NEET UG 2024 T5 Question Paper

Time Allowed :3 hours 20 minutes	**Maximum Marks :**720	**Total questions :**200

General Instructions

Read the following instructions very carefully and strictly follow them:

(i)The test is of 3 hours 20 minutes duration and the Test Booklet contains 200 multiple-choice questions (four options with a single correct answer) from Physics, Chemistry, and Biology (Botany and Zoology). 50 questions in each subject are divided into two Sections (A and B) as per details given below:

(a) Section-A shall consist of 35 (Thirty-five) Questions in each subject (Question Nos-1 to 35, 51 to 85, 101 to 135, and 151 to 185). All Questions are compulsory.

(b) Section-B shall consist of 15 (Fifteen) questions in each subject (Question Nos- 36 to 50, 86 to 100, 136 to 150, and 186 to 200). In Section B, a candidate needs to attempt any 10 (Ten) questions out of 15 (Fifteen) in each subject.

Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, the first ten questions answered by the candidate shall be evaluated.

2. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.

3. On completion of the test, the candidate must hand over the Answer Sheet (ORIGINAL and OFFICE copy) to the Invigilator before leaving the Room / Hall. The candidates are allowed to take away this Test Booklet with them.

SECTION A

(Physics)

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

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

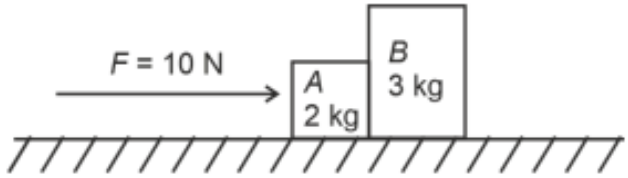
(2) $2T$

(3) T

(4) $4T$

---

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



(1) 6 N

(2) 10 N

(3) Zero

(4) 4 N

---

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

(1) 40 mm

(2) 8 mm

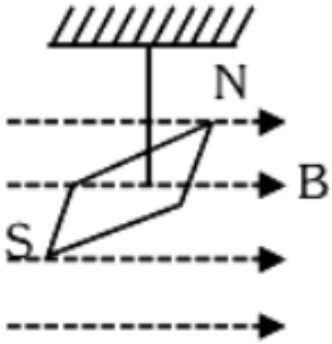
(3) 4 mm

(4) 0.4 mm

---

4. In a uniform magnetic field of 0.049 T, a magnetic needle performs 20 complete oscillations in 5 seconds. The moment of inertia of the needle is 9.8×10^{-6} kg m². If the

magnitude of the magnetic moment of the needle is $x \times 10^{-5}$ Am², then the value of x is:



(1) $50\pi^2$

(2) $1280\pi^2$

(3) $5\pi^2$

(4) $128\pi^2$

---

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

A. The energy of a photon is E = hv.

B. The velocity of a photon is c.

C. The momentum of a photon, v = hpc .

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, C and D only

(2) A, B, D and E only

(3) A and B only

(4) A, B, C and D only

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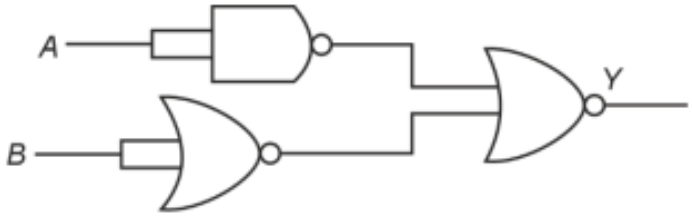
6. The output (Y) of the given logic gate is similar to the output of an/a



(1) OR gate

(2) AND gate

(3) NAND gate

(4) NOR gate

---

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

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

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

(1) Both A and B are correct

(2) Both A and B are incorrect

(3) A is correct but B is incorrect

(4) A is incorrect but B is correct

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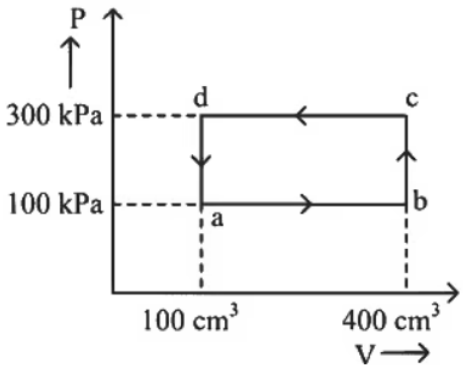
8. A thermodynamic system is taken through the cycle $abcda$. The work done by the gas



along the path bc is:

(1) $-90J$

(2) $-60J$

(3) 0

(4) $30J$

---

9. 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 N m, then the excess force required to take it away from the surface is:

(1) 1.98 mN

(2) 99 N

(3) 19.8 mN

(4) 198 N

---

10. 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) 7

(2) 6

(3) 10

(4) 5

---

11. In the nuclear reaction:

$$^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{\beta^-} Z \xrightarrow{\beta^-} P \xrightarrow{e} Q$$

The mass number and atomic number of the product Q respectively, are:

(1) $288, 82$

(2) $286, 81$

(3) $280, 81$

(4) $286, 80$

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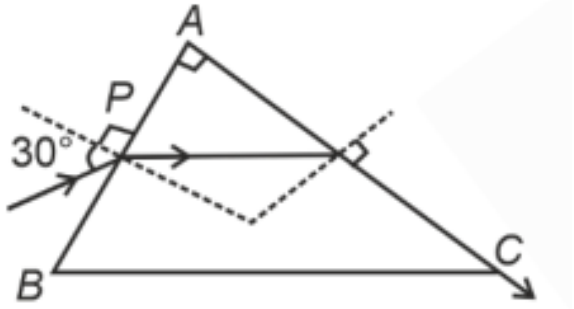
12. A light ray enters through a right angled prism at point P with the angle of incidence 30° as shown in figure. It travels through the prism parallel to its base BC and emerges along the face AC. The refractive index of the prism is:



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

(2) $\frac{\sqrt{3}}{2}$

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

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

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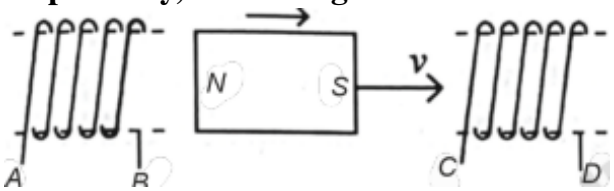
13. In the given diagram, a strong bar magnet is moving towards solenoid-2 from solenoid-1. The direction of induced current in solenoid-1 and that in solenoid-2, respectively, are through the directions:



