

PHYSICS

SECTION - A (Answer all the questions)

1. A tightly wound 100 turns coil of radius 10 cm carries a current 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 unit):
 1) 4.4 mT 2) 44 T 3) 44 mT 4) 4.4 T

KEY : 1

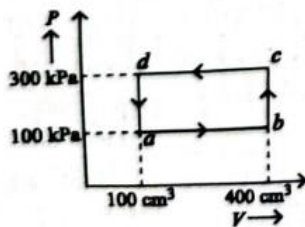
2. Match List-I with List II.
 List-I (Material) List-II (Susceptibility (x))
 A. Diamagnetic I. $x = 0$
 B. Ferromagnetic II. $0 > x \geq -1$
 C. Paramagnetic III. $x \gg 1$
 D. Non-magnetic IV. $0 < x < \epsilon$ (a small positive number)

Choose the correct answer from the options given below

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

KEY : 3

3. A thermodynamic system is taken through the cycle abcda. The work done by the gas along the path bs is:



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

KEY : 3

4. An unpolarized light beam strikes a glass surface at Brewster's angle. then
 1) both reflected and refracted light will be completely polarised
 2) the reflected light will be completely polarised but the refracted light will be partially polarised.
 3) the reflected light will be partially polarised.
 4) the refracted light will be completely polarised.

KEY : 2

5. In an ideal transformer, the turns 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 : 1 2) 1 : 4 3) 1 : 2 4) 2 : 1

KEY : 4

6. 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) \bar{B} 2) B 3) $A \cdot B + \bar{A}$ 4) $A \cdot \bar{B} + \bar{A}$

KEY : 1

7. 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) $100N$ 2) $10(N + 1)$
 3) $\frac{1}{10N}$ 4) $\frac{1}{100(N + 1)}$

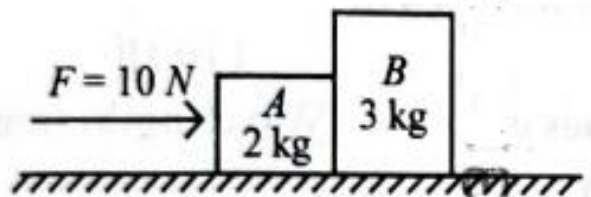
KEY : 4

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

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

KEY : 3

9. 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 :



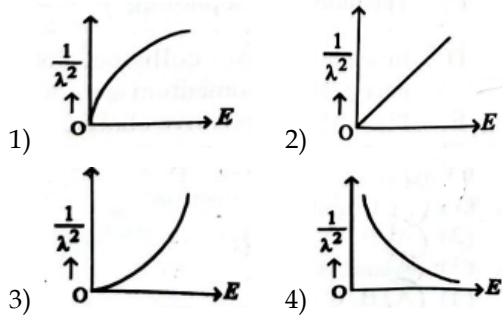
- 1) 6 N 2) 10 N 3) zero 4) 4 N

KEY : 1

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

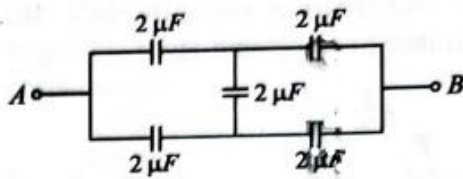
KEY : 1

11. 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):



KEY : 2

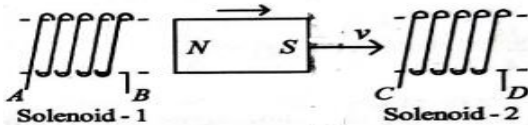
12. In the following circuit, the equivalent capacitance between terminal A and terminal B is :



- 1) $0.5 \mu F$ 2) $4 \mu F$
3) $2 \mu F$ 4) $1 \mu F$

KEY : 3

13.

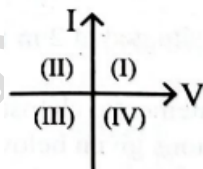


In the above diagram, a strong bar magnet is moving towards solenoid-2 from solenoid-1. The direction of induced current in solenoid-1 and that in solenoid-2, respectively, are through the directions:

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

KEY : 3

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



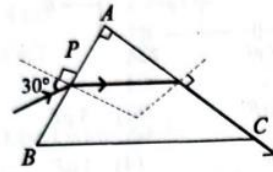
A. For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.

B. In a reverse biased pn junction diode, the current measured in (μA) , is due to majority charge carriers.

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

KEY : 3

15. A light ray 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) $\frac{\sqrt{3}}{4}$ 2) $\frac{\sqrt{3}}{2}$ 3) $\frac{\sqrt{5}}{4}$ 4) $\frac{\sqrt{5}}{2}$

KEY : 4

16. 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 2 m distance (r) from the centre of the dipole of dipole moment vector \vec{P} of magnitude, $4 \times 10^{-6} C m$, is $\pm 9 \times 10^3 V$.

(Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9$ 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 2 m 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 true but R is false.
2) A is false but R is true.
3) Both A and R true and R is the correct explanation of A.
4) Both A and R are true and R is NOT the correct explanation of A.

