VMC MEDICAL

# NEET 2024 | Question Paper | Code – Q3

| Date: 05/05/2024 | Max. Marks: 720 |
|---|---|

## General Instructions

1. Immediately fill in the particulars on this page of the Test Booklet with Blue or Black Ball Point Pen. To mark answers on the OMR Sheet, use Blue or Black ball point pen only.
2. The Test Booklet consists of **200 questions**. There are questions of **Four subjects** in the paper namely **Physics, Chemistry, Botany & Zoology**. Questions of each subject are divided into two sections. **Section-A** contains **35 Questions** of a Subject all of which must be attempted. **Section-B** contains **15 Questions** of which any **10** can be attempted.
3. Each question is allotted **4 (four)** marks for correct response. For each wrong answer, **1 (One) mark** will be deducted. **No deduction** from the total score will be made if no response is indicated for an item in the answer sheet. Maximum marks of the paper are **720**.
4. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction 3 above.
5. No candidate is allowed to carry any text material, printed or written, mobile phone or any electronic device, etc. inside the examination room/hall.
6. **Do not fold or make any stray mark on the Answer Sheet.**
7. The candidates are governed by all Rules and Regulations of the Examination body with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Examination body.

**Name of the Candidate (In CAPITAL letters) :** .....

**Roll Number :** ☐☐☐☐☐☐☐☐☐☐☐☐

**OMR Sheet bar code Number :** ☐☐☐☐☐☐

**Candidate's Signature :** ..... **Invigilator's Signature :** .....

| SECTION – A | PHYSICS | 140 MARKS |
|---|---|---|

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

**2. 3** If the monochromatic source in Young's double slit experiment is replaced by white light, then:

**(1)** interference pattern will disappear

**(2)** there will be a central dark fringe surrounded by a few coloured fringes

**(3)** there will be a central bright white fringe surrounded by a few coloured fringes

**(4)** all bright fringes will be of equal width

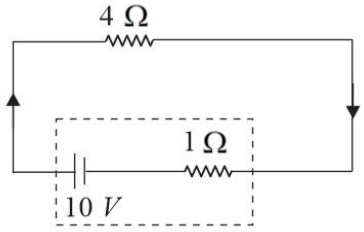
**3. 3** A logic circuit provides the output $Y$ as per the following truth table:

| $A$ | $B$ | $Y$ |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

The expression for the output $Y$ is:

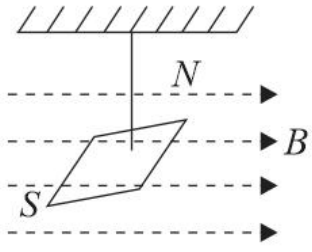
**(1)** $A\cdot B+\overline{A}$ **(2)** $A\cdot\overline{B}+\overline{A}$ **(3)** $\overline{B}$ **(4)** $B$

**4. 3** The terminal voltage of the battery, whose emf is $10V$ and internal resistance $1\,\Omega$, when connected through an external resistance of $4\,\Omega$ as shown in the figure is:




**(1)** $4\,V$ **(2)** $6\,V$ **(3)** $8\,V$ **(4)** $10\,V$

**5. 4** 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 $9.8\times10^{-6}\ kg\ m^2$. If the magnitude of magnetic moment of the needle is $x\times10^{-5}\ Am^2$; then the value of '$x$' is:

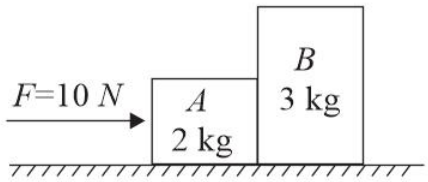



**(1)** $5\,\pi^2$ **(2)** $128\,\pi^2$ **(3)** $50\,\pi^2$ **(4)** $1280\,\pi^2$

**6. 2** 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)** $26\,\Omega$ **(2)** $52\,\Omega$ **(3)** $55\,\Omega$ **(4)** $60\,\Omega$

**7. 3** 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)** zero **(2)** 4 $N$ **(3)** 6 $N$ **(4)** 10 $N$

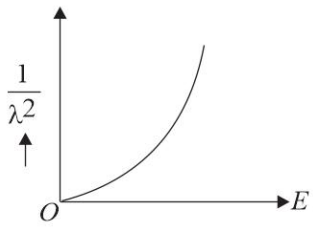
**8. 3** A tightly wound 100 turns coil of radius 10 cm carries a current of 7$A$. The magnitude of the magnetic field at the centre of the coil is (Take permeability of free space as $4\pi\times10^{-7}$ SI units):

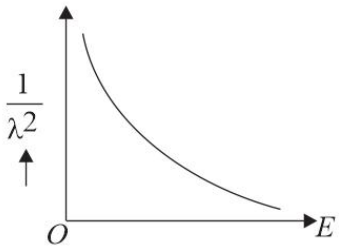
**(1)** 44 $mT$ **(2)** 4.4 $T$ **(3)** 4.4 $mT$ **(4)** 44 $T$

**9. 2** 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 : 2 **(2)** 2 : 1 **(3)** 1 : 1 **(4)** 1 : 4

**10. 4** The graph which shows the variation of $\left(\frac{1}{\lambda^2}\right)$ and its kinetic energy, E is (where $\lambda$ is de Broglie wavelength of a free particle):

**(1)**



**(2)**
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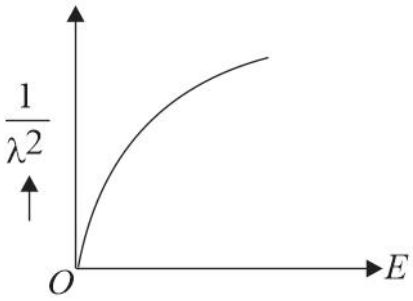


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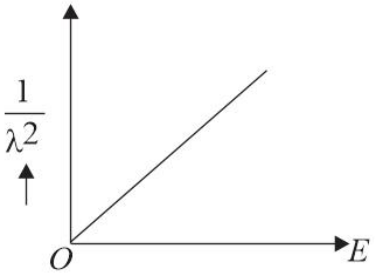


**11. 3** Given below are two statements:

**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)** Both Statement I and Statement II are correct.

**(2)** Both Statement I and Statement II are incorrect.

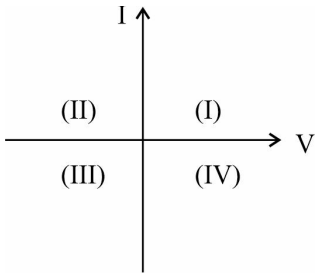
**(3)** Statement I is correct but Statement II is incorrect.

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

**12. 2** A bob is whirled in a horizontal plane by means of a string with an initial speed of $\omega$ rpm. The tension in the string is $T$. If speed becomes $2\omega$ while keeping the same radius, the tension in the string becomes:

**(1)** $T$ **(2)** $4T$ **(3)** $\frac{T}{4}$ **(4)** $\sqrt{2}\,T$

**13. 1** Consider the following statements A and B and identify the correct answer:



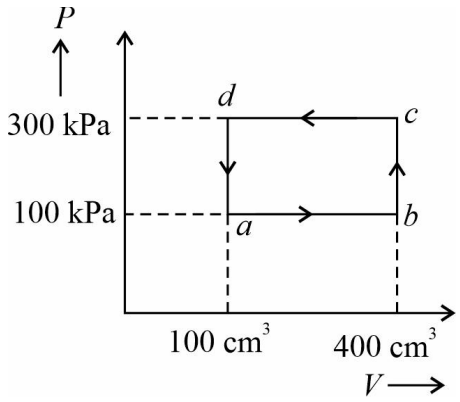

**A.** For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.

**B.** In a reverse biased *pn* junction diode, the current measured in $(\mu A)$, is due to majority charge carriers.

**(1)** A is correct but B is incorrect. **(2)** A is incorrect but B is correct.

**(3)** Both A and B are correct. **(4)** Both A and B are incorrect.

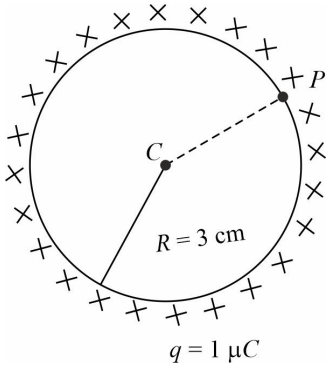
**14. 1** A thermodynamic system is taken through the cycle $abcda$. The work done by the gas along the path $bc$ is:




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

**15. 4** A thin spherical shell is charged by some source. The potential different between the two points $C$ and $P$ (in $V$) shown in the figure is:

$\left(\text{Take } \frac{1}{4\pi \in_0} = 9\times10^9 \text{ SI units}\right)$




**(1)** $3\times10^5$ **(2)** $1\times10^5$ **(3)** $0.5\times10^5$ **(4)** zero

**16. 1** 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 400 g rod is nearly:

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

**17. 4** A particle moving with uniform speed in a circular path maintains:

**(1)** constant velocity.

**(2)** constant acceleration.

**(3)** constant velocity but varying acceleration.

**(4)** varying velocity and varying acceleration.

**18. 2** If $c$ is the velocity of light in free space, the correct statement 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:

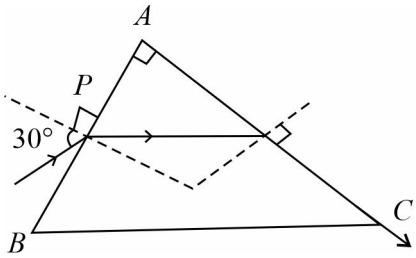
**(1)** A and B only **(2)** A, B, C and D only

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

**19. 1** At any instant of time $t$, the displacement of any particle is given by $2t - 1$ (SI unit) under the influence of force of 5$N$. The value of instantaneous power is (in SI unit):

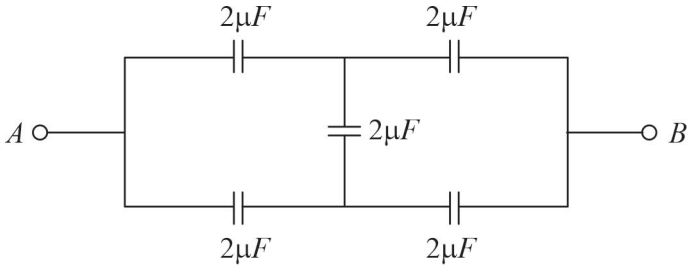
**(1)** 10 **(2)** 5 **(3)** 7 **(4)** 6

**20. 2** 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)** $\frac{\sqrt{5}}{4}$ **(2)** $\frac{\sqrt{5}}{2}$ **(3)** $\frac{\sqrt{3}}{4}$ **(4)** $\frac{\sqrt{3}}{2}$

**21. 1** In the following circuit, the equivalent capacitance between terminal $A$ and terminal $B$ is:




**(1)** 2 μF **(2)** 1 μF **(3)** 0.5 μF **(4)** 4μF

**22. 1** The quantities which have the same dimensions as those of solid angle are:

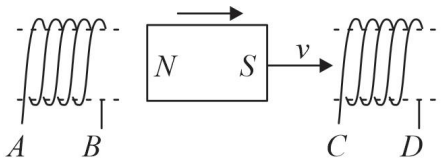
**(1)** Strain and angle **(2)** Stress and angle

**(3)** Strain and arc **(4)** Angular speed and stress

**23. 1** The maximum elongation of a steel wire of 1 m length if the elastic limit of steel and its Young's modulus, respectively, are $8\times10^{8}$ N m$^{-2}$ and $2\times10^{11}$ N m$^{-2}$, is:

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

**24. 1**




Solenoid-1 Solenoid-2

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 is solenoid-2, respectively, are through the directions.

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

**25. 4** The mass of a planet is $\frac{1}{10}^{\text{th}}$ that of the earth and its diameter is half that of the earth. The acceleration due to gravity on that planet is:

**(1)** 19.6 m s$^{-2}$ **(2)** 9.8 m s$^{-2}$ **(3)** 4.9 m s$^{-2}$ **(4)** 3.92 m s$^{-2}$

**26. 2** Match List – I with List – II.

| **List – I (Spectral lines of Hydrogen for transition 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-II, B-I, C-IV, D-III **(2)** A-III, B-IV, C-II, D-I

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

**27. 4** An unpolarized light beam strikes a glass surface at Brewster's angle. Then:

**(1)** The reflected light will be partially polarized.

**(2)** The refracted light will be completely polarized

**(3)** Both the reflected and refracted light will be completely polarized

**(4)** The reflected light will be completely polarized but the refracted light will be partially polarized

**28. 1** Match List – I with List – II.

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

Choose the correct answer from the options given below:

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

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

**29. 2** 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 : 2 **(2)** 2 : 1 **(3)** 4 : 1 **(4)** 1 : 4

**30. 4** $^{290}_{82}\text{X} \xrightarrow{\alpha} \text{Y} \xrightarrow{e^+} \text{Z} \xrightarrow{\beta^-} \text{P} \xrightarrow{e^-} \text{Q}$

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

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

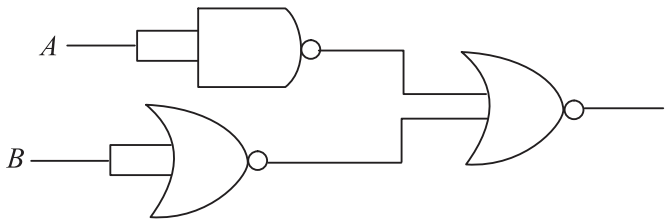
**31. 2** If $x = 5\sin\left(\pi t + \frac{\pi}{3}\right)m$ represented the motion of a particle executing simple harmonic motion, the amplitude and time period of motion, respectively, are:

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

**32. 1** 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)** 19.8 mN **(2)** 198 N **(3)** 1.98 mN **(4)** 99 N

**33. 4** The output (*Y*) of the given logic gate is similar to the output of an/a:




**(1)** NAND gate **(2)** NOR gate **(3)** OR gate **(4)** AND Gate

**34. 3** 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, $4\times10^{-6}\,C\,m$, is $\pm9\times10^{3}V$.

(Take $\frac{1}{4\pi\in_0} = 9\times10^9$ SI units)

**Reason (R):** $V = \pm\frac{2P}{4\pi\in_0 r^2}$, 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:

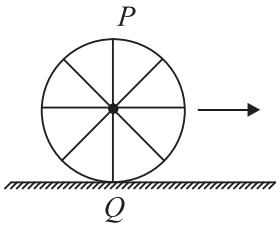
**(1)** Both A and R are true and R is the correct explanation of A.