(1) AB and CD

(2) BA and DC

(3) AB and DC

(4) BA and CD

---

14. In an ideal transformer, the turns ratio is $\frac{N_P}{N_S} = \frac{P}{S}$. The ratio $V_S : V_P$ is equal to (the symbols carry their usual meaning):

(1) 1 : 1

(2) 1 : 4

(3) 1 : 2

(4) 2 : 1

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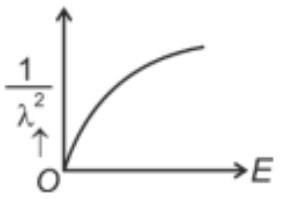
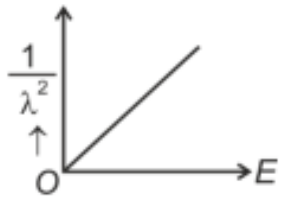
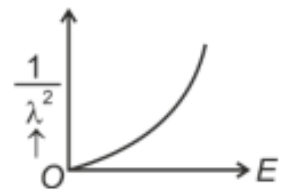
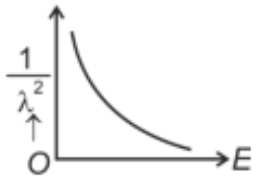
15. The graph which shows the variation of λ and its kinetic energy, E, is (where λ is the de Broglie wavelength of a free particle):

(1) 

(2) 

(3) 

(4) 

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16. If the monochromatic source in Young's double slit experiment is replaced by white light, then

(1) There will be a central bright white fringe surrounded by a few coloured fringes

(2) All bright fringes will be of equal width

(3) Interference pattern will disappear

(4) There will be a central dark fringe surrounded by a few coloured fringes

---

17. 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 P of magnitude, 4×10^{-6} C·m, is $\pm 9 \times 10^3$ V.

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

(1) A is true but R is false.

(2) A is false but R is true.

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

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

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

(1) 4 : 1

(2) 1 : 4

(3) 1 : 2

(4) 2 : 1

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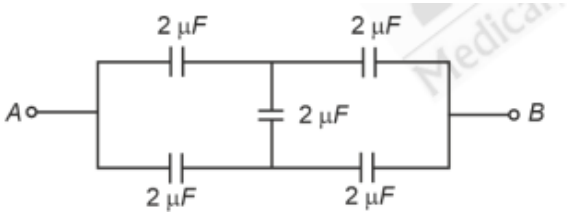
19. In the following circuit, the equivalent capacitance between terminal A and



terminal B is:

(1) 0.5 μF

(2) 4 μF

(3) 2 μF

(4) 1 μF

---

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

(1) Strain and arc

(2) Angular speed and stress

(3) Strain and angle

(4) Stress and angle

---

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

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

The expression for the output Y is:

(1) B'

(2) B

(3) $A.B + \overline{A}$

(4) $A.\overline{B} + \overline{A}$

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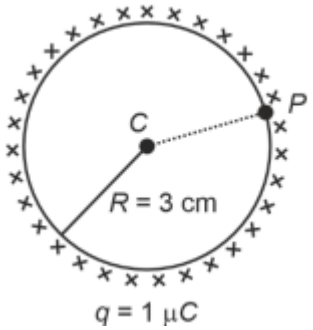
22. A thin spherical shell is charged by some source. The potential difference between the two points C and P (in V) shown in the figure is: (Take 9×10^9 SI units)



(1) 0.5×10^5

(2) Zero

(3) 3×10^5

(4) 1×10^5

---

23. Given below are two statements:

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

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

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

(2) Statement I is incorrect but Statement II is correct

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

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24. Match List-I with List-II.

List-I (Spectral Lines of Hydrogen for transitions from)	**List-II** (Wavelengths (nm))
A. $n_2 = 3$ to $n_1 = 2$	I. 410.2
B. $n_2 = 4$ to $n_1 = 2$	II. 434.1
C. $n_2 = 5$ to $n_1 = 2$	III. 656.3
D. $n_2 = 6$ to $n_1 = 2$	IV. 486.1

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

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

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

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

25. If $5\sin x = \pi + 3x$ represents the motion of a particle executing simple harmonic motion, the amplitude and time period of motion, respectively, are:

(1) 5 cm, 1 s

(2) 5 m, 1 s

(3) 5 cm, 2 s

(4) 5 m, 2 s

26. Match List-I with List-II.

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

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

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

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

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

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27. A wire of length 'l' and resistance 100 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) 55

(2) 60

(3) 26

(4) 52

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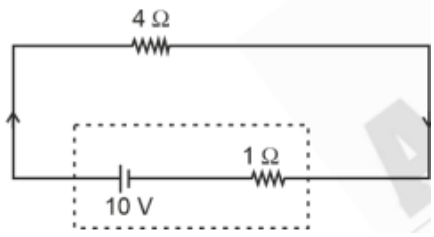
28. The terminal voltage of the battery, whose emf is 10 V and internal resistance 1 , when connected through an external resistance of 4 as shown in the figure, is:



(1) 8 V

(2) 10 V

(3) 4 V

(4) 6 V

---

29. A particle moving with uniform speed in a circular path maintains:

(1) Constant velocity but varying acceleration

(2) Varying velocity and varying acceleration

(3) Constant velocity

(4) Constant acceleration

---

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

(1) 4.4 mT

(2) 44 T

(3) 44 mT

(4) 4.4 T

---

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

(1) 100N

(2) 10(N + 1)

(3) $\frac{1}{10}N$

(4) $\frac{1}{100}(N + 1)$

---

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

(1) Both the reflected and refracted light will be completely polarised.

(2) The reflected light will be completely polarised but the refracted light will be partially polarised.

(3) The reflected light will be partially polarised.

(4) The refracted light will be completely polarised.

---

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

(1) 4.9 m/s²

(2) 3.92 m/s²

(3) 19.6 m/s²

(4) 9.8 m/s²

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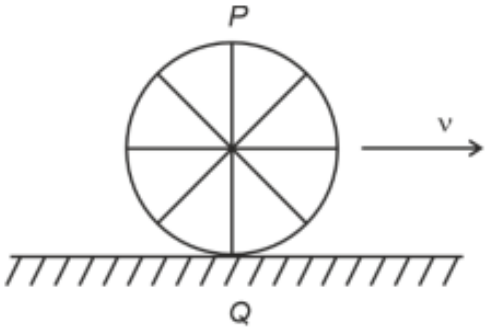
34. A wheel of a bullock cart is rolling on a level road as shown in the figure below. If its linear speed is v in the direction shown, which one of the following options is correct (P and Q are any highest and lowest points on the wheel, respectively)?