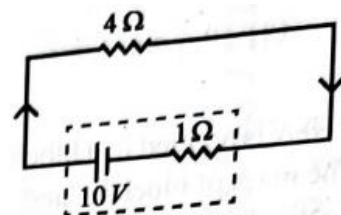
KEY : 1

17. The moment of inertial 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 400 g rod is nearly :

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

KEY : 3

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



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

KEY : 1

19. 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-IV, B-III, C-I, D-II 2) A-I, B-II, C-III, D-IV
3) A-II, B-I, C-IV, D-III 4) A-III, B-IV, C-II, D-I

KEY : 4

20. If c is the velocity of light in free space, the correct statements about photon among the following are :
- A. The energy of photon is $E = hv$.
B. The velocity of photon is c .
C. The momentum of photon, $P = \frac{hv}{c}$.
D. In a photon-electron collision, both total energy and total energy momentum are conserved.
E. Photon possesses positive charge.
- Choose the correct answer from the options given below :
- 1) A, C and D only 2) A, B, D and E only
3) A and B only 4) A, B, C and D only

KEY : 4

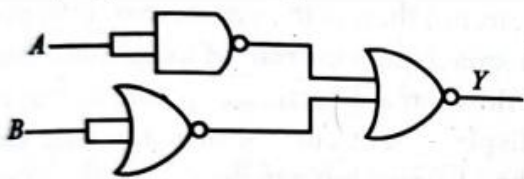
21. $^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$
- In the nuclear emission stated above, the mass number and atomic number of the product Q respectively, are :
- 1) 288, 82 2) 286, 81 3) 280, 81 4) 286, 80

KEY : 2

22. 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) 7 2) 6 3) 10 4) 5

KEY : 3

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



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

KEY : 2

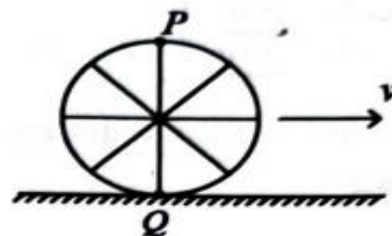
24. The mass of planet is $\frac{1}{10}$ th that of the earth and its diameter is half that of the earth. The acceleration due to gravity on that planet is :
- 1) 4.9 m s^{-2} 2) 3.92 m s^{-2}
3) 19.6 m s^{-2} 4) 9.8 m s^{-2}

KEY : 2

25. 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 characteristics spectrum.
In the light of the above statements, choose the most appropriate answer from the options given below :
- 1) Statement I is correct but Statement II is incorrect.
2) Statement I is incorrect but Statement II is correct.
3) Both Statement I and Statement II are correct.
4) Both Statement I and Statement II are incorrect.

KEY : 1

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

KEY : 4

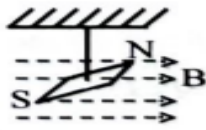
27. A particle moving with uniform speed in a circular path maintains :
- 1) constant velocity but varying acceleration.
2) varying velocity and varying acceleration.
3) constant velocity.
4) constant acceleration.

KEY : 2

28. A thin flat circular disc of radius 4.5 cm 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) 1.98 mN 2) 99 N 3) 19.8 mN 4) 198 N

KEY : 3

29. In a uniform magnetic field of 0.49 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) $50 \pi^2$ 2) $1280 \pi^2$ 3) $4 \pi^2$ 4) $128 \pi^2$

KEY : 2

30. 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) 4 : 1 2) 1 : 4 3) 1 : 2 4) 2 : 1

KEY : 4

31. If $x = 5 \sin\left(\pi t + \frac{\pi}{3}\right) \text{ m}$ represents the motion

of a particle executing simple harmonic, the amplitude and time period of motion, respectively, are :

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

KEY : 4

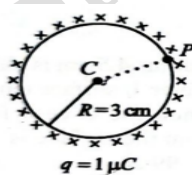
32. The quantities which have the same dimensions as those of solid angle are :

- 1) strain and arc 2) angular speed and stress
3) strain and angle
4) stress and angle

KEY : 3

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



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

KEY : 2

34. A bob whirled in a horizontal plane by means of a string with an initial speed of ω rpm. The tension in the string is T. If speed becomes 2ω while keeping the same radius, the tension in the string becomes :

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

KEY : 4

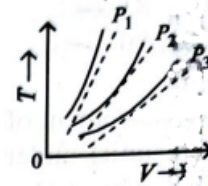
35. A wire of length 'l' and resistance 100Ω is divided into 10 equal parts. The first 5 parts are connected in series while the next 5 parts are connected in parallel. The two combinations are again connected in series. The resistance of this final combination is :

- 1) 55Ω 2) 60Ω 3) 26Ω 4) 52Ω

KEY : 4

SECTION - B (Answer any 10 questions only)

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



Then the correct relation is :

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

KEY : 2

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

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

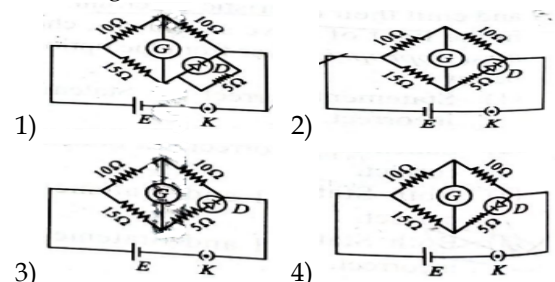
KEY : 4

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

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

KEY : 2

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



KEY : 3

40. If the plates of a 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
- B, D and E only
 - A, B and C only
 - A, B and E only
 - A, C and E only

KEY : 4

41. 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 constants, is :
- $\alpha\beta t$
 - $\frac{\alpha\beta}{t}$
 - $\frac{\beta t}{\alpha}$
 - $\frac{\alpha t}{\beta}$

KEY : 4

42. A metallic bar of Young's modulus, $0.5 \times 10^{11} \text{ Nm}^{-2}$ and coefficient of linear thermal expansion $10^{-5} \text{ }^\circ\text{C}^{-1}$ 1 m 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 :
- $100 \times 10^3 \text{ N}$
 - $2 \times 10^3 \text{ N}$
 - $5 \times 10^3 \text{ N}$
 - $50 \times 10^3 \text{ N}$

KEY : 4

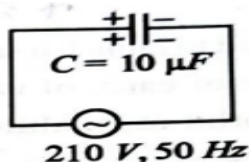
43. A small telescope has an objective of focal length 140 cm and an eye piece of focal length 5.0 cm. The magnifying power of telescope for viewing a distant object is :
- 17
 - 32
 - 34
 - 28

