Test Booklet Code

← Test Booklet No. **ENGLISH**

Q1

DUGRI

This Booklet contains **32** pages, including Rough Page.

Do not open this Test Booklet until you are asked to do so.

Important Instructions:

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with **blue/black** ball point pen only.
2. 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.**
3. 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.**
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
6. 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.
7. **The CODE for this Booklet is Q1. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet.** In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
9. Use of white fluid for correction is **NOT** permissible on the Answer Sheet.
10. Each candidate must show on-demand his/her Admit Card to the Invigilator.
11. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
12. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet **twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**
13. Use of Electronic/Manual Calculator is prohibited.
14. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
15. **No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
17. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of Scribe or not.

Name of the Candidate (in Capitals): _____

Roll Number : In figures _____

: In words _____

Centre of Examination (in Capitals): _____

Candidate's Signature: _____ Invigilator's Signature: _____

Facsimile signature stamp of Centre Superintendent

Physics : Section-A (Q. No. 1 to 35)

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

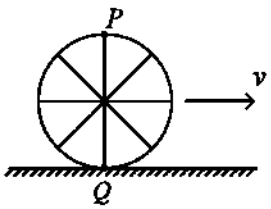
A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

The expression for the output Y is :

(1) $A.B + \overline{A}$ (2) $A.\overline{B} + \overline{A}$

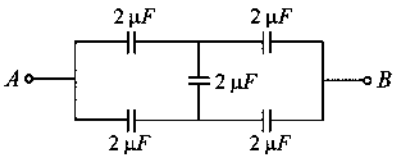
(3) $\overline{B}$ (4) B

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.

3 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) 4 μF

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

(1) 10 (2) 5

(3) 7 (4) 6

5 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, 4×10^{-6} C m, is $\pm 9\times10^{3}$ 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:

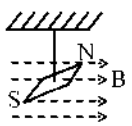
(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true and R is NOT the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

6 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

7 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 9.8×10^{-6} kg m^2. If the magnitude of magnetic moment of the needle is $x \times 10^{-5}$ Am^2; then the value of 'x' is :



(1) $5\pi^2$ (2) $128\pi^2$

(3) $50\pi^2$ (4) $1280\pi^2$

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

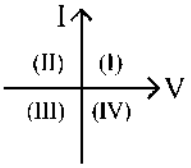
(1) the reflected light will be partially polarised.

(2) the refracted light will be completely polarised.

(3) both the reflected and refracted light will be completely polarised.

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

9 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.

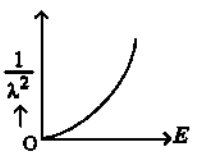
(1) A is correct but B is incorrect.

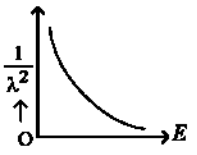
(2) A is incorrect but B is correct.

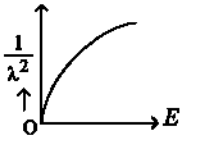
(3) Both A and B are correct.

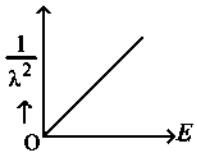
(4) Both A and B are incorrect.

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

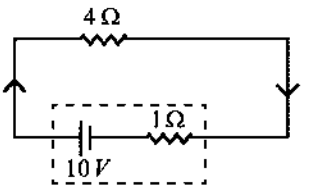
(1) 

(2) 

(3) 

(4) 

11 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) $10\ V$

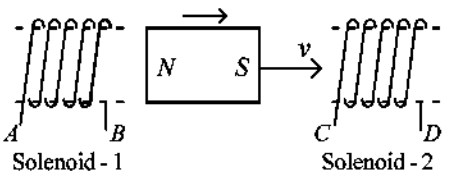
12 The quantities which have the same dimensions as those of solid angle are :

(1) strain and angle

(2) stress and angle

(3) strain and arc

(4) angular speed and stress

13 

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

(1) AB and DC (2) BA and CD

(3) AB and CD (4) BA and DC

14 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

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

(1) 5 cm, 2 s (2) 5 m, 2 s

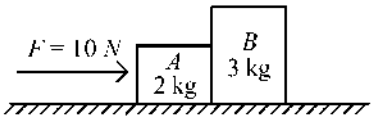
(3) 5 cm, 1 s (4) 5 m, 1 s

16 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) 19.6 m s^{-2} (2) 9.8 m s^{-2}

(3) 4.9 m s^{-2} (4) 3.92 m s^{-2}

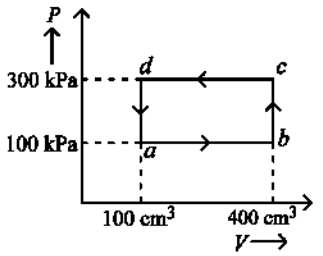
17 A horizontal force 10 N is applied to a block A as shown in figure. The mass of blocks A and B are 2 kg and 3 kg, respectively. The blocks slide over a frictionless surface. The force exerted by block A on block B is :



(1) zero (2) 4 N

(3) 6 N (4) 10 N

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



(1) zero (2) 30 J

(3) –90 J (4) –60 J

19 Given below are two statements :

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

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

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

(1) 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.

20 $^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$

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

(1) 280, 81 (2) 286, 80

(3) 288, 82 (4) 286, 81

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

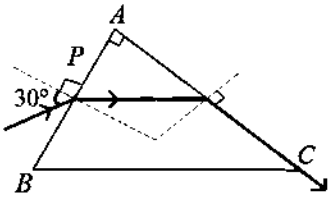
(1) constant velocity.

(2) constant acceleration.

(3) constant velocity but varying acceleration.

(4) varying velocity and varying acceleration.

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

23 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 :

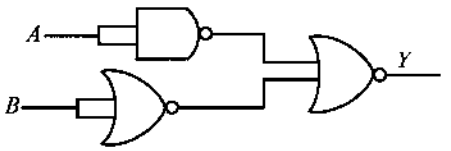
(1) $\frac{1}{10N}$ (2) $\frac{1}{100(N+1)}$

(3) $100N$ (4) $10\,(N + 1)$

24 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.

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

26 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

27 Match List I with List II.

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

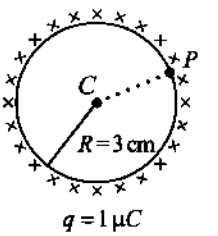
Choose the correct answer from the options given below :
(1) A-II, B-I, C-IV, D-III
(2) A-III, B-IV, C-II, D-I
(3) A-IV, B-III, C-I, D-II
(4) A-I, B-II, C-III, D-IV

28 A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If surface tension of water is 0.07 Nm^{-1}, then the excess force required to take it away from the surface is :
(1) 19.8 mN (2) 198 N
(3) 1.98 mN (4) 99 N

29 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

30 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) 4 mm (2) 0.4 mm
(3) 40 mm (4) 8 mm

31 A thin spherical shell is charged by some source. The potential difference between the two points C and P (in V) shown in the figure is:
(Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9$ SI units)



$q = 1\,\mu C$

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

Physics : Section-B (Q. No. 36 to 50)

32 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) $60\,\Omega$

33 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

34 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.	$\chi >> 1$
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

35 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) T (2) $4T$

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

36 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 :

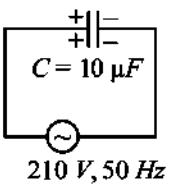
(1) there is no current.

(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 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 $(\pi = 3.14)$:



(1) 0.58 A (2) 0.93 A

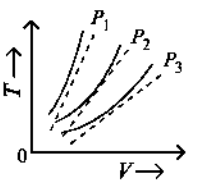
(3) 1.20 A (4) 0.35 A

38 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

39 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) $P_1 > P_2 > P_3$

40 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) $\frac{GmM}{3R}$

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

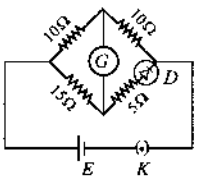
(1) they are transverse in nature.

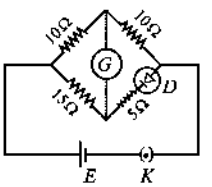
(2) the energy density in electric field is equal to energy density in magnetic field.

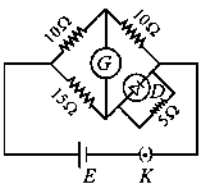
(3) they travel with a speed equal to $\frac{1}{\sqrt{\mu_0 \in_0}}$.