(1) Both the points P and Q move with equal speed

(2) Point P has zero speed

(3) Point P moves slower than point Q

(4) Point P moves faster than point Q

---

35. The moment of inertia of a thin rod about an axis passing through its midpoint and perpendicular to the rod is 2400 g cm². The length of the 400 g rod is nearly:

(1) 20.7 cm

(2) 72.0 cm

(3) 8.5 cm

(4) 17.5 cm

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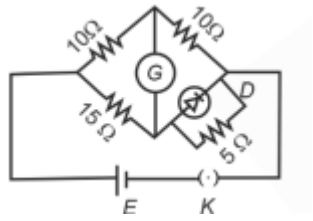
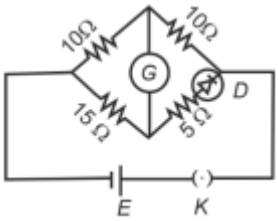
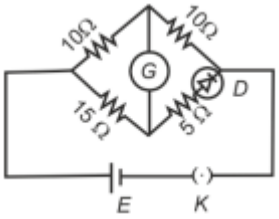
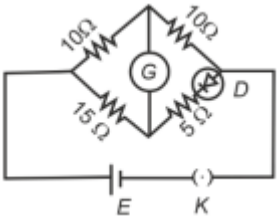
36. Choose the correct circuit which can achieve the bridge balance.

(1) 

(2) 

(3) 

(4) 

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37. 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) Displacement current of magnitude equal to I flows in a direction opposite to that of I

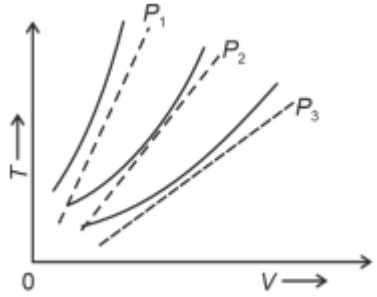
(2) Displacement current of magnitude greater than I flows but can be in any direction

(3) There is no current

(4) Displacement current of magnitude equal to I flows in the same direction as I

---

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



(1) P_2¿P_1¿P_3

(2) P_1¿P_2¿P_3

(3) P_3¿P_2¿P_1

(4) $P_1¿P_3¿P_2$

---

39. 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 2^x times its original time period. Then the value of x is:

(1) $2\sqrt{3}$

(2) 4

(3) $\sqrt{3}$

(4) $\sqrt{2}$

---

40. Two heaters A and B have power ratings 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 : 2

(2) 2 : 3

(3) 1 : 1

(4) 2 : 9

---

41. If the plates of a parallel plate 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.

(1) B, D, and E only

(2) A, B and C only

(3) A, B and E only

(4) A, C and E only

---

42. 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) 17

(2) 32

(3) 34

(4) 28

---

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

(1) hold the sheet there if it is magnetic.

(2) hold the sheet there if it is non-magnetic.

(3) move the sheet away from the pole with uniform velocity if it is conducting.

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

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44. A metallic bar of Young's modulus, 0.5×10^{11} **N/m**^{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) 100×10^3 N

(2) 2×10^3 N

(3) 5×10^3 N

(4) 50×10^3 N

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

(1) $\frac{GmM}{2R}$

(2) $\frac{GmM}{3R}$

(3) $\frac{5GmM}{6R}$

(4) $\frac{2GmM}{3R}$

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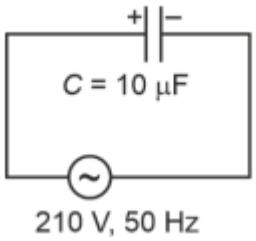
46. A 10 µF capacitor is connected to a 210 V, 50 Hz source as shown in figure. The peak current in the circuit is nearly (π **= 3.14):**



(1) 1.20 A

(2) 0.35 A

(3) 0.58 A

(4) 0.93 A

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47. 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) 2M

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

(3) M

(4) $\frac{M}{2}$

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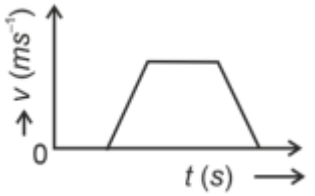
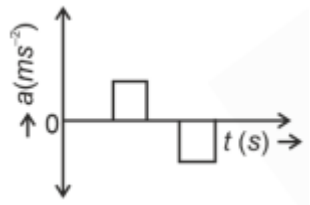
48. The velocity (v) – time (t) plot of the motion of a body is shown below:



(1)



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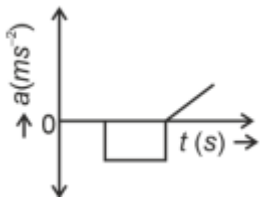
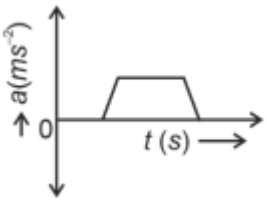
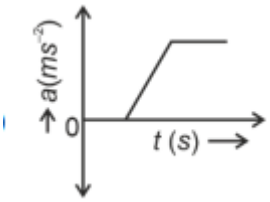


(3)



(4)



---

49. The property which is not of an electromagnetic wave traveling in free space is that:

(1) They travel with a speed equal to $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$

(2) They originate from charges moving with uniform speed

(3) They are transverse in nature

(4) The energy density in electric field is equal to energy density in magnetic field

---

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

(1) $\alpha\beta t$

(2) $\frac{\alpha\beta}{t}$

(3) $\frac{\beta t}{\alpha}$

(4) $\frac{\alpha t}{\beta}$

SECTION B

(Chemistry)

51. In which of the following processes does entropy increase?

A. A liquid evaporates to vapor.

B. Temperature of a crystalline solid is 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, C and D

(2) C and D

(3) A and C

(4) A, B and D

---

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

(1) Distillation

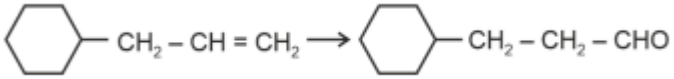
(2) Chromatography

(3) Crystallization

(4) Sublimation

---

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



(1) (i) BH_3, (ii) H_2O_2/OH, (iii) alk.$KMnO_4$, (iv) H_3O^+

(2) (i) H_2O/H^+, (ii) PCC

(3) (i) H_2O/H^+, (ii) CrO_3

(4) (i) BH_3, (ii) H_2O_2/OH, (iii) PCC

---

54. The energy of an electron in the ground state ($n = 1$) for He^+ ion is $-x$ J, then that

for an electron in $n = 2$ state for Be^{3+} ion in J is:

(1) -4x

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

(3) -x

(4) $\frac{-x}{9}$

---

55. Match List I with List II.

List I (Molecule)	List II (Number and types of bonds between two carbon atoms)
A. ethane	I. one σ-bond and two π-bonds
B. ethene	II. two π-bonds
C. carbon molecule, C_2	III. one σ-bond
D. ethyne	IV. one σ-bond and one π-bond

Table 1: Matching of molecules with the types of bonds between two carbon atoms

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

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

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

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

---

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

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

(2) Reaction has gone to completion in forward direction.