**(2)** Both A and R are true and R is NOT the correct explanation of A.

**(3)** A is true but R is false.

**(4)** A is false but R is true.

**35. 2** 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 $P$ moves slower than point $Q$.

**(2)** Point $P$ moves faster than point $Q$

**(3)** Both the points $P$ and $Q$ move with equal speed.

**(4)** Point $P$ has zero speed.

| SECTION – B | PHYSICS | 40 MARKS |
|---|---|---|

**36. 2** 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:

**(1)** there is no current.

**(2)** displacement current of magnitude equal to I flows in the same direction as I.

**(3)** displacement current of magnitude equal to I flows in a direction opposite to that of I.

**(4)** displacement current of magnitude greater than I flows but can be in any direction.

**37. 4** The property which is not of an electromagnetic wave travelling in free space is that:

**(1)** they are transverse in nature.

**(2)** the energy density in electric field is equal to energy density in magnetic field.

**(3)** they travel with a speed equal to $\frac{1}{\sqrt{\mu_0 \in_0}}$.

**(4)** they originate from charges moving with uniform speed

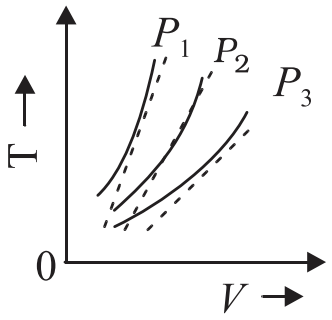
**38. 2** A small telescope has an objective of focal length 140 cm and an eye piece of focal length 5.0 cm. The magnifying power of telescope for viewing a distant object is:

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

**39. 2** 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)** 1 : 1 **(2)** 2 : 9 **(3)** 1 : 2 **(4)** 2 : 3

**40. 4** 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.

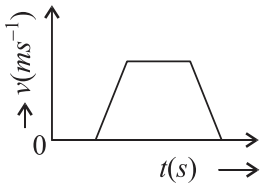



Then the correct relation is:

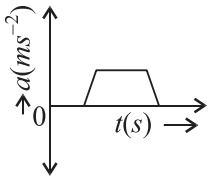
**(1)** $P_3 > P_2 > P_1$ **(2)** $P_1 > P_3 > P_2$

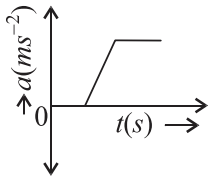
**(3)** $P_2 > P_1 > P_3$ **(4)** $P_1 > P_2 > P_3$

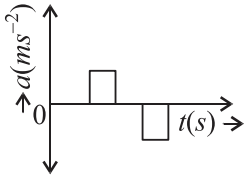
**41. 3** The velocity ($v$) – time ($t$) plot of the motion of a body is shown below:

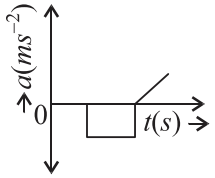



The acceleration ($a$) – time ($t$) graph that best suits this motion is:

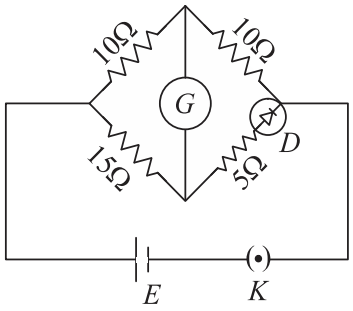
**(1)** 

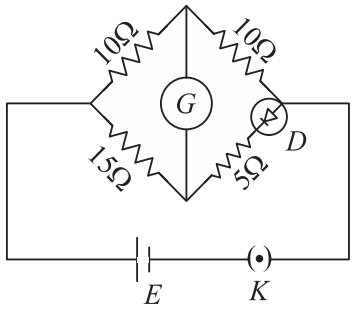

**(2)** 

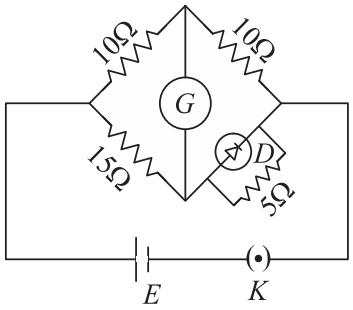

**(3)** 

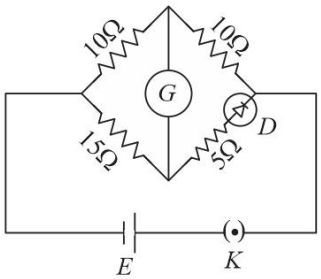

**(4)** 


**42. 1** Choose the correct circuit which can achieve the bridge balance.

**(1)** 


**(2)** 


**(3)** 


**(4)** 


**43. 2** 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)** $\sqrt{3}$ **(2)** $\sqrt{2}$ **(3)** $2\sqrt{3}$ **(4)** 4

**44. 1** 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)** $\frac{5GmM}{6R}$ **(2)** $\frac{2GmM}{3R}$ **(3)** $\frac{GmM}{2R}$ **(4)** $\frac{GmM}{3R}$

**45. 2** 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.

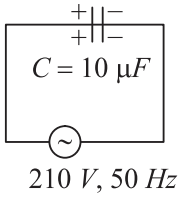
**D.** move the sheet away from the pole with uniform velocity if it is both, non-conducting and non-polar.

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

**(1)** B and D only **(2)** A and C only

**(3)** A, C and D only **(4)** C only

**46. 2** A $10\,\mu F$ capacitor is connected to a 210 V, 50 Hz source as shown in the figure. The peak current in the circuit is nearly $(\pi = 3.14)$:




**(1)** 0.58 $A$ **(2)** 0.93 $A$ **(3)** 1.20 $A$ **(4)** 0.35 $A$

**47. 2** A metallic bar of Young's modulus, $0.5\times10^{11}\,Nm^{-2}$ and coefficient of linear thermal expansion $10^{-5}\,°C^{-1}$ length 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:

**(1)** $5\times10^3\,N$ **(2)** $50\times10^3\,N$ **(3)** $100\times10^3\,N$ **(4)** $2\times10^3\,N$

**48. 2** 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)** $M$ **(2)** $\frac{M}{2}$ **(3)** $2\,M$ **(4)** $\frac{M}{\sqrt{3}}$

**49. 2** If the plates of a parallel capacitor connected to a battery are moved close to each other, then:

**A.** the charge stored in it, increases.

**B.** the energy stored in it, decreases.

**C.** its capacitance increases.

**D.** the ratio of charge to its potential remains the same.

**E.** the product of charge and voltage increases.

Choose the most appropriate answer from the options given below:

**(1)** A, B and E only **(2)** A, C and E only

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

**50. 2** 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 $\alpha$ and $\beta$ are constants, is:

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

| SECTION – A | CHEMISTRY | 140 MARKS |
|---|---|---|

**51. 3** Match List I with List II.

| List I (Molecule) | | List II (Number and types of bond/s between two carbon atoms) | |
|---|---|---|---|
| **A.** | ethane | **I.** | One $\sigma-$ bond and two $\pi-$ bonds |
| **B.** | ethene | **II.** | Two $\pi-$ bonds |
| **C.** | carbon molecule, $C_2$ | **III.** | One $\sigma-$ bond |
| **D.** | ethyne | **IV.** | One $\sigma-$ bond and one $\pi-$ bond |

Choose the correct answer from the options below :

**(1)** $A-I, B-IV, C-II, D-III$ **(2)** $A-IV, B-III, C-II, D-I$

**(3)** $A-III, B-IV, C-II, D-I$ **(4)** $A-III, B-IV, C-I, D-II$

**52. 2** The Henry's a law constant $(K_H)$ values of gases (A, B, C) in water are 145, $2\times10^{-1}$ 35 kbar, respectively. The solubility of then in water follow the order:

**(1)** B > A > C **(2)** B > C > A **(3)** A > C > B **(4)** A > B > C

**53. 1** Given below are two statements:

**Statement I :** The boiling point of hydride of Group 16 elements follow the order $H_2O > H_2Te > H_2Se > H_2S$.

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

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

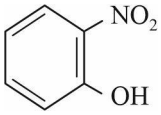
**(1)** Both Statement I and Statement II are correct.

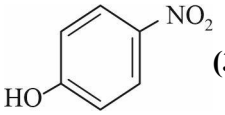
**(2)** Both Statement I and Statement II are incorrect.

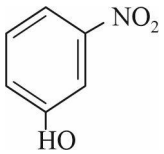
**(3)** Statement I is correct but Statement II is incorrect.

**(4)** Statement I is incorrect but Stateemnt II is correct.

**54. 1** Intramolecular hydrogen bonding is present in

**(1)** 


**(2)** 


**(3)** 


**(4)** HF

**55. 1** Given below are two statements:

**Statement I ;** The boiling poiint of the three isomeric pentanes follows the order

n-pentane > isopentane > neopentane

**Statement II :** When branching increase, the molecule attains a shape of sphere. This result 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 *most appropriate* answer from the options given below :

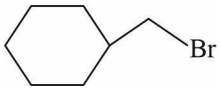
**(1)** Both Statement I and Statement II are correct.