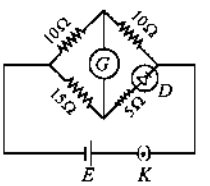
(4) they originate from charges moving with uniform speed.

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

(1) 

(2) 

(3) 

(4) 

43 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) $\beta t/\alpha$ (2) $\alpha t/\beta$

(3) $\alpha\beta t$ (4) $\alpha\beta/t$

44 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

45 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) $\frac{M}{2}$

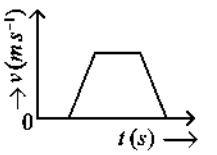
(3) 2 M (4) $\frac{M}{\sqrt{3}}$

46 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:

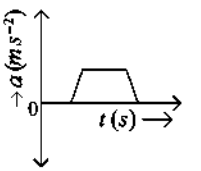
(1) 5×10^3 N (2) 50×10^3 N

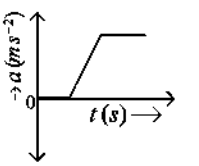
(3) 100×10^3 N (4) 2×10^3 N

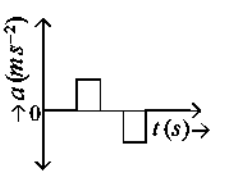
47 The velocity (v) – time (t) plot of the motion of a body is shown below :

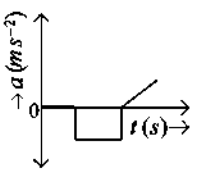


The acceleration (a) – time (t) graph that best suits this motion is :

(1) 

(2) 

(3) 

(4) 

48 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.

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

49 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

50 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

51 Arrange the following elements in increasing order of electronegativity:

N, O, F, C, Si

Choose the correct answer from the options given below:

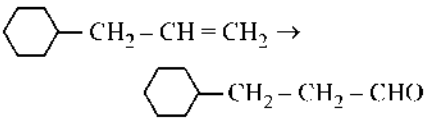
(1) Si < C < N < O < F

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

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

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

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



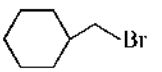
(1) (i) H_2O/H^+
(ii) CrO_3

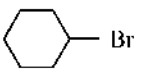
(2) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) PCC

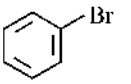
(3) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) alk. $KMnO_4$
(iv) $H_3O^{\oplus}$

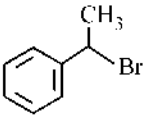
(4) (i) H_2O/H^+
(ii) PCC

53 The compound that will undergo S_N1 reaction with the fastest rate is

(1) 

(2) 

(3) 

(4) 

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

Then, which of the following is correct?

(1) Reaction 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.

55 The highest number of helium atoms is in

(1) 4 mol of helium

(2) 4 u of helium

(3) 4 g of helium

(4) 2.271098 L of helium at STP

56 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 options given 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-I

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

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

58 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 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

Choose the correct answer from the options given 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

59 Match List I with List II.

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

Choose the correct answer from the options given below:

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

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

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

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

60 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^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

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

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

(2) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2\,HI_{(g)}$

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

(4) $2\,BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$

62 Among Group 16 elements, which one does **NOT** show –2 oxidation state?

(1) O (2) Se

(3) Te (4) Po

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

A. Ti^{3+} B. Cr^{2+}

C. Mn^{2+} D. Fe^{2+}

E. Sc^{3+}

Choose the most appropriate answer from the options given below:

(1) B and D only

(2) A and E only

(3) B and C only

(4) A and D only

64 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

65 Given below are two statements:

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

n-pentane > isopentane > neopentane

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

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

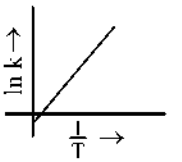
(1) Both Statement I and Statement II are correct.

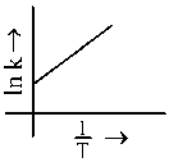
(2) Both Statement I and Statement II are incorrect.

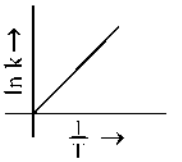
(3) Statement I is correct but Statement II is incorrect.

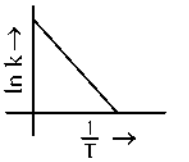
(4) Statement I is incorrect but Statement II is correct.

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

(1) 

(2) 

(3) 

(4) 

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

(1) B > A > C (2) B > C > A

(3) A > C > B (4) A > B > C

68 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

69 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) 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.

70 Given below are two statements :

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

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

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

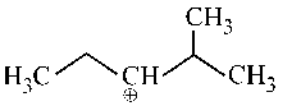
(1) Both Statement I and Statement II are true.

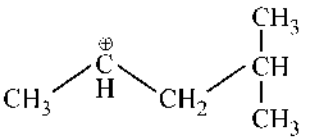
(2) Both Statement I and Statement II are false.

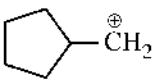
(3) Statement I is true but Statement II is false.

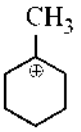
(4) Statement I is false but Statement II is true.

71 The most stable carbocation among the following is:

(1) 

(2) 

(3) 

(4) 

72 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

73 Match List I with List II.

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

Choose the correct answer from the options given below:

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

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

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

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

74 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

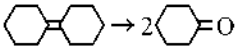
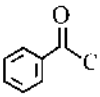
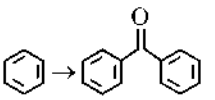
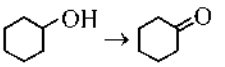
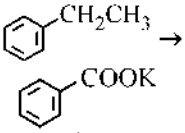
E. $NaHSO_3$

Choose the correct options from the given below:

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

(3) B and E (4) E and D

75 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, Δ
D. 	IV. (i) O_3 (ii) Zn-H_2O

Choose the correct answer from the options given below:

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

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

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

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

76 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.

77 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:

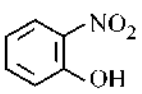
(1) A-II, B-IV, C-I, D-III

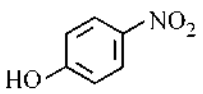
(2) A-III, B-IV, C-I, D-II

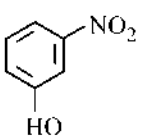
(3) A-II, B-III, C-I, D-IV

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

78 Intramolecular hydrogen bonding is present in

(1) 

(2) 

(3) 

(4) HF

79 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) 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.

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

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

(2) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-OH$

(3) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2OH$

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

81 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

82 Which reaction is **NOT** a redox reaction?

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

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

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

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

83 Match List I with List II.

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

Choose the correct answer from the options given below:

(1) A-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

84 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. $2\,NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$

D. $Cl_{2(g)} \rightarrow 2\,Cl_{(g)}$

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

85 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) 750 mg (2) 250 mg

(3) Zero mg (4) 200 mg

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

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

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

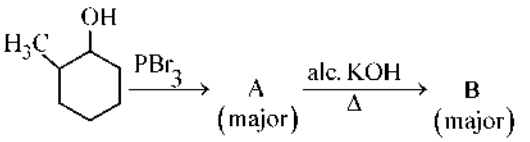
(1) $POCl_3$ and H_3PO_3

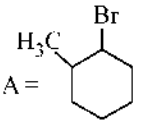
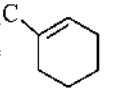
(2) $POCl_3$ and H_3PO_4

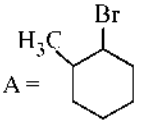
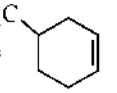
(3) H_3PO_4 and $POCl_3$

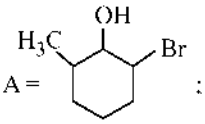
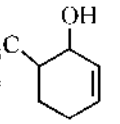
(4) H_3PO_3 and $POCl_3$

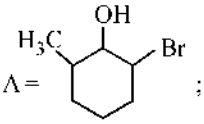
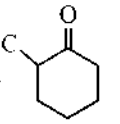
87 Major products A and B formed in the following reaction sequence, are



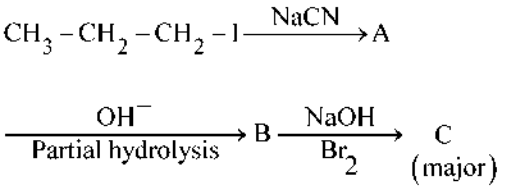
(1) A =  ; B = 

(2) A =  ; B = 

(3) A =  ; B = 

(4) A =  ; B = 

88 Identify the major product C formed in the following reaction sequence :



(1) propylamine

(2) butylamine

(3) butanamide

(4) α – bromobutanoic acid

89 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

90 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.