(3) Reaction is at equilibrium.

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

---

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

(1) d^4 to d^5 configuration

(2) d^3 to d^5 configuration

(3) d^5 to d^4 configuration

(4) d^5 to d^2 configuration

---

58. Given below are two statements:

Statement I: The boiling point of hydrides of Group 16 elements follow the order $H_2O > H_2Te > H_2Se > H_2S$. **Statement II:** On the basis of molecular mass, H_2O is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in H_2O, it has higher boiling point.

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

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

59. 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

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

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

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

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

---

60. 1 gram of sodium hydroxide was treated with 25 mL of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to:

(1) Zero mg

(2) 200 mg

(3) 750 mg

(4) 250 mg

---

61. 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

(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

---

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

(1) Te

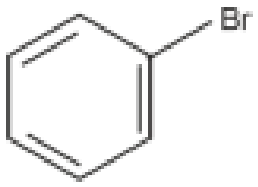
(2) Po

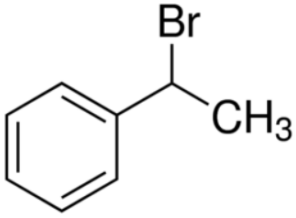
(3) O

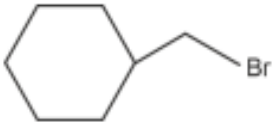
(4) Se

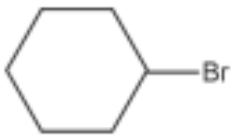
---

63. The compound that will undergo Sn1 reaction with the fastest rate is:

(1) 

(2) 

(3) 

(4) 

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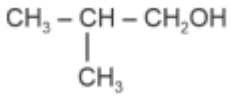
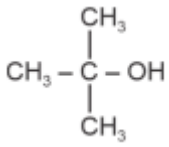
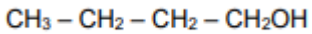
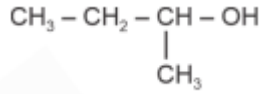
64. Which one of the following alcohols reacts instantaneously with Lucas reagent?

(1) 

(2) 

(3) 

(4) 

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65. 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	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

Table 2: Matching of conversions with the required number of Faradays

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

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

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

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

---

66. The highest number of helium atoms is in:

(1) 4 g of helium

(2) 2.271098 L of helium at STP

(3) 4 mol of helium

(4) 4 u of helium

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

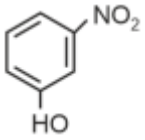
(1) Ti^{3+}

(2) Cr^{2+}

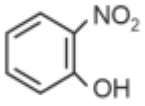
(3) Mn^{2+}

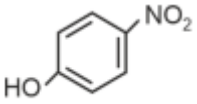
(4) Fe^{2+}

68. Intramolecular hydrogen bonding is present in:

(1) 

(2) HF

(3) 

(4) 

69. Fehling's solution 'A' is:

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

(2) aqueous sodium citrate

(3) aqueous copper sulphate

(4) alkaline copper sulphate

70. Match List I with List II.

List I (Quantum Number)	List II (Information provided)
A. m_l	I. Shape of orbital
B. m_s	II. Size of orbital
C. l	III. Orientation of orbital
D. n	IV. Orientation of spin of electron

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

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

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

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

---

71. Arrange the following elements in increasing order of first ionization enthalpy: Li, Be, B, C, N

(1) Li < Be < C < B < N

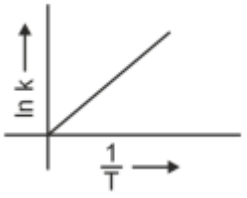
(2) Li < Be < N < B < C

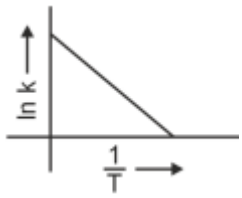
(3) Li < B < Be < C < N

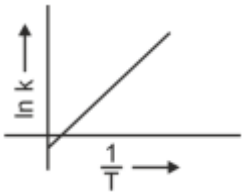
(4) Li < B < Be < C < N

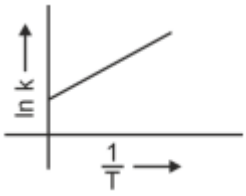
---

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

(1)


(2)


(3)


(4)


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73. Arrange the following elements in increasing order of electronegativity: N, O, F, C, Si

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

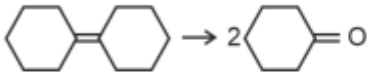
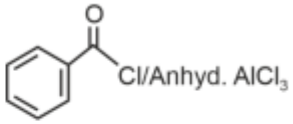
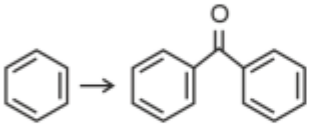
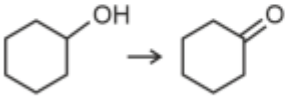
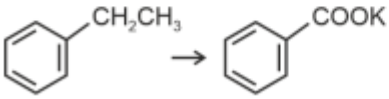
(2) F < O < N < C < Si

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

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

---

74. Match List I with List II.

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

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

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

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

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

---

75. Given below are two statements: Statement I: Aniline does not undergo Friedel-Crafts alkylation reaction. Statement II: Aniline cannot be prepared through Gabriel synthesis. In the light of the above statements, choose the correct answer from the options given below:

(1) Statement I is correct but Statement II is false

(2) Statement I is incorrect but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

76. In which of the following equilibria, Kp and Kc are NOT equal?

(1) $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$

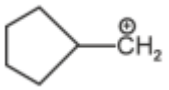
(2) $2BrCl(g) \rightleftharpoons Br_2(g) + Cl_2(g)$

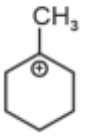
(3) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

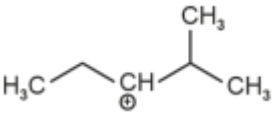
(4) $H_2I_2(g) \rightleftharpoons 2HI(g)$