KEY : 4

44. An iron bar 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 :
- $2M$
 - $\frac{M}{\sqrt{3}}$
 - M
 - $\frac{M}{2}$

KEY : 4

45. 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 ($\pi = 3.14$):



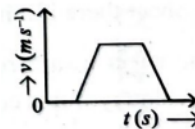
- 1.20 A
- 0.35 A
- 0.58 A
- 0.93 A

KEY : 4

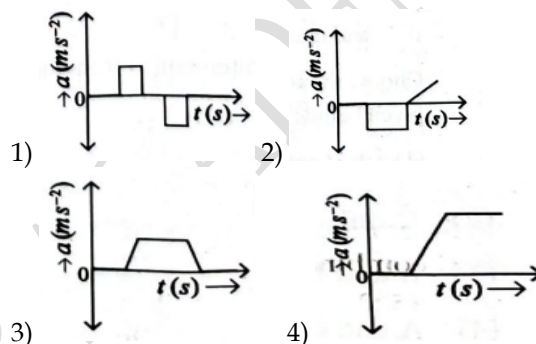
46. Two heaters A and B have power rating of 1 kW and 2 kW, respectively. Those two are first connected in series and then in parallel to a fixed power source. The ratio of power outputs for these two cases is :
- 1 : 2
 - 2 : 3
 - 1 : 1
 - 2 : 9

KEY : 4

47. 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 :



KEY : 1

48. 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 :

- $2\sqrt{3}$
- 4
- $\sqrt{3}$
- $\sqrt{2}$

KEY : 4

49. 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 :

- $\frac{GmM}{2R}$
- $\frac{GmM}{3R}$
- $\frac{5GmM}{6R}$
- $\frac{2GmM}{3R}$

KEY : 3

50. A sheet is placed on a horizontal surface in front of a strong magnetic pole. A force is needed to :
- hold the sheet there if it is magnetic.
 - hold the sheet there if it is non-magnetic.
 - move the sheet away from the pole with uniform velocity if it is conducting.
 - 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:
- A, C and D only
 - C only
 - B and D only
 - A and C only.

KEY : 1

CHEMISTRY

SECTION - A (Answer all the questions)

51. Match List I with list II.

List I	List II
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	III. 1F
D. 1 mol of FeO to Fe_2O_3	IV. 5F

Chose the correct answer from the options given below:

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

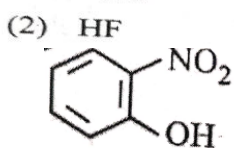
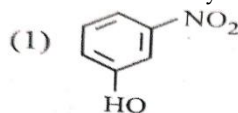
KEY : 3

52. Which reaction is Not a redox reaction?

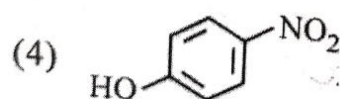
- 1) $H_2 + Cl_2 \rightarrow 2HCl$
2) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$
3) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
4) $2KClO_3 + I_2 \rightarrow 2KIO_3 + Cl_2$

KEY : 2

53. Intramolecular hydrogen bonding is present in



3)



KEY : 3

54. Fehling's solutions 'A' is

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

KEY : 3

55. 1 gram of sodium hydroxide was treated with 25mL of 0.75M HCl solutions, the mass of sodium hydroxide left underreacted is equal to

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

KEY : 4

56. Match list I with list II

A. NH_3	I. Trigonal pyramidal
B. BrF_5	II. Square Planar
C. XeF_4	III. Octahedral
D. SF_6	IV. Square pyramidal

KEY : 3

57. The E^0 value for Mn^{3+}/Mn^{2+} couple is more positive than that of Cr^{3+}/Cr^{2+} or Fe^{2+} due to change of

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

KEY : 1

58. Match list I with list II

A. Isothermal process	I. No heat exchange
B. Isochoric process	II. Carried temperature
C. Isobaric process	III. Carried out at constant volume
D. Adiabatic process	IV. Carried out at constant pressure

Choose the correct answer from the options given below

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

KEY : 2

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

- 1) orientation of reactant molecules during collision.
2) Rate constant at two different temperatures.
3) Rate constant at standard temperatures.
4) Probability of collision.

KEY : 2

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

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

KEY : 1

61. '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) B and C only 2) A and D only
3) B and D only 4) A and E only

KEY : 3

62. Arrange the following elements in increasing order of electronegativity.

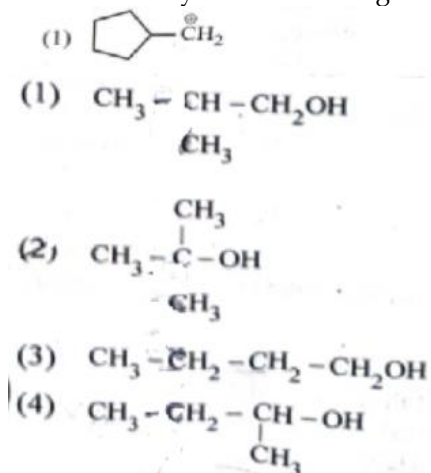
N, O, F, C, Si

Choose the correct answer from the options given below

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

KEY : 3

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



KEY : 2

64. 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 behavior.

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

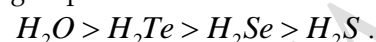
In the light of the above statements, choose the correct answer from the options given below;

- Statement I is true but Statement II is false
- Statement I is false but Statement II is true
- Both Statement I and Statement II is true
- Both Statement I and Statement II false

KEY : 3

65. Given below are two statements:

Statement 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 points than the other members of the group but due to the presence of extensive H-bonding in H_2O , it has higher boiling point.