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

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

(1) 0.00889 (2) 0.0889

(3) 0.8889 (4) 0.717

91 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

92 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

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

Given R = 8.314 J K^{-1} mol^{-1}, log 4 = 0.6021

(1) 38.04 kJ/mol

(2) 380.4 kJ/mol

(3) 3.80 kJ/mol

(4) 3804 kJ/mol

94 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) 37°C (2) 310°C

(3) 25.73°C (4) 12.05°C

95 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) B, A, D, C, E

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

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

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

96 Given below are two statements :

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

Statement II : Complex $\left[Co(NH_3)_6\right]^{3+}$ has only one kind of ligands but $\left[Co(NH_3)_4Cl_2\right]^{+}$ 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.

97 The pair of lanthanoid ions which are diamagnetic is

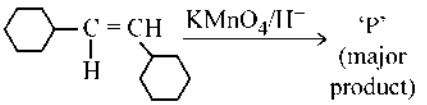
(1) Ce^{4+} and Yb^{2+}

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

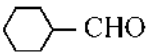
(3) Gd^{3+} and Eu^{3+}

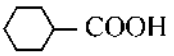
(4) Pm^{3+} and Sm^{3+}

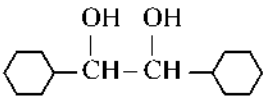
98 For the given reaction:

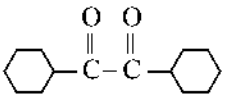


'P' is

(1) 

(2) 

(3) 

(4) 

99 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.

100 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 = 32 u)

(1) A_2BC_2 (2) ABC_3

(3) AB_2C_2 (4) ABC_4

101 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:

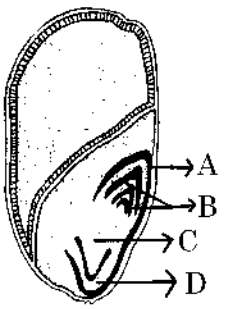
(1) A-III, B-II, C-IV, D-I

(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

102 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

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

(1) Amino acids

(2) Phospholipids

(3) Glycerides

(4) Carbohydrates

104 Match List I with List II

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

Choose the correct answer from the options given below:

(1) A-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

105 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

106 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.

107 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

108 Match List I with List II

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

Choose the correct answer from the options given below:

(1) A-III, B-I, C-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

109 Spindle fibers attach to kinetochores of chromosomes during

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

110 Which of the following is an example of actinomorphic flower?

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

111 The cofactor of the enzyme carboxypeptidase is:

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

112 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

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

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

(1) Totipotency

(2) Micropropagation

(3) Differentiation

(4) Somatic hybridization

114 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

115 Identify the set of correct statements:

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

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

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

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

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

Choose the correct answer from the options given below:

(1) 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

116 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

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

(1) Differentiation

(2) Redifferentiation

(3) Dedifferentiation

(4) Maturation

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

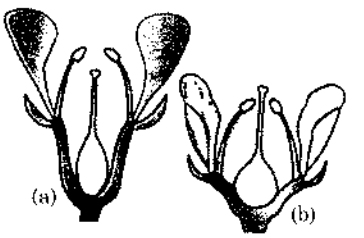
(1) Cofactor inhibition

(2) Feedback inhibition

(3) Competitive inhibition

(4) Enzyme activation

119 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

120 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

121 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

122 The equation of Verhulst-Pearl logistic growth is

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

From this equation, K indicates:

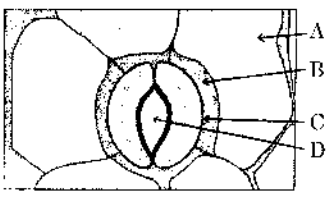
(1) Intrinsic rate of natural increase

(2) Biotic potential

(3) Carrying capacity

(4) Population density

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



(1) C (2) D

(3) A (4) B

124 Given below are two statements:

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

Statement II : The begining 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

125 List of endangered species was released by-

(1) GEAC (2) WWF

(3) FOAM (4) IUCN

126 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

127 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

128 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

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

(1) Beta-galactosidase

(2) Acetylase

(3) Permease

(4) Polymerase

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

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

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

131 Which one of the following is <u>not</u> a criterion for classification of fungi?

(1) Morphology of mycelium

(2) Mode of nutrition

(3) Mode of spore formation

(4) Fruiting body

132 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

133 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.

134 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

135 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

Botany : Section-B (Q. No. 136 to 150)

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 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:

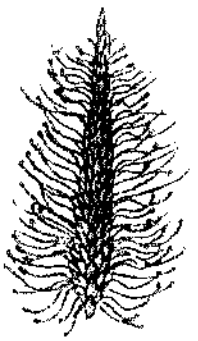
(1) A-II, B-III, C-I, D-IV

(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

137 Identify the correct description about the given figure:



(1) Wind pollinated plant inflorescence showing 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.

138 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

139 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

140 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

141 Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae,

A. Asexual reproduction occurs usually by biflagellate zoospores.

B. Sexual reproduction is by oogamous method only.

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

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

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

Choose the correct answer from the options given below:

(1) A, 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

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

(1) Malic acid → Oxaloacetic acid

(2) Succinic acid → Malic acid

(3) Succinyl-CoA → Succinic acid

(4) Isocitrate → α-ketoglutaric acid

143 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

144 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 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

146 The DNA present in chloroplast is:

(1) Linear, double stranded

(2) Circular, double stranded

(3) Linear, single stranded

(4) Circular, single stranded

147 In an ecosystem if the Net Primary Productivity (NPP) of first trophic level is

$100x\ (kcal\ m^{-2})\ yr^{-1}$, what would be the GPP (Gross Primary Productivity) of the third trophic level of the same ecosystem?

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

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

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

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

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

(1) Callus

(2) Somatic embryos

(3) Protoplasts

(4) Pollens

149 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

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

(1) The DNA dependent DNA polymerase catalyses polymerization in one direction that is 3' → 5'.

(2) The DNA dependent RNA polymerase catalyses polymerization in one direction, that is 5' → 3'.

(3) The DNA dependent DNA polymerase catalyses polymerization in 5' → 3' as well as 3' → 5' direction.

(4) The DNA dependent DNA polymerase catalyses polymerization in 5' → 3' direction.

151 Which of the following is not a steroid hormone?

(1) Cortisol

(2) Testosterone

(3) Progesterone

(4) Glucagon

152 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 is true but Statement II is false

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

153 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.

154 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'

155 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

156 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-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

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

A. AV bundle

B. Purkinje fibres

C. AV node

D. Bundle branches

E. SA node

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

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

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

158 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 from the options given below :

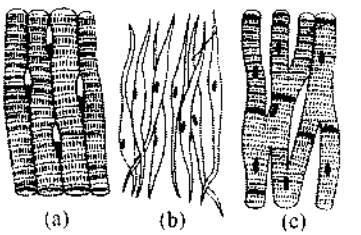
(1) A-IV, B-II, C-III, D-I

(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

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



Name of muscle/location

(1) (a) 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.

160 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

161 Match List I with List II :

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

Choose the correct answer from the options 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

162 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.

163 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

164 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

165 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

166 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-II, B-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

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

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

168 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 from 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

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

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

170 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

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

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

172 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-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

173 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

174 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

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

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

176 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

177 The flippers of the Penguins and Dolphins are the example of the

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

178 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

179 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

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

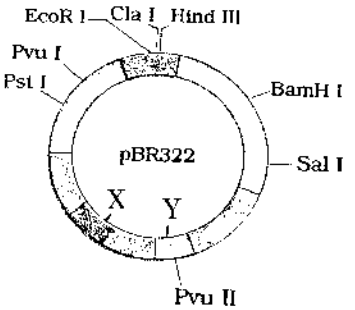
(1) High pO_2 and High pCO_2

(2) High pO_2 and Lesser H^+ concentration

(3) Low pCO_2 and High H^+ concentration

(4) Low pCO_2 and High temperature

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



(1) The gene '*X*' is 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 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-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

183 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) B only (2) A only

(3) C only (4) D only

184 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

185 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*

Choose the correct answer from 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

Zoology : Section-B (Q. No. 186 to 200)

186 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 but Statement II is false.