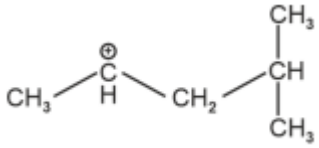
---

77. The most stable carbocation among the following is:

(1) 

(2) 

(3) 

(4) 

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

(1) B and E

(2) E and D

(3) B and C

(4) A and D

---

79. Given below are two statements:

Statement I: Both $[Co(NH_3)_5]^{3+}$ and $[CoF_6]^{3-}$ complexes are octahedral but differ in their magnetic behaviour. **Statement II:** $[Co(NH_3)_5]^{3+}$ 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) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

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

of:

(1) Orientation of reactant molecules during collision

(2) Rate constant at two different temperatures

(3) Rate constant at standard temperature

(4) Probability of collision

---

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

(1) 2,3-dimethylbutane

(2) 2,2-dimethylbutane

(3) n-hexane

(4) 2-methylpentane

---

82. Match List I with List II.

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

(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-I, C-III, D-IV

---

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

(1) A $>$ C $>$ B

(2) B $>$ A $>$ C

(3) B $>$ A $>$ C

(4) B > C > A

---

84. Which reaction is NOT a redox reaction?

(1) $H_2 + Cl_2 \rightarrow 2HCl$

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

(3) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

(4) $2KClO_3 \rightarrow 2KCl + 3O_2$

---

85. Given below are two statements:

Statement I: The boiling point of three isomeric pentanes follows the order n-pentane > isopentane > neopentane. Statement II: When branching increases, the molecule attains a shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point.

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

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

---

86. The rate of a reaction quadruples when temperature changes from 27°C to 57°C. Calculate the energy of activation. Given $R = 8.314\,\mathbf{J\ K^{-1}\ mol^{-1}}$, log_4 = 0.6021

(1) 3.80 kJ/mol

(2) 3804 kJ/mol

(3) 38.04 kJ/mol

(4) 380.4 kJ/mol

---

87. Consider the following reaction in a sealed vessel at equilibrium with concentrations of

$$N_2 = 3.0 \times 10^{-3}\,M, \quad O_2 = 4.2 \times 10^{-3}\,M, \quad NO = 2.8 \times 10^{-3}\,M.$$

If 0.1 mol/L of NO(g) is taken in a closed vessel, what will be the degree of dissociation (α) of NO(g) at equilibrium?

(1) 0.8889

(2) 0.717

(3) 0.0889

(4) 0.0089

---

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

(1) Dilute nitric acid

(2) Dilute sulfuric acid

(3) Dilute hydrochloric acid

(4) Concentrated sulfuric acid

---

89. A compound X contains 32% of A, 20% of B and the remaining percentage of C. Then, the empirical formula of X is: (Given atomic masses of A = 64; B = 40; C = 32 u)

(1) A_2BC_2

(2) ABC_4

(3) AB_2C_2

(4) ABC_3

---

90. The pair of lanthanoid ions which are diamagnetic is:

(1) Gd^{3+} and Eu^{3+}

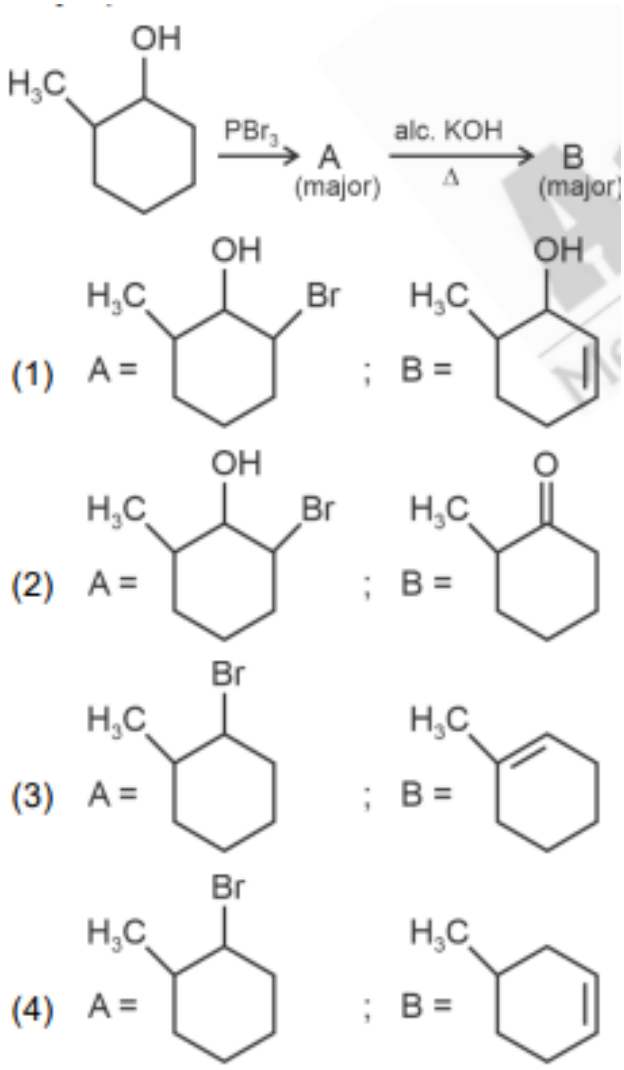
(2) Pm^{3+} and Sm^{3+}

(3) Ce^{4+} and Yb^{2+}

(4) Ce^{3+} and Eu^{2+}

---

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



---

92. The plot of osmotic pressure (Π) 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) 25.73°C

(2) 12.05°C

(3) 37°C

(4) 310°C

---

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

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

Choose the correct answer from the options given below:

(1) E, C, D, B, A

(2) E, A, B, C, D

(3) B, A, D, C, E

(4) B, C, A, D, E

---

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

$$3ROH + \text{PCl}_5 \rightarrow 3RCl + A$$

$$ROH + \text{PCl}_5 \rightarrow \text{RCl} + \text{HCl} + B$$

Choose the correct answer from the options given below:

(1) H_2PO_4 and $POCl_3$

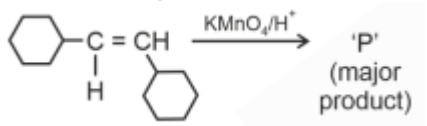
(2) H_3PO_4 and $POCl_3$

(3) $POCl_3$ and H_3PO_4

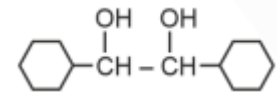
(4) $POCl_3$ and H_3PO_4

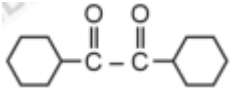
---

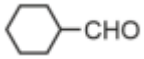
95. For the given reaction:

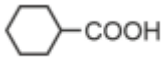


Identify the major product ('P').