- Statement I is true but Statement II is false
- Statement I is false but Statement II is true
- Both Statement I and Statement II is true
- Both Statement I and Statement II false

KEY : 3

66. Match list I with list II

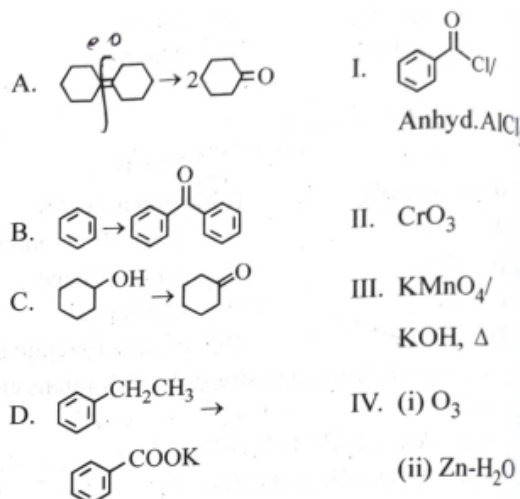
- | | |
|----------|-------------------------------------|
| A. m_l | I. Shape of orbital |
| B. m_s | II. Size of orbital |
| C. l | III. Orientation of orbital |
| D. n | IV. Orientation of spin of electron |

Choose the correct answer from the options given below

- A-III, B-IV, C-III, D-I
- A-II, B-I, C-IV, D-III
- A-I, B-III, C-II, D-IV
- A-III, B-IV, C-I, D-II

KEY : 4

67. Match List I with List II

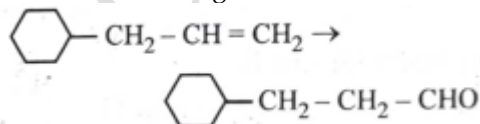


Choose the correct answer from the options given below

- A-IV, B-I, C-II, D-III
- A-I, B-IV, C-III, D-II
- A-IV, B-I, C-III, D-II
- A-III, B-I, C-II, D-IV

KEY : 1

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



- (i) BH_3 (ii) $\text{H}_2\text{O}_2 / \text{O}^\ominus\text{H}$ (iii) alk. KMnO_4 (iv) $\text{H}_3\text{O}^\oplus$
- (i) $\text{H}_2\text{O} / \text{H}^+$ (ii) PCC
- (i) $\text{H}_2\text{O} / \text{H}^+$ (ii) CrO_3
- (i) BH_3 (ii) $\text{H}_2\text{O} / \text{O}^\ominus\text{H}$ (iii) PCC

KEY : 4

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

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

Choose the correct options from the given below:

- B and E
- E and D
- B and C
- A and D

KEY : 1

70. Match List I with List II

- | | |
|----------------------------------|---|
| List I | List II |
| A. ethane | I. one σ -bond and two π -bonds |
| B. ethane | II. two π -bonds |
| C. carbon molecule, C_2 | III. one σ -bond |
| D. ethyne | IV. one σ -bond and two π -bonds |
- A-III B-IV, C-II, D-IV
 - A-III, B-IV, C-I, D-II
 - A-I, B-IV, C-II, D-III
 - A-IV, B-III, C-II, D-I

KEY : 1

71. Among group 16 elements, which one does NOT show -2 oxidation state?

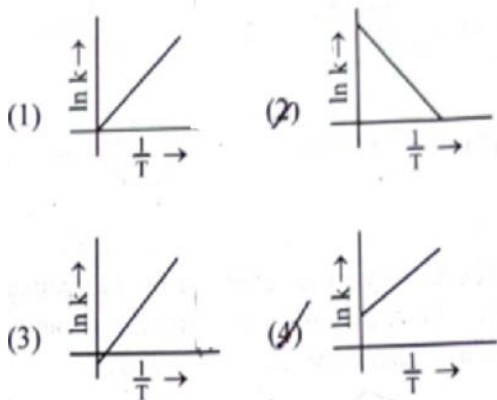
- Te
- Po
- O
- Se

KEY : 2

72. For the reactions $2A \rightleftharpoons B + C$, $K_c = 4 \times 10^{-3}$.
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 a tendency to go in backward direction.
2) Reaction has gone to completion in forward direction.
3) Reaction is at equilibrium.
4) Reactions has a tendency to go in forward direction.

KEY : 1

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



KEY : 2

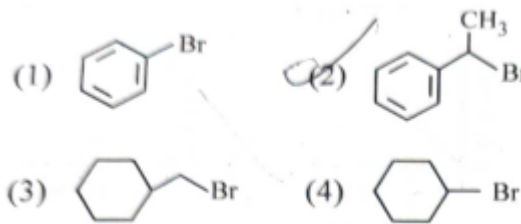
74. In which of the following equilibria, K_p and K_c are NOT equal?
(1) $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$
(2) $2BrCl(g) \rightleftharpoons Br_2(g) + Cl_2(g)$
(3) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
(4) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

KEY : 3

75. Given below are two statements
Statement I : The boiling point of three isomeric pentanes follows the Order n – pentane isopentane 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 Borrect but Statement II is incorrect.
(2) Statement I is incorrect but Statement II is correct.
(3) Both Statement I and Statement II are correct.
(4) Both Statemehif I and Statement II are incorrect.

KEY : 3

76. The compound that will undergo reaction with the fastest rate is



KEY : 2

77. The energy of an electron in the ground state ($n=1$) for He ion is $-x$, then that for an electron in $n=2$ state for Be^{3+} ion in J is:
1) $-4x$ 2) $-\frac{4}{9}x$ 3) $-x$ 4) $-\frac{x}{9}$

KEY : 3

78. In which of the following processes entropy increases?
A. A liquid evaporates to vapour.
B. Temperature of a crystalline solid lowered from to .
C. $2NaHCO_{3(g)} \rightarrow NaCO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$
D. $Cl_{2(g)} \rightarrow 2Cl(g)$

Choose the correct answer from the option the options given below:

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

KEY : 1

79. On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for the purification of such solid substances based on the above principle is known as
1) Distillation 2) Chromatography
3) Crystallization 4) Sublimation