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

187 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 & C only

(2) A, B & D only

(3) B, D & E only

(4) B, C & D only

188 Given below are two statements :

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

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

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

(1) 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.

189 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-IV, D-I

190 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-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

191 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 nephron 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.

192 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 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

194 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 Given below are two statements :

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

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

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

(1) 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.

196 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

197 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 :

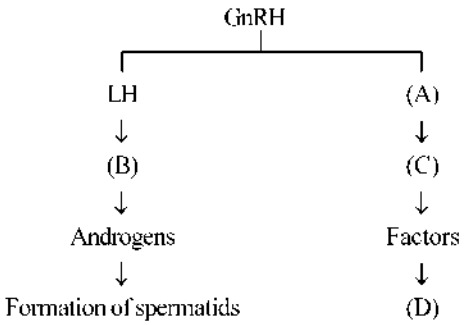
(1) Both Statement I and Statement II are correct.

(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.

198 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.

199 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

200 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-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

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

Test Booklet Code

← Test Booklet No. **ENGLISH**

R1

DUGRI

This Booklet contains **32** pages, including Rough Page.

Do not open this Test Booklet until you are asked to do so.

Important Instructions:

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with **blue/black** ball point pen only.
2. 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.**
3. 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.**
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
6. 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.
7. **The CODE for this Booklet is R1. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet.** In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
9. Use of white fluid for correction is **NOT** permissible on the Answer Sheet.
10. Each candidate must show on-demand his/her Admit Card to the Invigilator.
11. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
12. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet **twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**
13. Use of Electronic/Manual Calculator is prohibited.
14. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
15. **No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
17. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of Scribe or not.

Name of the Candidate (in Capitals): _____

Roll Number : In figures _____

: In words _____

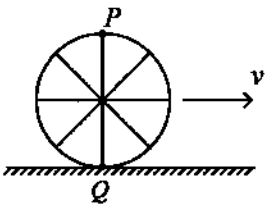
Centre of Examination (in Capitals): _____

Candidate's Signature: _____ Invigilator's Signature: _____

Facsimile signature stamp of Centre Superintendent

Physics : Section-A (Q. No. 1 to 35)

1 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)?



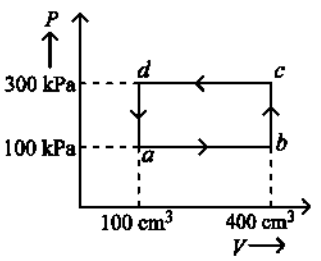
(1) Point P moves faster than point Q.
(2) Both the points P and Q move with equal speed.
(3) Point P has zero speed.
(4) Point P moves slower than point Q.

2 Match List I with List II.

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

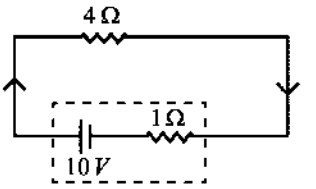
Choose the correct answer from the options given below :
(1) A-III, B-IV, C-II, D-I
(2) A-IV, B-III, C-I, D-II
(3) A-I, B-II, C-III, D-IV
(4) A-II, B-I, C-IV, D-III

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



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

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

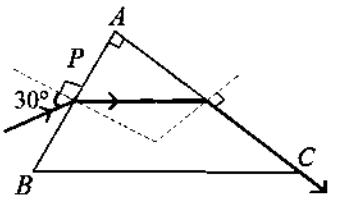


(1) $6\ V$ (2) $8\ V$
(3) $10\ V$ (4) $4\ V$

5 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) 2 : 1 (2) 1 : 1
(3) 1 : 4 (4) 1 : 2

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

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

8 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) 198 N (2) 1.98 mN

(3) 99 N (4) 19.8 mN

9 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, 4×10^{-6} C m, is $\pm 9\times10^{3}\ V$.

(Take $\frac{1}{4\pi\epsilon_0} = 9\times10^{9}$ SI units)

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

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

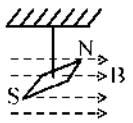
(1) Both A and R are true and R is NOT the correct explanation of A.

(2) A is true but R is false.

(3) A is false but R is true.

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

10 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 9.8×10^{-6} kg m^2. If the magnitude of magnetic moment of the needle is $x \times 10^{-5}$ Am^2; then the value of 'x' is :



(1) $128\pi^2$ (2) $50\pi^2$

(3) $1280\pi^2$ (4) $5\pi^2$

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

(1) there will be a central dark fringe surrounded by a few coloured fringes.

(2) there will be a central bright white fringe surrounded by a few coloured fringes.

(3) all bright fringes will be of equal width.

(4) interference pattern will disappear.

12 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 incorrect.

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

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

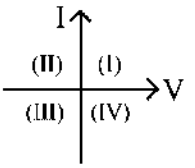
(4) Both Statement I and Statement II are correct.

13 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) 0.4 mm (2) 40 mm

(3) 8 mm (4) 4 mm

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



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

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

(1) A is incorrect but B is correct.

(2) Both A and B are correct.

(3) Both A and B are incorrect.

(4) A is correct but B is incorrect.

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

(1) constant acceleration.
(2) constant velocity but varying acceleration.
(3) varying velocity and varying acceleration.
(4) constant velocity.

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

A. The energy of a photon is $E = hv$.
B. The velocity of a photon is c.
C. The momentum of a photon, $p = \frac{hv}{c}$.
D. In a photon-electron collision, both total energy and total momentum are conserved.
E. Photon possesses positive charge.

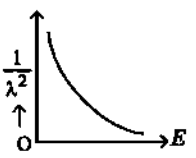
Choose the correct answer from the options given below :

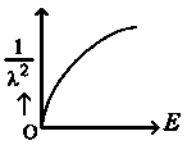
(1) A, B, C and D only
(2) A, C and D only
(3) A, B, D and E only
(4) A and B only

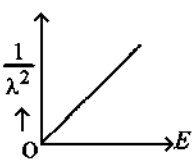
17 Two bodies A and B of same mass undergo completely inelastic one dimensional collision. The body A moves with velocity v_1 while body B is at rest before collision. The velocity of the system after collision is v_2. The ratio $v_1 : v_2$ is :

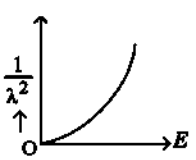
(1) 2:1 (2) 4:1
(3) 1:4 (4) 1:2

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

(1) 

(2) 

(3) 

(4) 

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

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

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

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

21 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 T (2) 4.4 mT
(3) 44 T (4) 44 mT

22 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) 17.5 cm (2) 20.7 cm
(3) 72.0 cm (4) 8.5 cm

23 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) $4T$ (2) $\frac{T}{4}$
(3) $\sqrt{2}T$ (4) T

24 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.	$\chi >> 1$
D. Non-magnetic	IV.	$0 < \chi < \varepsilon$ (a small positive number)

Choose the correct answer from the options given below:

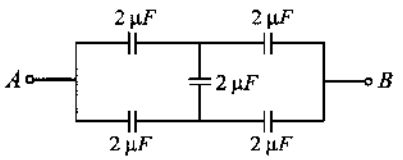
(1) A-II, B-I, C-III, D-IV

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

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

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

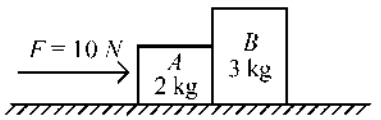
25 In the following circuit, the equivalent capacitance between terminal A and terminal B is :



(1) $1\ \mu F$ (2) $0.5\ \mu F$

(3) $4\ \mu F$ (4) $2\ \mu F$

26 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) 4 N (2) 6 N

(3) 10 N (4) zero

27 $^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$

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

(1) 286, 80 (2) 288, 82

(3) 286, 81 (4) 280, 81

28 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) $\frac{1}{100(N+1)}$ (2) $100N$

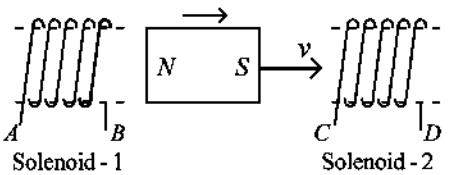
(3) $10\ (N + 1)$ (4) $\frac{1}{10N}$

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

(1) 5 m, 2 s (2) 5 cm, 1 s

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

30



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

(1) BA and CD (2) AB and CD

(3) BA and DC (4) AB and DC

31 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) $A.\overline{B} + \overline{A}$ (2) $\overline{B}$