(1) 

(2) 

(3) 

(4) 

---

96. 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 mol)

(1) 413.14 calories

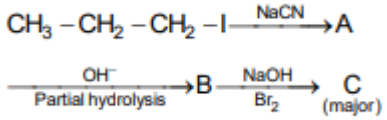
(2) 100 calories

(3) 0 calorie

(4) -413.14 calories

---

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



(1) butanamide

(2) α-bromobutanoic acid

(3) propylamine

(4) butylamine

---

98. Identify the correct answer.

(1) Dipole moment of NF_3 is greater than that of NH_3

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

(3) Three resonance structures can be drawn for ozone

(4) BF_3 has non-zero dipole moment

---

99. 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}, 1 F = 96487 C):

(1) 31.5 g

(2) 0.0315 g

(3) 3.15 g

(4) 0.315 g

---

100. 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.

Choose the correct answer from the options given below:

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

BOTANY

(Section-A)

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

(1) Competitive inhibition

(2) Enzyme activation

(3) Cofactor inhibition

(4) Feedback inhibition

---

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

A. Out of one pair of factors one is dominant and the other is recessive.

B. Alleles do not show any expression and both the characters appear as such in 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.

(1) B, C and D only

(2) A, B, C, D and E

(3) A, B and C only

(4) A, C, D and E only

---

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

(1) Glycerides

(2) Carbohydrates

(3) Amino acids

(4) Phospholipids

---

104. 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 synthesis
D.	Golgi apparatus	IV.	For storing nutrients

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

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

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

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

---

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

(1) *Pisum*

(2) *Sesbania*

(3) *Datura*

(4) *Cassia*

---

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

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

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

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

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

---

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

(1) Dedifferentiation

(2) Maturation

(3) Differentiation

(4) Redifferentiation

---

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

(1) does not affect mature monocotyledonous plants.

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

(3) promotes apical dominance.

(4) promotes abscission of mature leaves only.

---

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

A. Light

B. Chlorophyll

C. CO

D. ATP

E. NADPH

Choose the correct answer from the options given below:

(1) C, D and E only

(2) D and E only

(3) A, B and C only

(4) B, C and D only

---

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

(1) Permease

(2) Polymerase

(3) Beta-galactosidase

(4) Acetylase

---

111. The cofactor of the enzyme carboxypeptidase is:

(1) Flavin

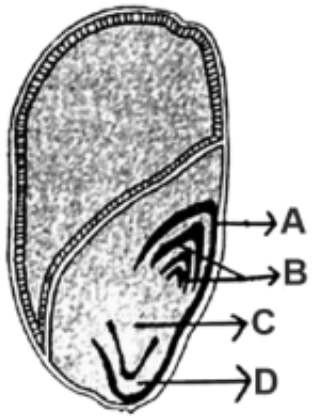
(2) Haem

(3) Zinc

(4) Niacin

---

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



(1) C

(2) D

(3) A

(4) B

---

113. Given below are two statements:

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

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

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

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

(1) Semi-conservative method

(2) Sustainable development

(3) In-situ conservation

(4) Biodiversity conservation

---

115. 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.

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

116. The equation of Verhulst-Pearl logistic growth is

$$\frac{dN}{dt} = rN\left(1 - \frac{N}{K}\right)$$

From this equation, K indicates:

(1) Carrying capacity

(2) Population density

(3) Intrinsic rate of natural increase

(4) Biotic potential

---

117. Match List I with List II

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

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

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

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

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

---

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

(1) Mode of spore formation.

(2) Fruiting body.

(3) Morphology of mycelium.

(4) Mode of nutrition.

---

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

(1) Differentiation

(2) Somatic hybridization

(3) Totipotency

(4) Micropropagation

---

120. 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.

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

121. Identify the set of *correct* statements:

A. The flowers of *Vallisneria* are colourful and produce nectar.

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

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

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

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

(1) A, C, D and E only

(2) B, C, D and E only

(3) C, D and E only

(4) A, B, C and D only

---

122. A transcription unit in DNA is defined primarily by the three regions in DNA and these are with respect to upstream and downstream ends;

(1) Inducer, Repressor, Structural gene

(2) Promotor, Structural gene, Terminator

(3) Repressor, Operator gene, Structural gene

(4) Structural gene, Transposons, Operator gene

---

123. Bulliform cells are responsible for

(1) Increased photosynthesis in monocots.

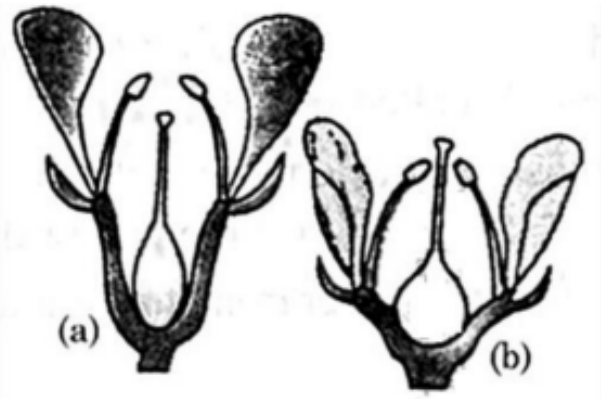
(2) Providing large spaces for storage of sugars.

(3) Inward curling of leaves in monocots.

(4) Protecting the plant from salt stress.

---

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



(1) (a) Perigynous; (b) Epigynous

(2) (a) Perigynous; (b) Perigynous

(3) (a) Epigynous; (b) Hypogynous

(4) (a) Hypogynous; (b) Epigynous

---

125. What is the fate of a piece of DNA carrying only a 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 the chromosome.

E. It shows ability to replicate.

(1) B and C only

(2) A and E only

(3) A and B only

(4) D and E only

---

126. Tropical regions show the 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.

(1) A, B and E only

(2) A, B and D only

(3) A, C, D and E only

(4) A and B only

---

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

(1) Only pink flowered plants

(2) Red, Pink as well as white flowered plants

(3) Only red flowered plants

(4) Red flowered as well as pink flowered plants

---

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

A. Over exploitation

B. Co-extinction

C. Mutation

D. Habitat loss and fragmentation

E. Migration

Choose the correct option:

(1) A, B and E only

(2) A, B and D only

(3) A, C and D only

(4) A, B, C and D only

---

129. 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

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

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

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

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

---

130. 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 genotypes will you cross it?