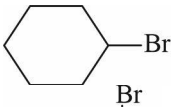
**(2)** Both Statement I and Statement II are incorrect.

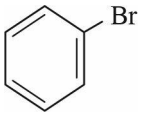
**(3)** Statement I is correct but Statement II is incorrect.

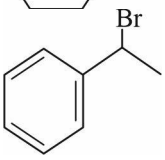
**(4)** Statement I is incorrect but Stateemnt II is correct.

**56. 4** The compound that will undergo $S_N1$ reaction with the fastest rate is:

**(1)** 

**(2)** 

**(3)** 

**(4)** 

**57. 4** Which one of the following alcohols reacts instantaneously with Lucas reagent?

**(1)** $CH_3-CH_2-CH_2-CH_2OH$

**(2)** $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{C}}H-OH$

**(3)** $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}H-CH_2OH$

**(4)** $CH_3-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}-OH$

**58. 2** 1 gram of sodium hydroxide was treated with 20 mL of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to:

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

**59. 2** Arrange the following elements in increasing order of first ionization enthalpy.

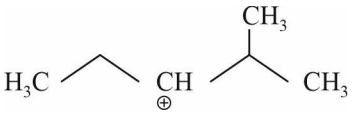
Li, Be, B, C, N

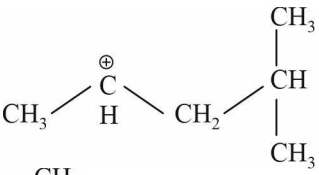
Choose the correct answer from the options given below:

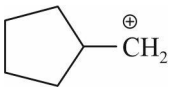
**(1)** $Li<Be<B<C<N$ **(2)** $Li<B<Be<C<N$

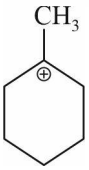
**(3)** $Li<Be<C<B<N$ **(4)** $Li<Be<N<B<C$

**60. 4** The most stable carbocation among the following is:

**(1)** 

**(2)** 

**(3)** 

**(4)** 

**61. 4** Activation energy of any chemical reaction can be calculated if one knows the value of _____.

**(1)** Rate constant at standard temperature

**(2)** Probability of collision

**(3)** Orientation of reactant molecules during collision

**(4)** Rate constant at two different temperatures

**62. 1** Given below are two statements:

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

**Statement I:** Aniline cannot be prepared through Gabriel synthesis.

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

**(1)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I is correct but Statement II is false

**(4)** Statement I is incorrect but Statement II is true

**63. 1** Arrange the following elements in increasing order of electronegativity:

N, O, F, C, Si

Choose the correct answer from the options given below:

**(1)** Si < C < N < O < F **(2)** Si < C < O < N < F

**(3)** O < F < N < C < Si **(4)** F < O < N < C < Si

**64. 1** 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-II, B-IV, C-I, D-III **(2)** A-III, B-IV, C-I, D-II

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

**65. 1** Match List I with List II.

| | List I (Complex) | | List II (Type of isomerism) |
|---|---|---|---|
| **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 |

Choose the correct answer from the options given below:

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

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

**66. 1** Match List I with List II.

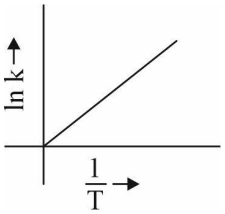
| | List I (Complex) | | List II (Type of isomerism) |
|---|---|---|---|
| **A** | $NH_3$ | **I** | Trigonal Pyramidal |
| **B** | $BrF_5$ | **II** | Square Planar |
| **C** | $XeF_4$ | **III** | Octahedral |
| **D** | $SF_6$ | **IV** | Square Pyramidal |

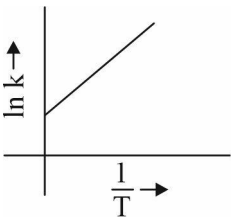
Choose the correct answer from the options given below:

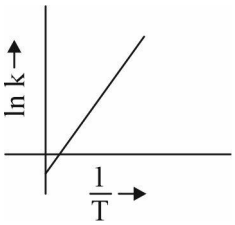
**(1)** A-III, B-IV, C-I, D-II **(2)** A-II, B-III, C-IV, D-I

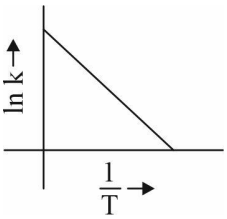
**(3)** A-I, B-IV, C-II, D-III **(4)** A-II, B-IV, C-III, D-I

**67. 4** Which plot of ln k vs $\frac{1}{T}$ is consistent with Arrhenius equation?

**(1)** 


**(2)** 


**(3)** 


**(4)** 


**68. 1** 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)** –x **(2)** $-\frac{x}{9}$ **(3)** –4x **(4)** $-\frac{4}{9}$

**69. 3** In which of the following processes entropy increases?

**(A)** A liquid evaporates to vapour.

**(B)** Temperature of a crystalline solid lowered from 130 K to 0 K.

**(C)** $2NaHCO_3(s) \rightarrow Na_2CO_3(s) + CO_2(g) + H_2O(g)$

**(D)** $Cl_2(g) \rightarrow 2Cl(g)$

Choose the correct answer from the options given below:

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

**70. 4** Which reaction is **NOT** a redox reaction?

**(1)** $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

**(2)** $2KClO_3 + I_2 \rightarrow 2KIO_3 + Cl_2$

**(3)** $H_2 + Cl_2 \rightarrow 2HCl$

**(4)** $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$

**71. 2** Match List I with List II.

| | **List I Quantum Number** | | **List II Information Provided** |
|---|---|---|---|
| **A.** | $m_I$ | **I.** | Shape of orbital |
| **B.** | $m_s$ | **II.** | Size of orbital |
| **C.** | l | **III.** | Orientation of orbital |
| **D.** | n | **IV.** | Orientation of spin of election |

Choose the correct answer from the options given below:

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

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

**72. 1** 'Spin only' magnetic moment is same for which of the following ions?

**A.** $Ti^{3+}$ **B.** $Cr^{2+}$ **C.** $Mn^{2+}$ **D.** $Fe^{2+}$

**F.** $Sc^{3+}$

Choose the most appropriate answer from the options given below:

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

**73. 1** The highest number of helium atoms in in:

**(1)** 4 mol of helium **(2)** 4 u of helium

**(3)** 4 g of helium **(4)** 2.271098 L of helium at STP

**74. 4** Among Group 16 elements, which one does NOT show -2 oxidation state?

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

**75. 3** The $E^\circ$ value for the $Mn^{3+}/Mn^{2+}$ couple is more positive than the of $Cr^{3+}/Cr^{2+}$ or $Fe^{3+}/Fe^{2+}$ due to change of:

**(1)** $d^5$ to $d^4$ configuration **(2)** $d^5$ to $d^2$ configuration

**(3)** $d^4$ to $d^5$ configuration **(4)** $d^3$ to $d^5$ configuration

**76. 3** The reagents with which glucose does not react to give the corresponding tests/products are:

**A.** Tollen's reagent **B.** Schiff's reagent

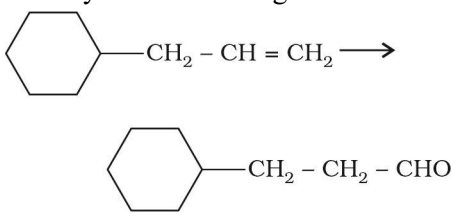
**C.** HCN **D.** $NH_2OH$

**E.** $NaHSO_3$

Choose the correct options from the given below:

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

**77. 2** Identify the correct reagents that would bring about the following transformation.




**(1)** (i) $H_2O/H^+$ (ii) $CrO_3$

**(2)** (i) $BH_3$ (ii) $H_2O_2 \cdot / \bar{O}H$ (iii) PCC

**(3)** (i) $BH_3$ (ii) $H_2O_2/\bar{O}H$ (iii) alk. $KMnO_4$

(iv) $H_3O^{\oplus}$

**(4)** (i) $H_2O/H^+$ (ii) PCC

**78. 1** In which of the following equilibria, $K_p$ and $K_c$ are NOT equal?

**(1)** $PCl_{5(g)} \quad PCl_{3(g)} + Cl_{2(g)}$

**(2)** $H_{2(g)} + I_{2(g)} \quad 2HI_{(g)}$

**(3)** $CO_{(g)} + H_2O_{(g)} \quad CO_{2(g)} + H_{2(g)}$

**(4)** $2BrCl_{(g)} \quad Br_{2(g)} + Cl_{2(g)}$

**79. 3** A compound with a molecular formula of $C_6H_{14}$ has two tertiary carbons. Its IUPAC name is:

**(1)** n-hexane **(2)** 2-methylpentane

**(3)** 2-3-dimethylbutane **(4)** 2,2-dimethylbutane

**80. 1** Fehling's solution 'A' is:

**(1)** aqueous copper sulphate

**(2)** alkaline copper sulphate

**(3)** alkaline solution of sodium potassium tartrate (Rochelle's salt)

**(4)** aqueous sodium citrate

**81. 4** 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 |
| **D** | Adiabatic process | **IV.** | Carried out at constant pressure |

Choose the correct answer from the option below:

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

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

**82. 1** Given below are two statements:

**Statement I :** Both $[Co(NH_3)_6]^{3+}$ and $[CoF_6]^{3-}$ complexes are octahedral but differ in their magnetic behaviour.

**Statement II :** $[Co(NH_3)_6]^{3+}$ is diamagnetic whereas $[CoF_6]^{3-}$ is paramagnetic.

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

**(1)** Both Statement I and Statement II are true.

**(2)** Both Statement I and Statement II are false.

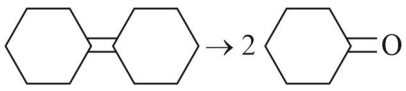
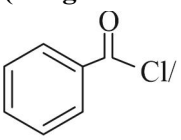
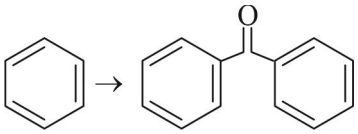
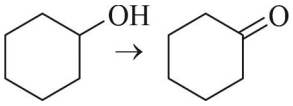
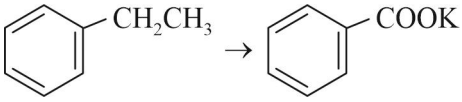
**(3)** Statement I is false but Statement II is true.

**(4)** Statement I is true but Statement II is false.

**83. 2** 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)** Crystallization **(2)** Sublimation **(3)** Distillation **(4)** Chromatography

**84. 3** Match List I with List II.

| **List-I (Reaction)** | | **List-II (Reagents/Condition)** | |
|---|---|---|---|
| **A.** |  | **I.** |  Anhyd. $AlCl_3$ |
| **B.** |  | **II.** | $CrO_3$ |
| **C.** |  | **III.** | $KMnO_4 / KOH, \Delta$ |
| **D** |  | **IV.** | (i) $O_3$ (ii) $Zn - H_2O$ |

Choose the correct answer from the option given below:

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

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

**85. 3** For the reaction $2A \quad B + C, K_c = 4 \times 10^{-3}$. 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 is at equilibrium.

**(2)** Reaction has a tendency to go in forward direction.

**(3)** Reaction has a tendency to go in backward direction.

**(4)** Reaction has gone to completion in forward direction.

| SECTION – B | CHEMISTRY | 40 MARKS |
|---|---|---|

**86. 1** The pair of lanthanoid ions which are diamagnetic is:

**(1)** $Ce^{4+}$ and $Yb^{2+}$ **(2)** $Ce^{3+}$ and $Eu^{2+}$

**(3)** $Gd^{3+}$ and $Eu^{3+}$ **(4)** $Pm^{3+}$ and $Sm^{3+}$

**87. 1** 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)** Both Statement I and Statement II are true.

**(2)** Both Statement I and Statement II are false.

**(3)** Statement I is true but Statement II is false.

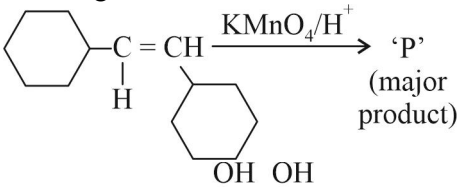
**(4)** Statement I is false but Statement II is true.

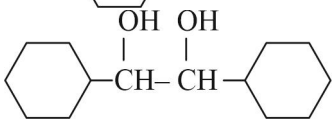
**88. 2** Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is:

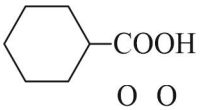
(Given: Molar mass of Cu: $63\,g\,mol^{-1}, 1F = 96487\,C$ )

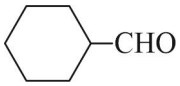
**(1)** 3.15 g **(2)** 0.315 g **(3)** 31.5 g **(4)** 0.0315 g

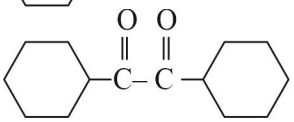
**89. 2** For the given reaction:




**(1)** 


**(2)** 


**(3)** 


**(4)** 


**90. 4** The products A and B obtained in the following reactions, respectively, are

$3ROH + PCl_3 \rightarrow 3RCl + A$

$ROH + PCl_5 \rightarrow RCl + HCl + B$

**(1)** $POCl_3$ and $H_3PO_3$ **(2)** $POCl_3$ and $H_3PO_4$

**(3)** $H_3PO_4$ and $POCl_3$ **(4)** $H_3PO_3$ and $POCl_3$

**91. 1** The rate of a reaction quadruples when temperature changes from 27°C to 57°C. Calculate the energy of activation.

Given R = 8.314 $JK^{-1}$ $mol^{-1}$, log4 = 0.6021

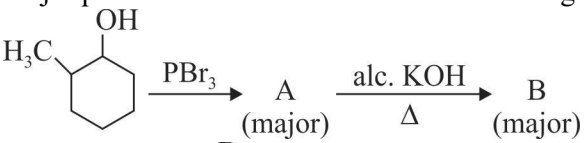
**(1)** 38.04 kJ/mol **(2)** 380.4 kJ/mol **(3)** 3.80 kJ/mol **(4)** 3804 kJ/mol

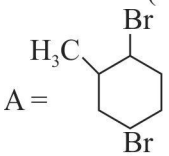
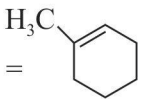
**92. 4** During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis of $Fe^{2+}$ ion?