KEY : 4

80. Match List I with List II

List I	List II
A. $[Co(NH_3)_5(NO_2)]Cl_2$	I. Solvate isomerism
B. $[Co(NH_3)_5(SO_4)]Br$	II. Linkage isomerism
C. $[Co(NH_3)_6] [Cr(CN)_6]$	III. Ionization isomerism
D. $[Co(H_2O)_6]Cl_3$	IV. Coordination isomerism

KEY : 3

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

KEY : 3

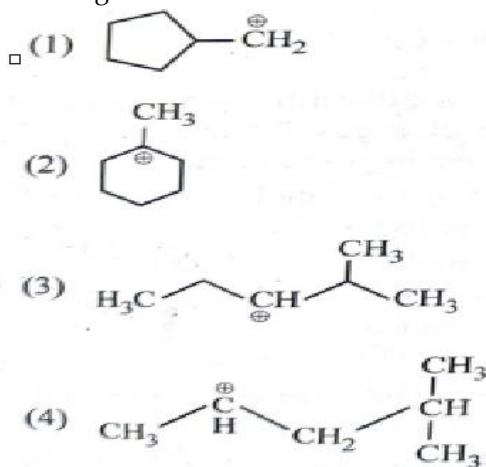
82. Arrange the following elements in increasing order of first ionization enthalpy: Li, Be, B, C, N
Choose the correct answer from the options given below:
- 1) Li < Be < C < B < N
 - 2) Li < Be < N < B < C
 - 3) Li < Be < B < C < N
 - 4) Li < B < Be < C < N

KEY : 4

83. The highest number of helium atoms is in
- (1) 4g of helium
 - (2) 2.271098L of helium at STP
 - (3) 4mol of helium
 - (4) 4 of helium

KEY : 3

84. The most stable carbocation among the following is:



KEY : 2

85. The Henry's law constant (K_H) values of three gases (A, B, C) in water are $145, 2 \times 10^{-5}$ and 35kbar, respectively. The solubility of these gases in water follow the order:
- 1) A > C > B
 - 2) A > B > C
 - 3) B > A > C
 - 4) B > C > A

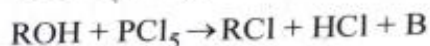
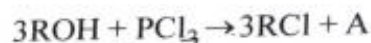
KEY : 4

SECTION - B (Answer any 10 questions only)

86. compound 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) AB_2C_2
 - 2) ABC_4
 - 3) A_2BC_2
 - 4) ABC_3

KEY : 4

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



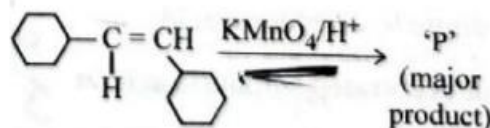
- (1) H_3PO_4 and $POCl_3$
- (2) H_3PO_3 and $POCl_3$
- (3) $POCl_3$ and H_3PO_3
- (4) $POCl_3$ and H_3PO_4

KEY : 2

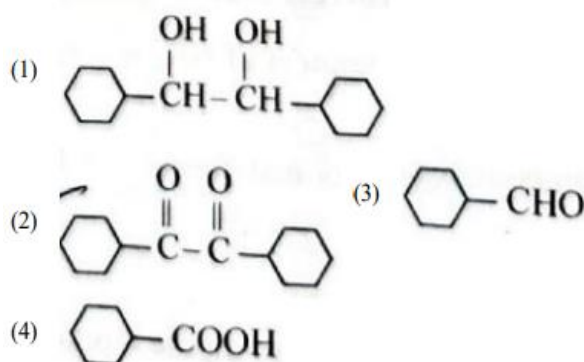
88. The plot of osmotic pressure Π vs concentration $molL^{-1}$ for a solution gives a straight line with slope $25.73Lbarmol^{-1}$. The temperature at which the osmotic pressure measurement is done is:
(Use $R = 0.083Lbarmol^{-1}K^{-1}$)
- 1) $25.73^\circ C$
 - 2) $12.05^\circ C$
 - 3) $37^\circ C$
 - 4) $310^\circ C$

KEY : 3

89. For the Given reaction:



'P' is



KEY : 4

90. Given below are two statements:

Statement I : $[Co(NH_3)_6]^{3+}$ is a homoleptic complex whereas $[Co(NH_3)_4Cl_2]^+$ is a heteroleptic complex.

Statement II : Complex $[Co(NH_3)_6]^{3+}$ has only one kind of ligands but $[Co(NH_3)_4Cl_2]^+$ 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 true but Statement II is false.
- 2) Statement I is false but Statement II is true.
- 3) Both Statement I and Statement II are true.
- 4) Both Statement I and Statement II are false.

KEY : 3

91. 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 nitric acid
 - 2) dilute sulphuric acid
 - 3) dilute hydrochloric acid
 - 4) concentrated sulphuric acid.

KEY : 2

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

KEY : 2

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

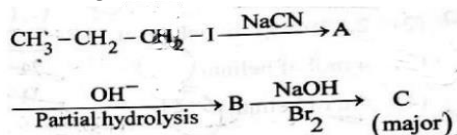
A. Al^{3+} B. Cu^{2+} C. Ba^{2+} D. Co^{2+}
E. Mg^{2+}

Choose the correct answer from the options given below:

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

KEY : 3

94. Identify the major product formed in the following



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

KEY : 3

95. The rate of a reaction quadruples when temperature changes from $27^\circ C$ to $57^\circ C$. Calculate the energy of activation. Given $R = 8.314 JK^{-1} mol^{-1}$, $\log 4 = 0.6021$
- 1) 3.80 kJ/mol
 - 2) 3804 kJ/mol
 - 3) 38.04 kJ/mol
 - 4) 380.4 kJ/mol