(1) Bb

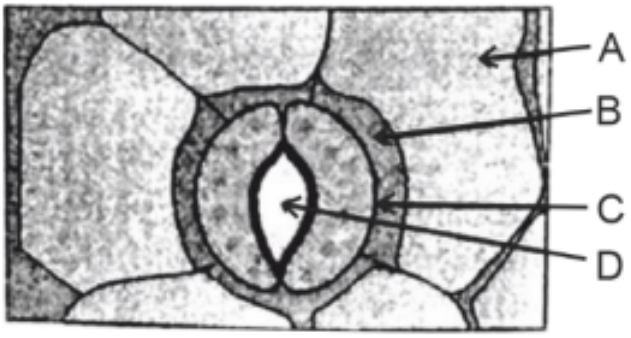
(2) BB/Bb

(3) BB

(4) bb

---

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



(1) A

(2) B

(3) C

(4) D

132. List of endangered species was released by

(1) FOAM

(2) IUCN

(3) GEAC

(4) WWF

---

133. Match List I with List II

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

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

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

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

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

---

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

(1) 4 bp

(2) 10 bp

(3) 8 bp

(4) 6 bp

---

135. Spindle fibers attach to kinetochores of chromosomes during

(1) Anaphase

(2) Telophase

(3) Prophase

(4) Metaphase

---

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

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

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

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

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

---

137. 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

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

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

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

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

---

138. 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

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

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

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

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

---

139. 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

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

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

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

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

---

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

(1) The DNA-dependent DNA polymerase catalyzes polymerization in 5' $\rightarrow$ 3' as well as 3' $\rightarrow$ 5' direction

(2) The DNA-dependent DNA polymerase catalyzes polymerization in 5' $\rightarrow$ 3' direction

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

(4) The DNA-dependent RNA polymerase catalyzes polymerization in one direction, that is 5' $\rightarrow$ 3'

---

141. 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

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

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

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

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

---

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

(1) Succinyl-CoA $\rightarrow$ Succinic acid

(2) Isocitrate $\rightarrow$ α-ketoglutaric acid

(3) Malic acid $\rightarrow$ Oxaloacetic acid

(4) Succinic acid $\rightarrow$ Malic acid

---

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

(1) Cytokinin

(2) Abscisic acid

(3) Auxin

(4) Gibberellin

---

144. The DNA present in chloroplast is:

(1) Linear, single stranded

(2) Circular, single stranded

(3) Linear, double stranded

(4) Circular, double stranded

---

145. 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.

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

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

(1) Protoplasts

(2) Pollens

(3) Callus

(4) Somatic embryos

---

147. Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae,

A. Asexual reproduction occurs usually by biflagellate zoospores.

B. Sexual reproduction is by oogamous method only.

C. Stored food is in the form of carbohydrates which is either mannitol or laminarin.

D. The major pigments found are chlorophyll *a*, *c*, carotenoids, and xanthophyll.

E. Vegetative cells have a cellulosic wall, usually covered on the outside by gelatinous coating of algin.

Choose the correct answer from the options given below:

(1) A, C, D and E only

(2) A, B, C and E only

(3) A, B, C and D only

(4) B, C, D and E only

---

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

(1) $10x$ (kcal m^{-2} yr^{-1})

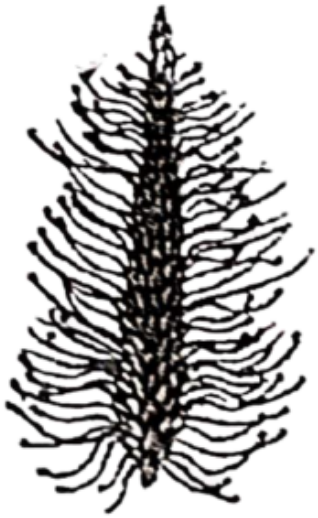
(2) $\frac{100x}{3}$ (kcal m^{-2} yr^{-1})

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

(4) x (kcal m^{-2} yr^{-1})

---

149. Identify the correct description about the given figure:



(1) Cleistogamous flowers showing autogamy.

(2) Compact inflorescence showing complete autogamy

(3) Wind-pollinated plant inflorescence showing flowers with well-exposed stamens.

(3) Water-pollinated flowers showing stamens with mucilaginous covering.

---

150. 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

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

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

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

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

ZOOLOGY

(Section-A)

151. Match List I with List II

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

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

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

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

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

---

152. 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

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

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

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

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

---

153. Match List I with List II

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

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

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

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

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

---

154. 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

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

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

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

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

---

155. Match List I with List II

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

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

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

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

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

---

156. 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

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

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

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

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

---

157. 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.

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

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

3' TACATGGCAAATATCCATTCA 5'

(1) 5' AUGUACCGUUUUAUAGGAAUAG 3'

(2) 5' ATGTACCGTTTATAGGTAAGT 3'

(3) 5' AUGUACCGUUUUAUAGGAAGU 3'

(4) 5' AUGUAAAGUUUAUGGAUAGU 3'

---

159. 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

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

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

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

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

---

160. Which of the following are Autoimmune disorders?

A. Myasthenia gravis

B. Rheumatoid arthritis

C. Gout

D. Muscular dystrophy

E. Systemic Lupus Erythematosus (SLE)

Choose the most appropriate answer from the options given below:

(1) B, C E only

(2) C, D E only

(3) A, B D only

(4) A, B E only

---

161. Consider the following statements:

A. Annelids are true coelomates

B. Poriferans are pseudocoelomates

C. Aschelminthes are acoelomates

D. Platyhelminthes are pseudocoelomates

Choose the correct answer from the options given below:

(1) C only

(2) D only

(3) B only

(4) A only

---

162. 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.

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

---

163. 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

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

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

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

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

---

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

(1) Progesterone

(2) Glucagon

(3) Cortisol

(4) Testosterone

---

165. Match List I with List II

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

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

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

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

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

---

166. Match List I with List II

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

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

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

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

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

---

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

(1) Tumor inducing plasmid

(2) Temperature independent plasmid

(3) Tumour inhibiting plasmid

(4) Tumor independent plasmid

---

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

Assertion A: Breast-feeding during the 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 newborn baby.