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

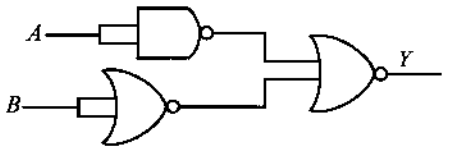
Physics : Section-B (Q. No. 36 to 50)

32 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) $52\,\Omega$ (2) $55\,\Omega$

(3) $60\,\Omega$ (4) $26\,\Omega$

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

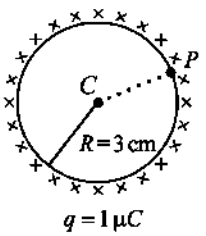


(1) NOR gate (2) OR gate

(3) AND gate (4) NAND gate

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

(Take $\frac{1}{4\pi\epsilon_0} = 9\times10^9$ SI units)



(1) 1×10^5 (2) 0.5×10^5

(3) zero (4) 3×10^5

35 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) $9.8\ m\ s^{-2}$ (2) $4.9\ m\ s^{-2}$

(3) $3.92\ m\ s^{-2}$ (4) $19.6\ m\ s^{-2}$

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

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

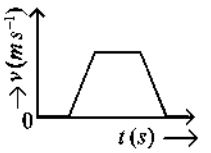
(3) $\frac{GmM}{3R}$ (4) $\frac{5GmM}{6R}$

37 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:

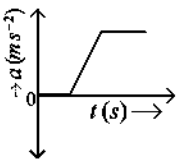
(1) 28 (2) 17

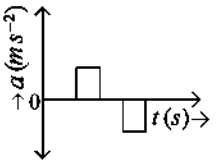
(3) 32 (4) 34

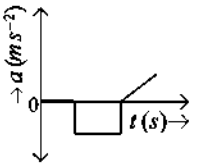
38 The velocity (v) – time (t) plot of the motion of a body is shown below :

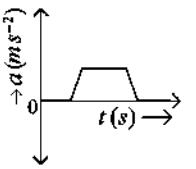


The acceleration (a) – time (t) graph that best suits this motion is :

(1) 

(2) 

(3) 

(4) 

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

(1) 2 : 9 (2) 1 : 2

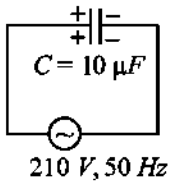
(3) 2 : 3 (4) 1 : 1

40 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) $\alpha t / \beta$ (2) $\alpha\beta t$

(3) $\alpha\beta / t$ (4) $\beta t / \alpha$

41 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 $(\pi = 3.14)$:



(1) 0.93 *A* (2) 1.20 *A*

(3) 0.35 *A* (4) 0.58 *A*

42 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) 50×10^3 N (2) 100×10^3 N

(3) 2×10^3 N (4) 5×10^3 N

43 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 :

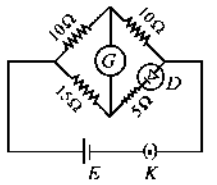
(1) displacement current of magnitude equal to I flows in the same direction as I.

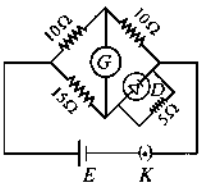
(2) displacement current of magnitude equal to I flows in a direction opposite to that of I.

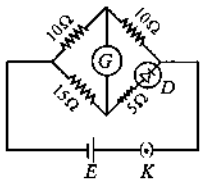
(3) displacement current of magnitude greater than I flows but can be in any direction.

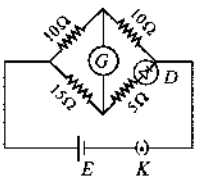
(4) there is no current.

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

(1)


(2)


(3)


(4)


45 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) A and C only

(2) A, C and D only

(3) C only

(4) B and D only

46 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.

Choose the most appropriate answer from the options given below:

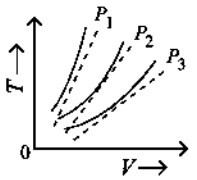
(1) A, C and E only

(2) B, D and E only

(3) A, B and C only

(4) A, B and E only

47 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) $P_1 > P_3 > P_2$ (2) $P_2 > P_1 > P_3$

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

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

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

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

(3) they originate from charges moving with uniform speed.

(4) they are transverse in nature.

49 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^o with each other. The magnetic moment of this new magnet is:

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

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

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

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

51 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) A and D (2) B and E

(3) E and D (4) B and C

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

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

53 Which reaction is **NOT** a redox reaction?

(1) $2\,KClO_3 + I_2 \rightarrow 2\,KIO_3 + Cl_2$

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

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

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

54 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 options given below:

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

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

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

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

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

Then, which of the following is correct?

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

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

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

(4) Reaction is at equilibrium.

56 Match List I with List II.

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

Choose the correct answer from the options given below:

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

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

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

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

57 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. $2\,NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$

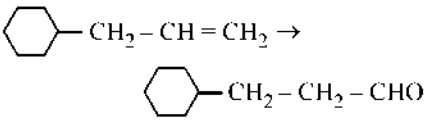
D. $Cl_{2(g)} \rightarrow 2\,Cl_{(g)}$

Choose the correct answer from the options given below:

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

(3) C and D (4) A and C

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



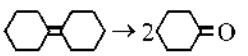
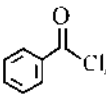
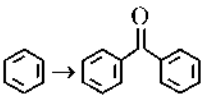
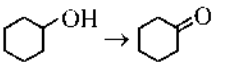
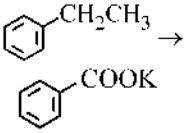
(1) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) PCC

(2) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) alk. $KMnO_4$
(iv) $H_3O^{\oplus}$

(3) (i) H_2O/H^+
(ii) PCC

(4) (i) H_2O/H^+
(ii) CrO_3

59 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, Δ
D. 	IV. (i) O_3 (ii) Zn-H_2O

Choose the correct answer from the options given below:

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

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

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

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

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

(1) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2\,HI_{(g)}$

(2) $CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$

(3) $2\,BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$

(4) $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

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

(1) $CH_3-CH_2-\underset{\displaystyle CH_3}{\overset{|}{CH}}-OH$

(2) $CH_3-\underset{\displaystyle CH_3}{\overset{|}{CH}}-CH_2OH$

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

(4) $CH_3-CH_2-CH_2-CH_2OH$

62 Given below are two statements:

Statement I : The boiling point of three isomeric pentanes follows the order
n-pentane > isopentane > neopentane

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

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

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

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

64 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^5 to d^2 configuration
(2) d^4 to d^5 configuration
(3) d^3 to d^5 configuration
(4) d^5 to d^4 configuration

65 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) Sublimation
(2) Distillation
(3) Chromatography
(4) Crystallization

66 Fehling's solution 'A' is

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

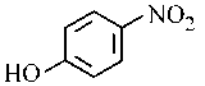
67 Match List I with List II.

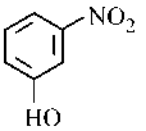
List I (Molecule)	**List II (Number and types of bond/s between two carbon atoms)**
A. ethane	I. one σ-bond and two π-bonds
B. ethene	II. two π-bonds
C. carbon molecule, C_2	III. one σ-bond
D. ethyne	IV. one σ-bond and one π-bond

Choose the correct answer from the options given below:

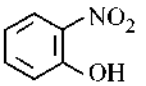
(1) A-IV, B-III, C-II, D-I
(2) A-III, B-IV, C-II, D-I
(3) A-III, B-IV, C-I, D-II
(4) A-I, B-IV, C-II, D-III

68 Intramolecular hydrogen bonding is present in

(1) 

(2) 

(3) HF

(4) 

69 The highest number of helium atoms is in

(1) 4 u of helium

(2) 4 g of helium

(3) 2.271098 L of helium at STP

(4) 4 mol of helium

70 Match List I with List II.

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

Choose the correct answer from the options given below:

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

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

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

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

71 Among Group 16 elements, which one does **NOT** show –2 oxidation state?

(1) Se (2) Te

(3) Po (4) O

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

A. Ti^{3+} B. Cr^{2+}

C. Mn^{2+} D. Fe^{2+}

E. Sc^{3+}

Choose the most appropriate answer from the options given below:

(1) A and E only

(2) B and C only

(3) A and D only

(4) B and D only

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

(1) 2-methylpentane

(2) 2,3-dimethylbutane

(3) 2,2-dimethylbutane

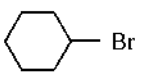
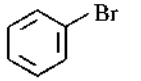
(4) n-hexane

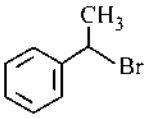
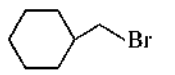
74 The Henry's law constant (K_H) values of three gases (A, B, C) in water are 145, 2×10^{-5} and 35 kbar, respectively. The solubility of these gases in water follow the order:

(1) B > C > A (2) A > C > B

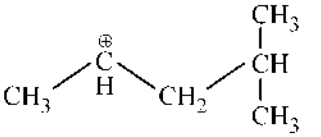
(3) A > B > C (4) B > A > C

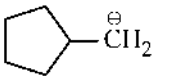
75 The compound that will undergo S_N1 reaction with the fastest rate is

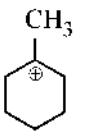
(1)  (2) 

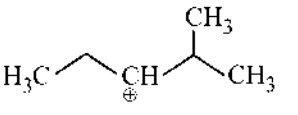
(3)  (4) 

76 The most stable carbocation among the following is:

(1) 

(2) 

(3) 

(4) 

77 Given below are two statements :

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

Statement II : $\left[Co(NH_3)_6\right]^{3+}$ is diamagnetic whereas $\left[CoF_6\right]^{3-}$ 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 false.

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

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

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

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

(1) 250 mg (2) Zero mg

(3) 200 mg (4) 750 mg

79 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) Both Statement I and Statement II are false.

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

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

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

80 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 < B < Be < C < N

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

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

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

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

(1) probability of collision.

(2) orientation of reactant molecules during collision.

(3) rate constant at two different temperatures.

(4) rate constant at standard temperature.

82 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 < O < N < F

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

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

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

83 Match List I with List II.

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

Choose the correct answer from the options given below:

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

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

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

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

84 Match List I with List II.

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

Choose the correct answer from the options given below:

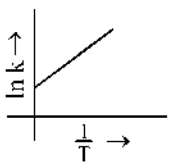
(1) A-II, B-IV, C-III, D-I

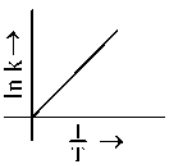
(2) A-III, B-IV, C-I, D-II

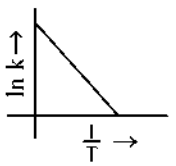
(3) A-II, B-III, C-IV, D-I

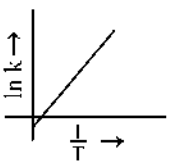
(4) A-I, B-IV, C-II, D-III

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

(1) 

(2) 

(3) 

(4) 

86 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) – 413.14 calories

(2) 413.14 calories

(3) 100 calories

(4) 0 calorie

87 Identify the **correct** answer.

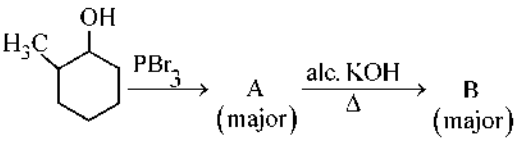
(1) BF_3 has non-zero dipole moment.

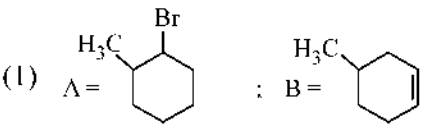
(2) Dipole moment of NF_3 is greater than that of NH_3.

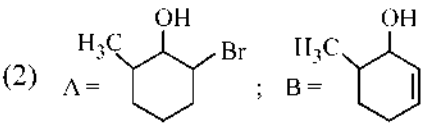
(3) Three canonical forms can be drawn for CO_3^{2-} ion.

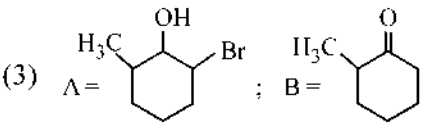
(4) Three resonance structures can be drawn for ozone.

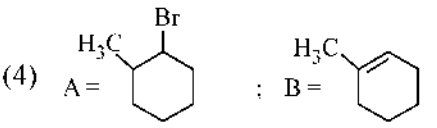
88 Major products A and B formed in the following reaction sequence, are



(1) 

(2) 

(3) 

(4) 

89 The pair of lanthanoid ions which are diamagnetic is

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

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

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

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

90 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 = 32 u)

(1) ABC_3 (2) AB_2C_2

(3) ABC_4 (4) A_2BC_2

91 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) B, C, A, D, E

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

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

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

92 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 = 2.8×10^{-3} M.

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

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

(1) 0.0889 (2) 0.8889

(3) 0.717 (4) 0.00889

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

Given R = 8.314 J K^{-1} mol^{-1}, log 4 = 0.6021

(1) 380.4 kJ/mol

(2) 3.80 kJ/mol

(3) 3804 kJ/mol

(4) 38.04 kJ/mol

94 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) concentrated sulphuric acid

(2) dilute nitric acid

(3) dilute sulphuric acid

(4) dilute hydrochloric acid

95 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) butylamine

(2) butanamide

(3) α – bromobutanoic acid

(4) propylamine

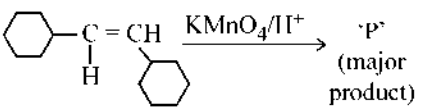
96 Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is:

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

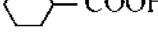
(1) 0.315 g (2) 31.5 g

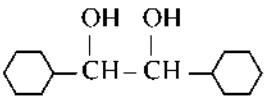
(3) 0.0315 g (4) 3.15 g

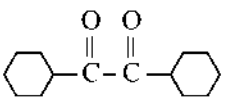
97 For the given reaction:

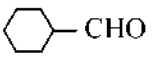


'P' is

(1) 

(2) 

(3) 

(4) 

98 Given below are two statements :

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

Statement II : Complex $\left[Co(NH_3)_6\right]^{3+}$ has only one kind of ligands but $\left[Co(NH_3)_4Cl_2\right]^{+}$ 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 false.

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

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

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

99 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) 310°C (2) 25.73°C

(3) 12.05°C (4) 37°C

100 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_4

(2) H_3PO_4 and $POCl_3$

(3) H_3PO_3 and $POCl_3$

(4) $POCl_3$ and H_3PO_3

Botany : Section-A (Q. No. 101 to 135)

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

(1) promotes abscission of mature leaves only.

(2) does not affect mature monocotyledonous plants.

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

(4) promotes apical dominance.

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

(1) Phospholipids

(2) Glycerides

(3) Carbohydrates

(4) Amino acids

103 Match List I with List II

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

Choose the correct answer from the options given below:

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

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

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

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

104 Identify the set of correct statements:

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

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

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

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

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

Choose the correct answer from the options given below:

(1) A, B, C and D only

(2) A, C, D and E only

(3) B, C, D and E only

(4) C, D and E only

105 List of endangered species was released by-

(1) WWF (2) FOAM

(3) IUCN (4) GEAC

106 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) D and E only

(2) B and C only

(3) A and E only

(4) A and B only

107 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) B, C and D only

(2) C, D and E only

(3) D and E only

(4) A, B and C only

108 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) Biodiversity conservation

(2) Semi-conservative method

(3) Sustainable development

(4) *in-situ* conservation

109 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 false

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

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

(4) Both Statement I and Statement II are true

110 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;

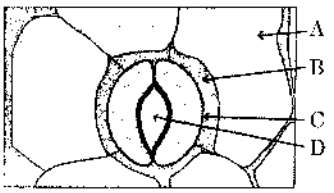
(1) Structural gene, Transposons, Operator gene

(2) Inducer, Repressor, Structural gene

(3) Promotor, Structural gene, Terminator

(4) Repressor, Operator gene, Structural gene

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

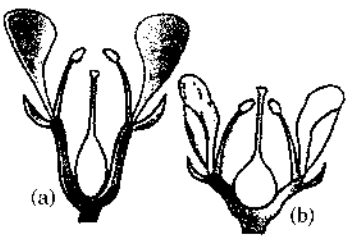


(1) D (2) A
(3) B (4) C

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

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

113 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) Hypogynous; (b) Epigynous
(2) (a) Perigynous; (b) Epigynous
(3) (a) Perigynous; (b) Perigynous
(4) (a) Epigynous; (b) Hypogynous