KEY : 3

96. Consider the following reaction in a sealed vessel at equilibrium with concentrations of $N_2 = 3.0 \times 10^{-3} M$, $O_2 = 4.2 \times 10^{-3} M$ and $NO = 2.8 \times 10^{-3}$
- $$2NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$$
- 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) 0.8889
 - 2) 0.717
 - 3) 0.00889
 - 4) 0.0889

KEY : 2

97. 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 $R = 2.0 \text{ cal } K^{-1} mol^{-1}$)

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

KEY : 4

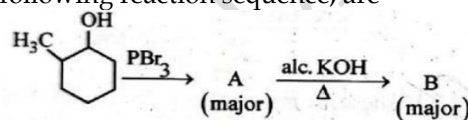
98. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is:

(Given: Molar mass of Cu : $63 \text{ g } mol^{-1}$, $1F = 96487 C$)

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

KEY : 4

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



- 1) A = 1-bromo-1-methylcyclohexane; B = 1-methylcyclohexene
- 2) A = 1-bromo-1-methylcyclohexane; B = 1-methylcyclohexanone
- 3) A = 1-bromo-1-methylcyclohexane; B = 1-methylcyclohexane
- 4) A = 1-bromo-1-methylcyclohexane; B = 1-methylcyclohexane

KEY : 3

100. The pair of lanthanoid ions which are diamagnetic is

- 1) Gd^{3+} and Eu^{3+}
- 2) Pm^{3+} and Sm^{3+}
- 3) Ce^{4+} and Yb^{2+}
- 4) Ce^{3+} and Eu^{2+}

KEY : 3

BOTANY

SECTION - A (Answer all the questions)

101. 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 passively inside water.
- Choose the correct answer from the options given below:
- 1) A, C, D and E only
 - 2) B, C, D and E only
 - 3) C, D and E only
 - 4) A, B, C and D only

KEY : 2

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

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

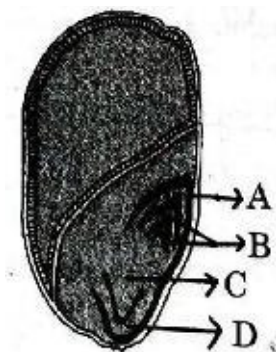
KEY : 4

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

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

KEY : 1

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



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

KEY : 1

105. Bulliform cells are responsible for

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

KEY : 3

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

- | | |
|--------------------|----------------|
| A. Light | B. Chlorophyll |
| C. CO ₂ | D. ATP |
| E. NADPH | |

Choose the correct answer from the options given below:

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

KEY : 1

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

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

KEY : 1

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

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

KEY : 4

109. 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 in tropics.
- 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 and E only
- 2) A, B and D only
- 3) A, C, D and E only
- 4) A and B only

KEY : 3

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

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

KEY : 4

111. How many molecules of ATP and NADPH are required for every molecule of CO₂ fixed in the Calvin cycle?

- 1) 3 molecules of ATP and 3 molecules of NADPH
- 2) 3 molecules of ATP and 2 molecules of NADPH
- 3) 2 molecules of ATP and 3 molecules of NADPH
- 4) 2 molecules of ATP and 2 molecules of NADPH

KEY : 2

112. These are regarded as major causes of biodiversity loss:

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

Choose the correct option:

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

KEY : 2

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

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

KEY : 3

114. The equation of Verhulst-Pearl logistic growth

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

is

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

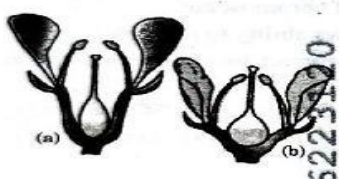
KEY : 1

115. Spindle fibers attach to kinetochores of chromosomes during

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

KEY : 4

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



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

KEY : 2

117. Match List I with List II

- | | |
|-------------|------------------|
| List - I | List - II |
| A. Rhizopus | I. Mushroom |
| B. Ustilage | II. Smut fungus |
| C. Puccinia | III. Bread mould |
| D. Agaricus | IV. Rust fungus |

Choose the correct answer from the options given below:

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

KEY : 3

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

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

KEY : 4

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

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

KEY : 4

120. 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 of 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-III, B-IV, C-I, D-II
- 2) A-IV, B-III, C-II, D-I
- 3) A-I, B-II, C-III, D-IV
- 4) A-II, B-I, C-III, D-IV

KEY : 1

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

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

KEY : 4

122. Match List I with List II

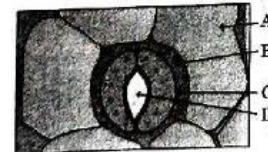
- | | |
|-----------------------------|-------------------|
| List - I | List - II |
| A. Clostridium butylicum | I. Ethanol |
| B. Saccharomyces cerevisiae | II. Streptokinase |
| C. Trichoderma polysporum | III. Butyric acid |
| D. Streptococcus sp. | IV. Cyclosporin-A |

Choose the correct answer from the options given below:

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

KEY : 1

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



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

KEY : 3

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

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

KEY : 3

125. A transcription unit in DNA is defined prima by the three regions in DNA and these are we respect to upstream and down steam end.

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

KEY : 2

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

- A. The piece of DNA would be able to multiple itself independently in the progeny cells 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 integrate part of chromosome.
- E. It shows ability to replicate

Choose the correct answer from the options given below:

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

KEY : 1

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

- 1) Does not affect mature monocotyledonous plants.
2) Can help in cell division in grasses, the produce growth.
3) Promotes apical dominance.
4) Promotes abscission of mature leaves only

KEY : 1

128. The cofactor of the enzyme carboxypeptidase is

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

KEY : 3

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

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

KEY : 1

130. 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 appear as such in F₂ 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 monohybrid cross.
Choose the correct answer from the options given below:

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

KEY : 4

131. 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 into active form due to acidic pH of the insect gut.