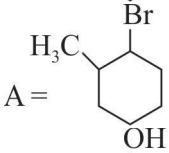
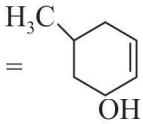
**(1)** dilute hydrochloric acid **(2)** concentrated sulphuric acid

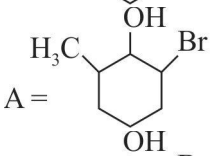
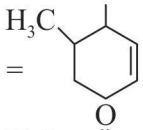
**(3)** dilute nitric acid **(4)** dilute sulphuric acid

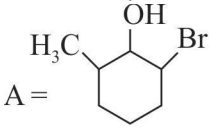
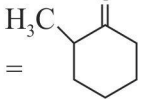
**93. 1** Major products A and B formed in the following reaction sequence, are




**(1)** A =  ; B = 

**(2)** A =  ; B = 

**(3)** A =  ; B = 

**(4)** A =  ; B = 

**94. 1** The plot of osmotic pressure $(\Pi)$ vs concentration (mol $L^{-1}$) for a solution gives a straight line with slope 25.73 L bar $mol^{-1}$. The temperature at which the osmotic pressure measurement is done is:
(Use R = 0.083 L bar $mol^{-1}$ $K^{-1}$)

**(1)** 37°C **(2)** 310°C **(3)** 25.73°C **(4)** 12.05°C

**95. 4** Identify the correct answer

**(1)** Three resonance structures can be drawn for ozone

**(2)** $BF_3$ has non-zero dipole moment

**(3)** Dipole moment of $NF_3$ is greater than that of $NH_3$

**(4)** Three canonical forms can be drawn for $CO_3^{2-}$ ion

**96. 1** Identify the major product C formed in the following reaction sequence

$$CH_3-CH_2-CH_2-I \xrightarrow{NaCN} A \xrightarrow[\text{Partial hydrolysis}]{OH^-} B \xrightarrow[Br_2]{NaOH} \underset{\text{(major)}}{C}$$

**(1)** propylamine

**(2)** butylamine

**(3)** butanamide

**(4)** $\alpha$ –bromobutanoic acid

**97. 1** 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 option given below:

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

**98. 2** The work done during reversible isothermal expansion of one mole of hydrogen gas at 25°C from pressure of 20 atmosphere to 10 atmosphere is:
(Given R = 2.0 cal $K^{-1}$ $mol^{-1}$)

**(1)** 0 calorie **(2)** –413.14 calories
**(3)** 413.14 calories **(4)** 100 calories

**99. 4** 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 = $2.8 \times 10^{-3}$ M.

$$2NO_{(g)} \quad N_{2(g)} + O_{2(g)}$$

If 0.1 mol $L^{-1}$ of $NO_{(g)}$ is taken in a closed vessel, what will be degree of dissociation ($\alpha$) of $NO_{(g)}$ at equilibrium?

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

**100. 2** 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)** $A_2BC_2$ **(2)** $ABC_3$ **(3)** $AB_2C_2$ **(4)** $ABC_4$

| SECTION – A | BOTANY | 140 MARKS |
|---|---|---|

**101. 2** Lecithin, a small molecular weight organic compound found in living tissues, is an example of:

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

**102. 4** How many molecules of ATP and NADPH are required for every molecule of $CO_2$ fixed in the Calvin cycle?

**(1)** 2 molecules of ATP and 3 molecules of NADPH

**(2)** 2 molecules of ATP and 2 molecules of NADPH

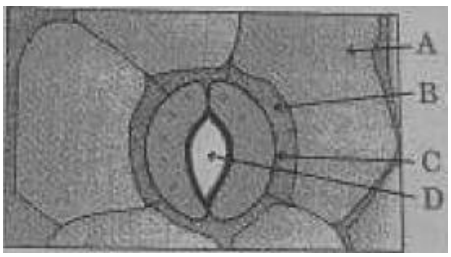
**(3)** 3 molecules of ATP and 3 molecules of NADPH

**(4)** 3 molecules of ATP and 2 molecules of NADPH

**103. 2** Hind II always cuts DNA molecules at a particular point called recognition sequence and it consists of:

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

**104. 1** In the given figure, which component has thin outer walls and highly thickened inner walls?




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

**105. 1** The cofactor of the enzyme carboxypeptidase is:

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

**106. 1** The capacity to generate a whole plant from any cell of the plant is called:

**(1)** Totipotency

**(2)** Micropropagation

**(3)** Differentiation

**(4)** Somatic hybridization

**107. 1** Match List-I with List II

| List I | | List II | |
|---|---|---|---|
| **A.** | *Rhizopus* | **I.** | Mushroom |
| **B.** | *Ustilago* | **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-IV, D-I

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

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

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

**108. 3** 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)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I is true but Statement II is false

**(4)** Statement I is false but Statement II is true

**109. 1** Which of the following is an example of actinomorphic flower?

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

**110. 3** 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)** *in-situ* conservation **(2)** Biodiversity conservation

**(3)** Semi-conservative method **(4)** Sustainable development

**111. 4** Identify the set of correct statements:

A. The flowers of Vallisneria are colourful produce nectar

B. The flowers of waterlily are not pollinated by water.

C. In most of water-pollinated species pollen grains are protected from wetting

D. Pollen grains of some hydrophytes are long and ribbon like.

E. In some hydrophytes, the pollen grain carried passively inside water.

Choose the correct Answer from the option is below:

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

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

**112. 3** The lactose present in the growth medium bacteria is transported to the cell by the action of:

**(1)** Beta-galactosidase **(2)** Acetylase

**(3)** Permease **(4)** Polymerase

**113. 3** Math 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 |

Choose the correct answer from the options below

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

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

**114. 3** The equation of Verhulst-Pearl logistic growth is $\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$

From this equation, K indicates:

**(1)** Intrinsic rate of natural increase **(2)** Biotic potential

**(3)** Carrying capacity **(4)** Population density

**115. 3** Auxin is used by gardeners to prepare weed-free lawns. But no damage is caused to grass as Auxin

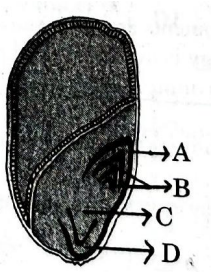
**(1)** promotes apical dominance.

**(2)** promotes abscission of mature leaves only

**(3)** does not affect mature monocotyledonous plants

**(4)** can help in cell division in grasses, to produce growth.

**116. 3** Identify the part of the seed from the given figure which is destined to form root when the seed germinates.




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

**117. 4** 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)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I is true but Statement II is false

**(4)** Statement I is false but Statement II is true

**118. 4** 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, C and D only **(2)** A, B, C and D only

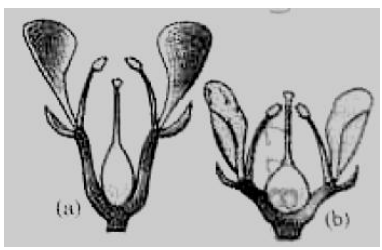
**(3)** A, B and E only **(4)** A, B and D only

**119. 2** Which one of the following is not a criterion for classification of fungi?

**(1)** Morphology of mycelium **(2)** Mode of nutrition

**(3)** Mode of spore formation **(4)** Fruiting body

**120. 4** 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) Epigynous; (b) Hypogynous

**(2)** (a) Hypogynous; (b) Epigynous

**(3)** (a) Perigynous; (b) Epigynous

**(4)** (a) Perigynous; (b) Perigynous

**121. 4** List of endangered species was released by:

**(1)** GEAC **(2)** WWF **(3)** FOAM **(4)** IUCN

**122. 3** 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 B only **(2)** D and E only **(3)** B and C only **(4)** A and E only

**123. 2** Which one of the following can be explained on the basis of Mender'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 $F_2$ 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 given below:

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

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

**124. 3** Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:

**(1)** Cofactor inhibition **(2)** Feedback inhibition

**(3)** Competitive inhibition **(4)** Enzyme activation

**125. 3** Formation of interfascicular cambium from fully developed parenchyma cells is an example for

**(1)** Differentiation **(2)** Redifferentiation

**(3)** Dedifferentiation **(4)** Maturation

**126. 2** Spindle fibers attach to kinetochores of chromosomes during:

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

**127. 1** 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, C, D and E only **(2)** A and B only

**(3)** A, B and E only **(4)** A, B and D only

**128. 1** 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 statements, choose the correct answer from the options given below:

**(1)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I is true but Statement II is false

**(4)** Statement I is false but Statement II is true

**129. 1** 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.** | Leucoplasts | **III.** | Site for active ribosomal RNA |
| **D.** | Golgi apparatus | **IV.** | For storing nutrients |

Choose the correct answer from the options given below:

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

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

**130. 1** Bulliform cells are responsible for

**(1)** Inward curling of leaves in monocots.

**(2)** Protecting the plant from salt stress.

**(3)** Increased photosynthesis in monocots.

**(4)** Providing large spaces for storage of sugars.

**131. 2** 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 red flowered plants

**(2)** Red flowered as well as pink flowered plants

**(3)** Only pink flowered plants

**(4)** Red, Pink as well as white flowered plants

**132. 4** 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)** Repressor, Operator gene, Structural gene

**(2)** Structural gene, Transposons, Operator gene

**(3)** Inducer, Repressor, Structural gene

**(4)** Promotor, Structural gene, Terminator

**133. 2** 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 **(3)** Bb **(4)** BB/Bb

**134. 3** 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)** A, B and C only **(2)** B, C and D only

**(3)** C, D and E only **(4)** D and E only

**135. 3** Match List I with List II

| | List I | | List II |
|---|---|---|---|
| **A.** | Two or more alternative forms of 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 plants | **IV.** | Test cross |

Choose the correct answer from the options given below:

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

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

| SECTION – B | BOTANY | 40 MARKS |
|---|---|---|

**136. 2** The DNA present in chloroplast is:

**(1)** Linear, double stranded **(2)** Circular, double stranded

**(3)** Linear, single stranded **(4)** Circular, single stranded

**137. 2** 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-II, B-III, C-I, D-IV **(2)** A-III, B-I, C-IV, D-II

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

**138. 1** 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-II, B-IV, C-I, D-III **(2)** A-I, B-II, C-III, D-IV

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

**139. 4** Which of the following statements is correct regarding the process of replication in E.coli?

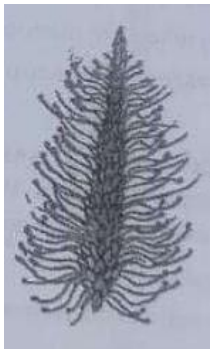
**(1)** The DNA dependent DNA polymerase catalyses polymerization in 5' $\rightarrow$ 3' as well as 3' $\rightarrow$ 5' direction.

**(2)** The DNA dependent RNA polymerase catalyses polymerization in 5' $\rightarrow$ 3' direction.

**(3)** The DNA dependent DNA polymerase catalyses polymerization in one direction that is 3' $\rightarrow$ 5'

**(4)** The DNA dependent DNA polymerase catalyses polymerization in one direction that is 5' $\rightarrow$ 3'

**140. 1** Identify the correct descriptions about the given figure:



**(1)** Wind pollinated plant inflorescent show flowers with well exposed stamens

**(2)** Water pollinated flowers showing stamens with mucilaginous covering

**(3)** Cleistogamous flowers showing autogamy

**(4)** Compact inflorescence showing complete autogamy

**141. 2** 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-I, B-II, C-III, D-IV **(2)** A-II, B-I, C-IV, D-III

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

**142. 3** Read the following statement 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, B, C and D only **(2)** B, C, D and E only

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

**143. 3** In an ecosystem if the Net Primary Productivity (NPP) of first trophic level is $100x(\text{kcal m}^{-2})\text{yr}^{-1}$, what would be the GPP (Gross Primary Productivity) of the third trophic level of the same ecosystem?

**(1)** $\frac{x}{10}(\text{kcal m}^{-2})\text{yr}^{-1}$ **(2)** $x(\text{kcal m}^{-2})\text{yr}^{-1}$

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

**144. 1** 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-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

**145. 3** Identify the step in tricarboxylic acid cycle, which does not involve oxidation of substrate.

**(1)** Malic acid $\rightarrow$ Oxaloacetic acid **(2)** Succinic acid $\rightarrow$ Malic acid

**(3)** Succinyl-CoA $\rightarrow$ Succinic acid **(4)** Isocitrate $\rightarrow$ $\alpha$-ketoglutaric acid

**146. 3** Given below are two statements:

**Statement I:** In $C_3$ plants, some $O_2$ binds to RuBisCO, 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)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I is true but Statement II is false

**(4)** Statement I is false but Statement II is true

**147. 1** 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 given below:

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

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

**148. 2** Match List I with List II.

| **List I** | | **List II** | |
|---|---|---|---|
| **A.** | Frederick 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-III, B-II, C-I, D-IV **(2)** A-III, B-IV, C-I, D-II

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

**149. 3** Which of the following are fused in somatic hybridization involving two varieties of plants?

**(1)** Callus **(2)** Somatic embryos

**(3)** Protoplasts **(4)** Pollens

**150. 2** Spraying sugarcane crop with which of the following plant growth regulators, increases the length of stem, thus, increasing the yield?

**(1)** Auxin **(2)** Gibberellin

**(3)** Cytokinin **(4)** Abscisic acid

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**151. 1** 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 options given below:

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

**152. 2** In both sexes of cockroach, a pair of jointed filamentous structures called anal cerci are present on:

**(1)** $5^{th}$ segment **(2)** $10^{th}$ segment
**(3)** $8^{th}$ and $9^{th}$ segment **(4)** $11^{th}$ segment

**153. 3** The flippers of the Penguins and Dolphins are the example of the

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

**154. 1** Which of the following is not a component of Fallopian tube?

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

**155. 4** 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)** D-A-C-B **(2)** B-A-D-C **(3)** C-B-D-A **(4)** A-D-C-B

**156. 4** Which of the following is not a steroid hormone?

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

**157. 3** Match the column I with column II:

| Column I | | Column II | |
|---|---|---|---|
| **A.** | $\alpha$ -1 antitrypsin | **I.** | Cotton bollworm |
| **B.** | Cry 1Ab | **II.** | ADA deficiency |
| **C.** | Cry 1Ac | **III.** | Emphysema |
| **D.** | Enzyme replacement therapy | **IV.** | Corn borer |

Choose the correct answer from the options given below:

**(1)** A – II ; B – I ; C – IV ; D – III **(2)** A – III ; B – I ; C – II ; D – IV
**(3)** A – III ; B – IV ; C – I ; D – II **(4)** A – II ; B – IV ; C – I ; D – III

**158. 4** 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)** C-E-D-A-B **(2)** E-B-D-A-C **(3)** B-D-E-A-C **(4)** E-C-A-D-B

**159. 4** Which one of the following factors will not affect the Hardy-Weinberg equilibrium?

**(1)** Genetic recombination **(2)** Genetic drift
**(3)** Gene migration **(4)** Contant gene pool

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

**161. 2** 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 form the options given below:

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

**162. 1** 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-II, B-IV, C-I, D-III
**(2)** A-III, B-II, C-IV, D-I
**(3)** A-II, B-I, C-IV, D-III
**(4)** A-I, B-III, C-II, D-IV

**163. 3** Match List I with List II.

| List I | | List II | |
|---|---|---|---|
| A. | Down's syndrome | I. | $11^{th}$ chromosome |
| B. | $\alpha$ - Thalassemia | II. | 'X' chromosome |
| C. | $\beta$ - Thalassemia | III. | $21^{st}$ chromosome |
| D. | Klinefelter's | IV. | $16^{th}$ chromosome |

Choose the correct answer form the options given below:

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

**164. 4** 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)** Both A and R are true and R is the correct explanation of A.
**(2)** Both A and R are true but R is NOT the correct explanation of A.
**(3)** A is true but R is false
**(4)** A is false but R is true

**165. 2** Match List I with List II.

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

Choose the correct answer form the options given below:

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

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

**166. 3** Match List I with List II.

| List I (Sub Phases 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 |

Choose the correct answer form the options given below:

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

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

**167. 3** The "Ti plasmid" of *Agrobacterium tumefaciens* stands for

**(1)** Tumor inhibiting plasmid **(2)** Tumor independent plasmid

**(3)** Tumor inducing plasmid **(4)** Temperature independent plasmid

**168. 4** 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. | *Erythroxyhum* |
| D. | Marijuana | IV. | Papaver somniferum |

Choose the correct answer form the options given below:

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

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

**169. 1** Which one is the correct product of DNA dependent RNA polymerase to the given template?

**3'TACATGGCAAATATCCATTCA5'**

**(1)** 5'AUGUACCGUUUAUAGGUAAGU3'

**(2)** 5'AUGUAAAGUUUAUAGGUAAGU3'

**(3)** 5'AUGUACCGUUUAUAGGGAAGU3'

**(4)** 5'ATGTACCGTTTATAGGTAAGT3'

**170. 2** 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 form the options given below:

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

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

**171. 3** 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 given below:

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

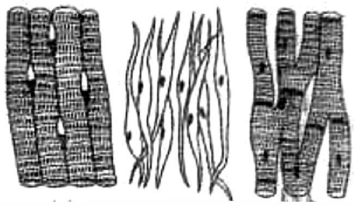
**(3)** A-II, B-IV, C-I, D-III **(4)** A-IV, B-I, C-III, D-II

**172. 4** Which of the following is not a natural/traditional contraceptive method?

**(1)** Coitus interruptus **(2)** Periodic abstinence

**(3)** Lactational amenorrhea **(4)** Vaults

**173. 2** Three types of muscles are given as a, b and c. Identify the correct matching pair along with their location in human body:



**(a)** **(b)** **(c)**

**Name of muscle/location**

**(1)** (a) Smooth – Toes, (b) Skeletal – Legs, (c) Cardiac – Heart

**(2)** (a) Skeletal – Triceps, (b) Smooth – Stomach, (c) Cardiac – Heart

**(3)** (a) Skeletal – Biceps, (b) Involuntary – Intestine, (c) Smooth – Heart

**(4)** (a) Involuntary – Nose tip, (b) Skeletal – Bone, (c) Cardiac – Heart

**174. 3** Which of the following statements is incorrect?

**(1)** A bio-reactor provides optimal growth conditions for achieving the desired product

**(2)** Most commonly used bio-reactors are of stirring type

**(3)** Bio-reactors are used to produce small scale bacterial cultures

**(4)** Bio-reactors have an agitator system, an oxygen delivery system and foam control system

**175. 1** 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)** Both A and R are correct and R is the correct explanation of A

**(2)** Both A and R are correct but R is NOT the correct explanation of A

**(3)** A is correct but R is not correct

**(4)** A is not correct but R is correct

**176. 2** Which of the following factors are favourable for the formation of oxyhaemoglobin in alveoli?

**(1)** High $pO_2$ and High $pCO_2$

**(2)** High $pO_2$ and Lesser $H^+$ concentration

**(3)** Low $pCO_2$ and High $H^+$ concentration

**(4)** Low $pCO_2$ and High temperature

**177. 3** 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-II, B-IV, C-III, D-I **(2)** A-I, B-III, C-II, D-IV

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

**178. 2** 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)** B only **(2)** A only **(3)** C only **(4)** D only

**179. 4** 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-II, D-IV **(2)** A-I, B-III, C-IV, D-II

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

**180. 2** 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:

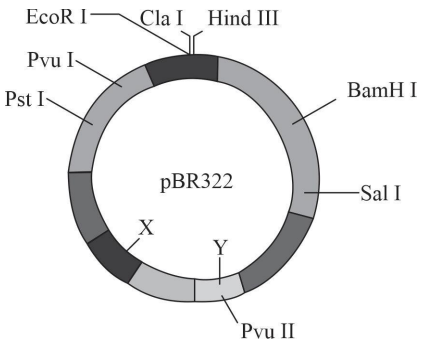
**(1)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I is true but Statement II is false

**(4)** Statement I is false but Statement II is true

**181. 2** The following diagram showing restriction sites E.coli cloning vector pBR322. Find the role of 'X' and 'Y' genes:




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

**(2)** The gene 'X' is responsible for controlling the copy number of the linked DNA and 'Y' for protein involved in the replication of Plasmid.

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

**(4)** Gene 'X' is responsible for recognition sites and 'Y' is responsible for antibiotic resistance.

**182. 4** 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-IV, B-III, C-II, D-I **(2)** A-IV, B-II, C-III, D-I

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

**183. 2** Match List I with List II:

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

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

**184. 4** 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-IV, B-II, C-III, D-I **(2)** A-I, B-III, C-II, D-IV

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

**185. 3** 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)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I true but Statement II is false

**(4)** Statement I is false but Statement II is true

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**186. 4** 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)** Both Statement I and Statement II are true

**(2)** Both Statement I and Statement II are false

**(3)** Statement I is true and Statement II is false

**(4)** Statement I is false and Statement II is true.

**187. 1** 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 thin 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-II, C-III, D-I **(2)** A-I, B-II, C-III, D-IV

**(3)** A-IV, B-III, C-II, D-I **(4)** A-III, B-II, C-VI, D-I

**188. 3** 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)** A and C only **(2)** A, B and D only

**(3)** B, D and E only **(4)** B, C and D only

**189. 3** Choose the correct statement given below regarding juxta medullary nephron.

**(1)** Juxta medullary nephrons are located in the columns of Bertini.

**(2)** Renal corpuscle of juxta medullary nephrons lies in the outer portion of the renal medulla.

**(3)** Loop of Henle of juxta medullary nephron runs deep into medulla.

**(4)** Juxta medullary nephrons outnumber the cortical nephrons.

**190. 3** 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)** Both Statement I and Statement II are correct.

**(2)** Both Statement I and Statement II are incorrect.

**(3)** Statement I is correct but Statement II is incorrect.

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

**191. 1** 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)** Both Statement I and Statement II are correct.

**(2)** Both Statement I and Statement II are incorrect.

**(3)** Statement I is correct but Statement II is incorrect.

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

**192. 1** 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.

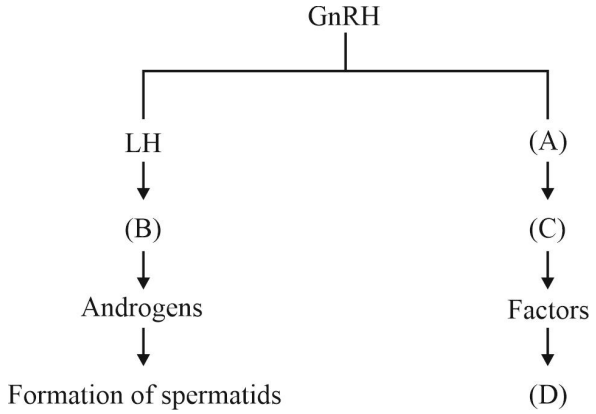
D. Chemical bonds of the substrate broken.

E. Substrate binding to active site.

Choose the correct answer from the options given below:

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

**193. 1** Identify the correct option (A), (B), (C), (D) with respect to spermatogenesis




**(1)** FSH, Leydig cells, Sertoli cells, spermiogenesis

**(2)** ICSH, Interstitial cells, Leydig cells, spermiogenesis.

**(3)** FSH, Sertoli cells, Leydig cells, spermatogenesis.

**(4)** ICSH, Leydig cells, Sertoli cells, spermatogenesis.

**194. 4** 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-II, B-I, C-III, D-IV **(2)** A-III, B-I, C-II, D-IV

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

**195. 3** 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-III, D-IV **(2)** A-IV, B-III, C-I, D-II

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

**196. 4** Match List I with List II:

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

Choose the correct answer from the options given below:

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

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

**197. 1** 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)** A only **(2)** B only **(3)** C & B only **(4)** D & E only

**198. 2** 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-I, B-III, C-IV, D-II **(2)** A-III, B-II, C-IV, D-I

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

**199. 3** Given below are two statements:

**Statement I:** Mitochondria and chloroplast 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)** Both Statement I and Statement II are correct.

**(2)** Both Statement I and Statement II are incorrect.

**(3)** Statement I is correct but Statement II is incorrect.

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

**200. 4** Match List I with List II:

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

Choose the correct answer from the options given below:

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

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

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

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