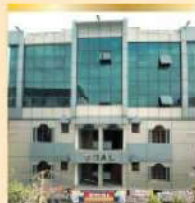
In the light of the above statements, choose the most appropriate answer from the options given below :

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

Ans. (4)

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