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

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

KEY : 1

132. 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 true but Statement II is false
2) Statement I is false but Statement II is true
3) Both Statement I and Statement II are true
4) Both Statement I and Statement II are false

KEY : 2

133. Given below are two statements:

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

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

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

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

KEY : 3

134. Match List I with List II

List - I

List - II

A. Nucleolus

I. Site of formation of glycolipid

B. Centriole

II. Organization like the cartwheel

C. Leucoplasis

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

KEY : 3

135. List of endangered species was released by

- 1) FOAM 2) IUCN
3) GEAC 4) WWF

KEY : 2

SECTION - B (Answer any 10 questions only)

136. 136. The DNA present in chloroplast is:

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

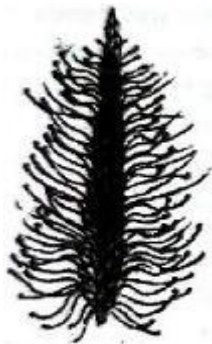
KEY : 4

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

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

KEY : 1

138. Identify the correct description about the given figure:



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

KEY : 3

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

- 1) Cytokinin
- 2) Abscisic acid
- 3) Auxin
- 4) Gibberellin

KEY : 4

140. Match List I with List II

- | List - I | List - II |
|----------------------------------|---|
| A. Frederict Griffith | I. Genetic code |
| B. Francois Jacob & Jacque Monod | II. Semi-conservative mode of DNA replication |
| C. Har Gobind Khorana | III. Transformation |
| D. Meselson & Stahl | IV. Lac operon |

Choose the correct answer from the options given below:

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

KEY : 4

141. 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 from the options given below:

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

KEY : 3

142. Given below are two statements:
Statement I : In C_3 plants, some O_2 binds RuBisCO, hence CO_2 fixation is decreased.
Statement II : In C_4 plants, mesophyll cells show very little photorespiration while bundle sheat 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 true but Statement II is false
2) Statement I is false but Statement II is true
3) Both Statement I and Statement II are true
4) Both Statement I and Statement II are false

KEY : 1

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

- 1) Succinyl-CoA - Succinic acid
- 2) Isocitrate - Alpha-ketoglutaric acid
- 3) Malic acid - Oxaloacetic acid
- 4) Succinic acid - Malic acid

KEY : 1

144. 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-III, B-IV, C-I, D-II
- 2) A-IV, B-III, C-II, D-I
- 3) A-I, B-II, C-III, D-IV
- 4) A-II, B-I, C-IV, D-III

KEY : 4

145. Which of the following statement is correct regarding the process of replication in E.coli?

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

KEY : 2

146. In an ecosystem if the Net Primary Productivity (NPP) of first trophic level is What would be the GPP (Gross Primary Productivity) of the third trophic level of the same ecosystem?

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

KEY : 1

147. Match List I with List II

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

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

KEY : 3

148. 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 plots
C. Paul Ehrlich	III. Global species diversity at about 7 million
D. David Tilman	IV. Rivet popper hypothesis

Choose the correct answer from the options given below:

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

KEY : 4

149. Match List I with List II

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

Choose the correct answer from the options below:

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

KEY : 3

150. 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 mannitol 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, C, D and E only
- 2) A, B, C and E only
- 3) A, B, C and D only
- 4) B, C, D and E only

KEY : 1

ZOOLOGY

SECTION - A (Answer all the questions)

151. 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-III, B-I, C-IV, D-II
- 2) A-II, B-IV, C-III, D-I
- 3) A-I, B-III, C-II, D-IV
- 4) A-IV, B-III, C-I, D-II

KEY : 4

152. Match List I With List II :

List I	List II
A) Non-medicated IUD	I. Multiloop 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-IV, B-I, C-II, D-III
- (2) A-III, B-I, C-IV, D-II
- (3) A-III, B-I, C-II, D-IV
- (4) A-I, B-III, C-IV, D-II

KEY : 2

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

KEY : 1

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

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

KEY : 4

155. 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

Choose the correct answer from the options given below :

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

KEY : 4

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

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

KEY : 2

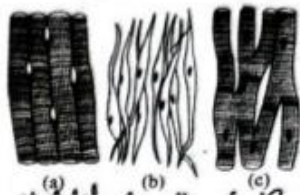
157. Which one is the correct product of DNA dependent RNA polymerase to the given template?

3'TACATGGCAAATATCCATTCA5'

- 1) 5'AUGUACCGUUUUAUAGGGAAGU3'
- 2) 5'ATGTACCGTTTATAGGTAAGT3'
- 3) 5'AUGUACCGUUUUAUAGGUAAGU3'
- 4) 5' AUGUAAAGUUUUAUAGGUAAGU3'

KEY : 3

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



(a) Skeletal (b) Smooth (c) Cardiac
Name of Muscle / Location

- (1) (a) Skeletal - Biceps
(b) Involuntary- Intestine
(c) Smooth - Heart
- (2) (a) Involuntary- Nose tip
(b) Skeletal - Bone
(c) Cardiac- Heart.
- (3) (a) Smooth - Toes
(b) Skeletal - Legs
(c) Cardiac - Heart.
- (4) (a) Skeletal- Triceps
(b) Smooth- Stomach
(c) Cardiac - Heart.