114 Which of the following is an example of actinomorphic flower?

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

115 Which one of the following is <u>not</u> a criterion for classification of fungi?

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

116 The equation of Verhulst-Pearl logistic growth is

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

From this equation, K indicates:

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

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

A. Out of one pair of factors one is dominant and the other is recessive.
B. Alleles do not show any expression and both the characters 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, C, D and E only
(2) B, C and D only
(3) A, B, C, D and E
(4) A, B and C only

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

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

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

120 Formation of interfascicular cambium from fully developed parenchyma cells is an example for
(1) Redifferentiation
(2) Dedifferentiation
(3) Maturation
(4) Differentiation

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

122 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/Bb (4) BB

123 Match List I with List II

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

Choose the correct answer from the options given below:
(1) A-II, B-IV, C-III, D-I
(2) A-III, B-I, C-IV, D-II
(3) A-IV, B-I, C-III, D-II
(4) A-III, B-I, C-II, D-IV

124 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 2 molecules of NADPH
(2) 3 molecules of ATP and 3 molecules of NADPH
(3) 3 molecules of ATP and 2 molecules of NADPH
(4) 2 molecules of ATP and 3 molecules of NADPH

125 The capacity to generate a whole plant from any cell of the plant is called:
(1) Micropropagation
(2) Differentiation
(3) Somatic hybridization
(4) Totipotency

126 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.

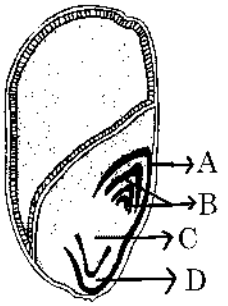
Choose the correct answer from the options given below:
(1) A and B only
(2) A, B and E only
(3) A, B and D only
(4) A, C, D and E only

127 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

Choose the correct answer from the options given below:
(1) A-II, B-III, C-I, D-IV
(2) A-III, B-IV, C-II, D-I
(3) A-I, B-II, C-III, D-IV
(4) A-III, B-II, C-IV, D-I

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



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

129 Spindle fibers attach to kinetochores of chromosomes during
(1) Metaphase (2) Anaphase
(3) Telophase (4) Prophase

130 Given below are two statements:
Statement I : Chromosomes become gradually visible under light microscope during leptotene stage.
Statement II : The begining 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 false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

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

132 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, C and D only

(2) A, B and E only

(3) A, B and D only

(4) A, C and D only

133 The lactose present in the growth medium of bacteria is transported to the cell by the action of:

(1) Acetylase

(2) Permease

(3) Polymerase

(4) Beta-galactosidase

134 Bulliform cells are responsible for

(1) Protecting the plant from salt stress.

(2) Increased photosynthesis in monocots.

(3) Providing large spaces for storage of sugars.

(4) Inward curling of leaves in monocots.

135 The cofactor of the enzyme carboxypeptidase is:

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

Botany : Section-B (Q. No. 136 to 150)

136 Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae,

A. Asexual reproduction occurs usually by biflagellate zoospores.

B. Sexual reproduction is by oogamous method only.

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

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

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

Choose the correct answer from the options given below:

(1) B, C, D and E only

(2) A, C, D and E only

(3) A, B, C and E only

(4) A, B, C and D only

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

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

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

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

138 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 false

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

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

(4) Both Statement I and Statement II are true

139 The DNA present in chloroplast is:

(1) Circular, double stranded

(2) Linear, single stranded

(3) Circular, single stranded

(4) Linear, double stranded

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

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

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

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

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

(1) Somatic embryos

(2) Protoplasts

(3) Pollens

(4) Callus

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

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

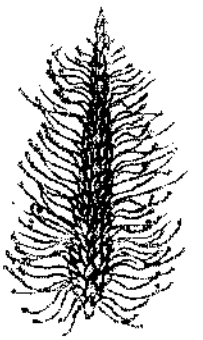
144 Match List I with List II

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

145 Identify the correct description about the given figure:



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

146 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-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

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

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

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

(1) Gibberellin

(2) Cytokinin

(3) Abscisic acid

(4) Auxin

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

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

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

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

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

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

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

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

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

151 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

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

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

152 Which of the following is not a component of Fallopian tube?

(1) Isthmus

(2) Infundibulum

(3) Ampulla

(4) Uterine fundus

153 The "Ti plasmid" of *Agrobacterium tumefaciens* stands for

(1) Tumor independent plasmid

(2) Tumor inducing plasmid

(3) Temperature independent plasmid

(4) Tumour inhibiting plasmid

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

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

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

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

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

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

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

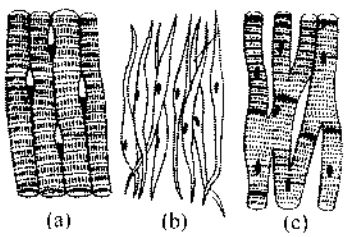
161 Match List I with List II :

	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 from the options given below :

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

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



Name of muscle/location

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

163 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 from the options given below :

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

164 Match List I with List II :

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

Choose the correct answer from the options given below :

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

165 Which of the following statements is incorrect?

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

166 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 :

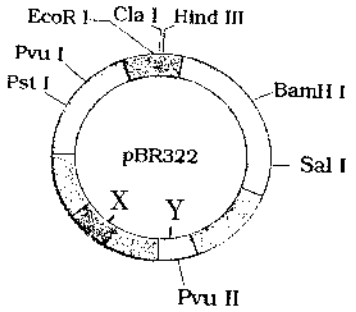
(1) A-III, B-I, C-II, D-IV

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

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

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

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



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

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

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

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

168 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 false

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

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

(4) Both Statement I and Statement II are true

169 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) A only (2) C only

(3) D only (4) B only

170 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 false

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

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

(4) Both Statement I and Statement II are true

171 Following are the stages of cell division :

A. Gap 2 phase

B. Cytokinesis

C. Synthesis phase

D. Karyokinesis

E. Gap 1 phase

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

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

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

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

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

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

174 Which of the following is not a steroid hormone?

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

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

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

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

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

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

3'TACATGGCAAATATCCATTCA5'

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

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

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

180 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*

Choose the correct answer from the options given below :

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

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

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

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

181 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

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

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

182 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

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

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

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

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

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

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

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

(2) A is correct but R is not correct.

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

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

184 The flippers of the Penguins and Dolphins are the example of the

(1) Natural selection

(2) Convergent evolution

(3) Divergent evolution

(4) Adaptive radiation

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

(1) High pO_2 and Lesser H^+ concentration

(2) Low pCO_2 and High H^+ concentration

(3) Low pCO_2 and High temperature

(4) High pO_2 and High pCO_2

Zoology : Section-B (Q. No. 186 to 200)

186 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

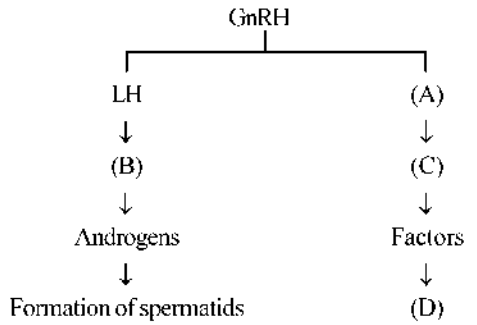
Choose the correct answer from the options given below :

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

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

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

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



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

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

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

191 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 false.

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

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

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

192 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

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

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

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

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

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

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

194 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) B only (2) C & B only

(3) D & E only (4) A only

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

Choose the correct answer from the options given below :

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

196 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

198 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) A, E, B, D, C
(2) B, A, C, D, E
(3) E, D, C, B, A
(4) E, A, D, C, B

199 Given below are two statements :

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

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

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

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

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

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

Test Booklet Code

← Test Booklet No. **ENGLISH**

T1

DUGRI

This Booklet contains **32** pages, including Rough Page.

Do not open this Test Booklet until you are asked to do so.

Important Instructions:

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with **blue/black** ball point pen only.
2. 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.**
3. 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.**
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
6. 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.
7. **The CODE for this Booklet is T1. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet.** In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
9. Use of white fluid for correction is **NOT** permissible on the Answer Sheet.
10. Each candidate must show on-demand his/her Admit Card to the Invigilator.
11. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
12. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet **twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**
13. Use of Electronic/Manual Calculator is prohibited.
14. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
15. **No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
17. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of Scribe or not.