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

(1) A is correct but R is not correct

(2) A is not correct but R is correct

(3) Both A and R are correct and R is the correct explanation of A

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

---

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

(1) Infundibulum

(2) Ampulla

(3) Uterine fundus

(4) Isthmus

---

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

(1) 8^{th} and 9^{th} segment

(2) 11^{th} segment

(3) 9^{th} segment

(4) 10^{th} segment

---

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

(1) Gene migration

(2) Constant gene pool

(3) Genetic recombination

(4) Genetic drift

---

172. Match List I with List II

List I		**List II**	
A.	Pons	I.	Provides 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.	Neurosecretory cells

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

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

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

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

---

173. The flippers of Penguins and Dolphins are an example of:

(1) Convergent evolution

(2) Divergent evolution

(3) Adaptive radiation

(4) Natural selection

---

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

A. AV bundle

B. Purkinje fibres

C. AV node

D. Bundle branches

E. SA node

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

(1) B-D-E-C-A

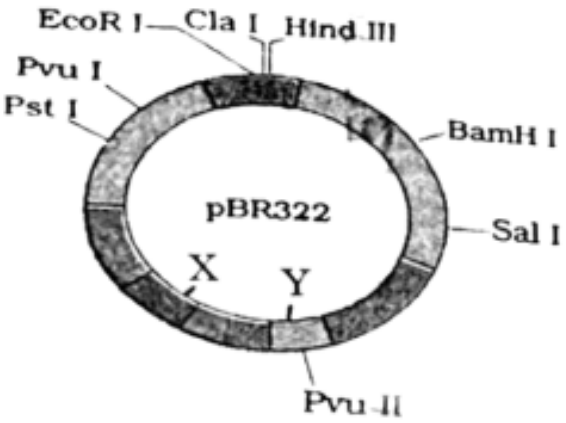
(2) E-A-D-B-C

(3) E-C-A-D-B

(4) A-E-C-B-D

---

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



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

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

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

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

---

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

Assertion A: FSH acts upon ovarian follicles in females and Leydig cells in males.

Reason R: Growing ovarian follicles secrete estrogen in females, while interstitial cells secrete androgens in males.

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

(1) A is true but R is false

(2) A is false but R is true

(3) Both A and R are true and R is the correct explanation of A

(4) Both A and R are true but R is NOT the correct explanation of A

---

177. Which of the following statements is incorrect?

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

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

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

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

---

178. 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

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

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

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

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

---

179. 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

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

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

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

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

---

180. 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) C-B-D-A

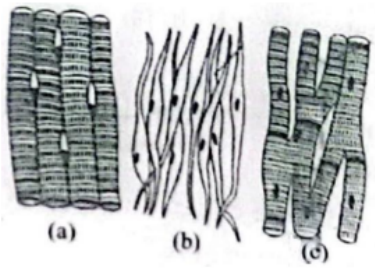
(2) A-D-C-B

(3) D-A-C-B

(4) B-A-D-C

---

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



Name of muscle/location

(1) (a) Skeletal – Biceps (b) Involuntary – Intestine (c) Smooth – Heart

(2) (a) Involuntary – Nose tip (b) Skeletal – Bone (c) Cardiac – Heart

(3) (a) Smooth – Toes (b) Skeletal – Legs (c) Cardiac – Heart

(4) (a) Skeletal – Triceps (b) Smooth – Stomach (c) Cardiac – Heart

---

182. Following are the stages of cell division:

A. Gap 2 phase

B. Cytokinesis

C. Synthesis phase

D. Karyokinesis

E. Gap 1 phase

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

(1) B-D-E-A-C

(2) E-C-A-D-B

(3) C-E-D-A-B

(4) E-B-D-A-C

---

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

(1) Lactational amenorrhea

(2) Vaults

(3) Coitus interruptus

(4) Periodic abstinence

---

184. 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

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

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

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

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

---

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

(1) Low pCO_2 and High H^+ concentration

(2) Low pCO_2 and High temperature

(3) High pO_2 and High pCO_2

(4) High pO_2 and Lesser H^+ concentration

---

186. 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 microenvironments for the development and maturation of T-lymphocytes.

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

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

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

---

187. 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.

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

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

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

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

---

188. Given below are two statements:

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

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

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

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

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

---

189. 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

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

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

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

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

---

190. 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

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

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

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

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

---

191. Match List I with List II

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

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

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

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

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

---

192. Given below are two statements:

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

Statement II: The inner membrane of mitochondria is relatively less permeable compared to the chloroplast.

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

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

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

---

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

Options:

A. I^Bi/I^Bi

B. I^BI^A/I^Ai

C. I^AI^B/I^Bi

D. I^Ai/I^Bi

E. $ii/I^Bi/I^AI^B$

Choose the most appropriate answer from the options given below:

(1) C B only

(2) D E only

(3) A D only

(4) B only

---

194. Match List I with List II

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

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

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

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

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

---

195. Match List I with List II:

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

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

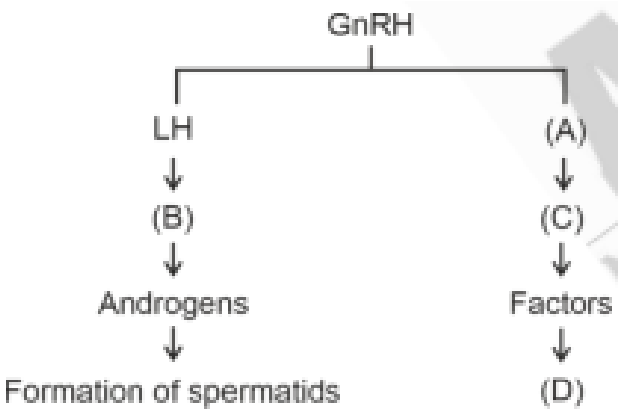
(2) A-IV, B-II, C-I, D-III

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

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

---

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



(1) FSH, Sertoli cells, Leydig cells, spermatogenesis.

(2) ICSH, Leydig cells, Sertoli cells, spermatogenesis.

(3) FSH, Leydig cells, Sertoli cells, spermiogenesis.

(4) ICSH, Interstitial cells, Leydig cells, spermiogenesis.

---

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

A. Pharynx is perforated by gill slits.

B. Notochord is absent.

C. Central nervous system is dorsal.

D. Heart is dorsal if present.

E. Post-anal tail is absent.

Choose the most appropriate answer from the options given below:

(1) B, D & E only

(2) B, C & D only

(3) A & C only

(4) A, B & D only

---

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

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

(2) Juxta medullary nephrons outnumber the cortical nephrons.

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

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

---

199. Given below are two statements:

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

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

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

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

---

200. 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) B, A, C, D, E

(2) E, D, C, B, A

(3) E, A, B, C, D

(4) A, E, B, D, C