KEY : 4

159. 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) B-D-E-A-C
- 2) E-C-A-D-B
- 3) C-E-D-A-B
- 4) E-B-D-A-C

KEY : 2

160. 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) B, C & E only
- 2) C, D & E only
- 3) A, B & D only
- 4) A, B & E only

KEY : 4

161. 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. Phosphodiester bond |

Choose the correct answer from the options give below :

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

KEY : 1

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

- 1) Convergent evolution
- 2) Divergent evolution
- 3) Adaptive evolution
- 4) Natural evolution

KEY : 1

163. 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 give below :

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

KEY : 3

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

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

KEY : 2

165. 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 stages from the options given below :

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

KEY : 2

166. 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 stages from the options given below :

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

KEY : 3

167. Which of the following factors are favorable for the formation of oxyhaemoglobin in alveoli ?

- 1) Low pCO₂ and High H⁺ concentration
- 2) Low pCO₂ and High temperature
- 3) High pO₂ and High pCO₂
- 4) High pO₂ and Lesser H⁺ concentration

KEY : 4

168. Match List I with List II :

- | List I | List II |
|-------------------------------|--------------------|
| A. a-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 give below :

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

KEY : 1

169. Give 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.

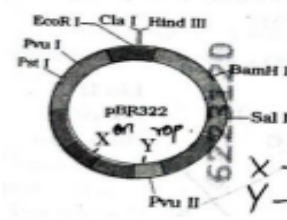
Reason R : Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

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

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

KEY : 2

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



1) The gene 'X' is for protein involved in replication of Plasmid and 'Y' for resistance to antibiotics.

2) Gene 'X' is responsible for recognition sites and 'Y' is responsible for antibiotic resistance.

3) The gene 'X' is responsible for resistance to antibiotics and 'Y' for protein involved in the replication of Plasmid.

4) The gene 'X' is responsible for controlling the copy number of the linked DNA and 'Y' for protein involved in the replication of plasmid

KEY : 4

171. Match List I with List II :

- | List I | List II |
|--------------|----------------------------------|
| A. Cocaine | I. Effective sedative in surgery |
| B. Heroin | II. Cannabis sativa |
| C. Morphine | III. Erythroxylum |
| D. Marijuana | IV. Papaver sommiferum |

Choose the correct answer from the options give below :

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

KEY : 2

172. 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 option given below :

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

KEY : 4

173. Given below are two statements :

Statement I : In the nephron, the descending limb of loop of Henley 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 true but Statement II is false
- 2) Statement I is false but Statement II is true
- 3) Both statement I and Statement II are true
- 4) Both statement I and Statement II are false

KEY : 4

174. 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 give below :

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

KEY : 2

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

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

KEY : 2

176. Match List I with List II :

List I	List II
A. Pleurobrachra	I. Mollusca
B. Radula	II. Ctenophora
C. Stomochord	III. Osteichthyes
D. Air bladder	IV. Hemichordate

Choose the correct answer from the options give below :

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

KEY : 4

177. 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 give below :

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

KEY : 2

178. Which of the following statements is incorrect?

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

KEY : 1

179. Match List I with List II Choose the correct answer from the options given below:

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

KEY : 1

180. Match List I with List II :

List I	List II
A. Common cold	I. 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-III, B-I, C-II, D-IV 2) A-IV, B-II, C-III, D-I
3) A-II, B-IV, C-III, D-I 4) A-I, B-III, C-II, D-IV

KEY : 1

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

KEY : 3

182. Match List I with List:

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

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

KEY : 4

183. The "Ti plasmid" of Agrobacterium tumefaciens stands for

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

KEY : 1

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

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

KEY : 3

185. 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 th chromosome |
| D. Klinefelter's Syndrome | IV. 16 th chromosome |

Choose the correct answer from the options given below :

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

KEY : 1

SECTION - B (Answer any 10 questions only)

186. 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, D & E Only 2) B, C & D only
3) A & C only 4) A, B & D only

KEY : 1

187. 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-I, B-II, C-IV, D-III 2) A-III, B-I, C-IV, D-II
3) A-II, B-I, C-III, D-IV 4) A-III, B-I, C-II, D-IV

KEY : 2

188. Given below are two statements :

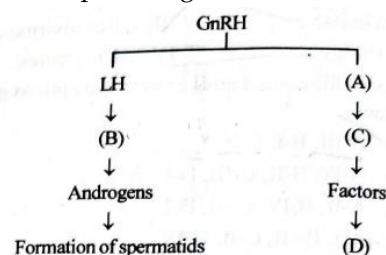
Statement I : The cerebral hemispheres are connected by nerve tract known as corpus callosum.

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

KEY : 1

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



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

KEY : 3

190. 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-III, B-IV, C-I, D-II 2) A-IV, B-III, C-I, D-II
3) A-II, B-IV, C-I, D-I -III 4) A-III, B-II, C-IV, D-I

KEY : 2

191. Match List I with List II :

- | | |
|-----------------------|---|
| List I | List II |
| A. Exophthalmic | 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-II, D-I 2) A-III, B-IV, C-I, D-II
3) A-I, B-III, C-II, D-IV 4) A-IV, B-II, C-I, D-III

KEY : 2

192. Match List I with 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 IV. Moist surface of buccal

Glandular epithelium cavity

Choose the correct answer from the options given below :

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

KEY : 1

193. 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 correct but Statement II is incorrect.
2) Statement I is incorrect but Statement II is correct.
3) Both Statement I and Statement II are correct.
4) Both Statement I and Statement II are incorrect.

KEY : 3

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

List I

List II

A. The structures used for storing of 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 thins filaments at junction of midgut and hindgut III. Malpighian tubules

D. The structures used for grinding the food. IV. Crop

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

KEY : 3

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

- 1) Loop of Henle of juxta medullary nephron runs deep into medulla.
2) Juxta medullary nephrons outnumber the cortical nephrons.
3) Juxta medullary nephrons are located in the columns of Bertini.

4) Renal corpuscle of juxta medullary nephron lies in the outer portion of the renal medulla.

KEY : 1

196. Match List I with List II :

Choose the correct answer from the options given below :

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

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

KEY : 4

197. 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

Choose the most appropriate answer from the options given below :

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

1) C & B only

2) D & E only

3) A only

4) B only

KEY : 1

198. 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 correct answer from the options given below:

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

KEY : 2

199. 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 give below :

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

KEY : 3

200. Given below are two statements :

Statement : 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 correct but Statement II incorrect.
2) Statement I is incorrect but Statement II correct
3) Both statement I and Statement II are correct
4) Both Statement I and Statement II incorrect.

KEY : 1

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