Name of the Candidate (in Capitals): _____

Roll Number : In figures _____

: In words _____

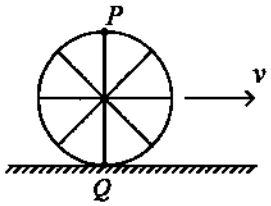
Centre of Examination (in Capitals): _____

Candidate's Signature: _____ Invigilator's Signature: _____

Facsimile signature stamp of Centre Superintendent

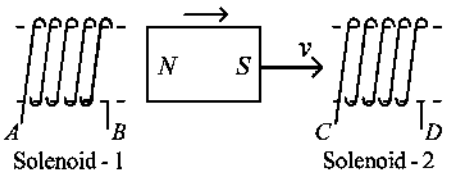
Physics : Section-A (Q. No. 1 to 35)

1 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.

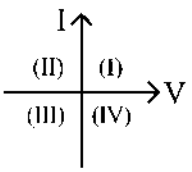
2



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 in solenoid-2, respectively, are through the directions:

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

3 Consider the following statements A and B and identify the correct answer :



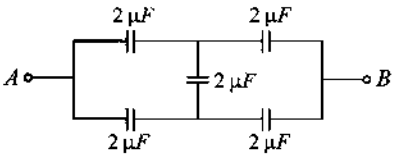
A. For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.
B. In a reverse biased pn junction diode, the current measured in (μA), is due to majority charge carriers.

(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.

4 A wire of length 'l' and resistance 100 Ω 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:

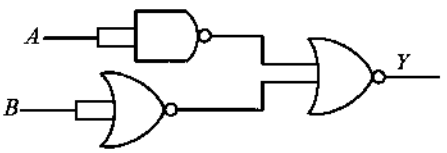
(1) 55 Ω (2) 60 Ω
(3) 26 Ω (4) 52 Ω

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



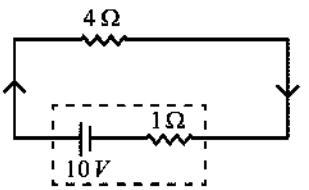
(1) 0.5 μF (2) 4 μF
(3) 2 μF (4) 1 μF

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



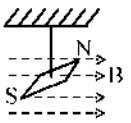
(1) 8 V (2) 10 V
(3) 4 V (4) 6 V

8 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 s^{-2} (2) 3.92 m s^{-2}

(3) 19.6 m s^{-2} (4) 9.8 m s^{-2}

9 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 9.8×10^{-6} kg m^2. If the magnitude of magnetic moment of the needle is $x \times 10^{-5}$ Am^2; then the value of 'x' is :



(1) $50\pi^2$ (2) $1280\pi^2$

(3) $5\pi^2$ (4) $128\pi^2$

10 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 $E = h\nu$.

B. The velocity of a photon is c.

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

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, C and D only

(2) A, B, D and E only

(3) A and B only

(4) A, B, C and D only

11 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

12 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) $\overline{B}$ (2) B

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

13 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) 20.7 cm (2) 72.0 cm

(3) 8.5 cm (4) 17.5 cm

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

(1) $100N$ (2) $10\,(N + 1)$

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

15 Match List I with List II.

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

Choose the correct answer from the options given below :

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

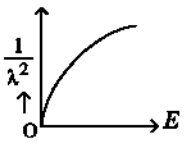
(2) A-I, B-II, C-III, D-IV

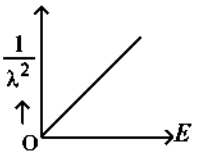
(3) A-II, B-I, C-IV, D-III

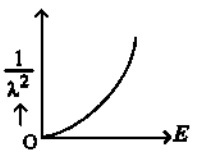
(4) A-III, B-IV, C-II, D-I

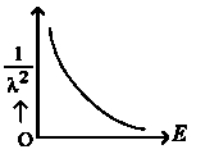
16 If the monochromatic source in Young's double slit experiment is replaced by white light, then
(1) there will be a central bright white fringe surrounded by a few coloured fringes.
(2) all bright fringes will be of equal width.
(3) interference pattern will disappear.
(4) there will be a central dark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

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

(1) 

(2) 

(3) 

(4) 

18 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.	$\chi >> 1$
D. Non-magnetic	IV.	$0 < \chi < \varepsilon$ (a small positive number)

Choose the correct answer from the options given below:
(1) A-III, B-II, C-I, D-IV
(2) A-IV, B-III, C-II, D-I
(3) A-II, B-III, C-IV, D-I
(4) A-II, B-I, C-III, D-IV

19 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.

20 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.

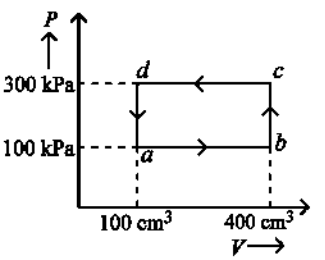
21 The quantities which have the same dimensions as those of solid angle are :
(1) strain and arc
(2) angular speed and stress
(3) strain and angle
(4) stress and angle

22 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) $\sqrt{2}T$
(3) T (4) $4T$

23 If $x = 5\sin\left(\pi t + \frac{\pi}{3}\right)m$ represents the motion of a particle executing simple harmonic motion, the amplitude and time period of motion, respectively, are :
(1) 5 cm, 1 s (2) 5 m, 1 s
(3) 5 cm, 2 s (4) 5 m, 2 s

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



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

25 Given below are two statements :

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

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

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

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

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

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

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

26 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 : 1 (2) 1 : 4

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

27 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

28 $^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$

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

(1) 288, 82 (2) 286, 81

(3) 280, 81 (4) 286, 80

29 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, 4×10^{-6} C m, is $\pm 9 \times 10^3$ V.

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

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

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

(1) A is true but R is false.

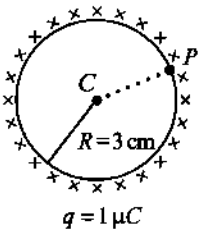
(2) A is false but R is true.

(3) Both A and R 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.

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

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



(1) 0.5×10^5 (2) zero

(3) 3×10^5 (4) 1×10^5

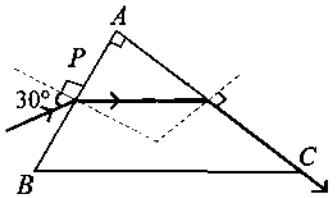
31 A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If surface tension of water is 0.07 Nm^{-1}, then the excess force required to take it away from the surface is :

(1) 1.98 mN (2) 99 N

(3) 19.8 mN (4) 198 N

Physics : Section-B (Q. No. 36 to 50)

32 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) $\frac{\sqrt{5}}{2}$

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

(1) 7 (2) 6

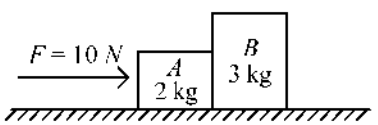
(3) 10 (4) 5

34 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

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



(1) 6 N (2) 10 N

(3) zero (4) 4 N

36 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

37 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 : 2 (2) 2 : 3

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

38 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) $2\sqrt{3}$ (2) 4

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

39 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.

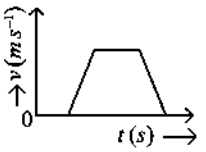
(4) displacement current of magnitude equal to I flows in the same direction as I.

40 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:

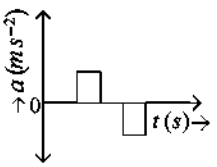
(1) 100×10^3 N (2) 2×10^3 N

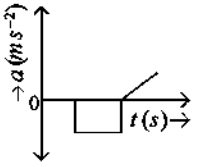
(3) 5×10^3 N (4) 50×10^3 N

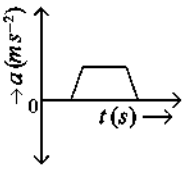
41 The velocity (v) – time (t) plot of the motion of a body is shown below :

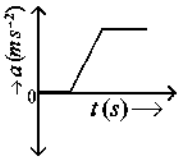


The acceleration (a) – time (t) graph that best suits this motion is :

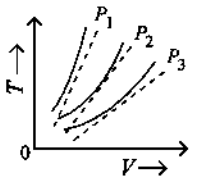
(1) 

(2) 

(3) 

(4) 

42 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.

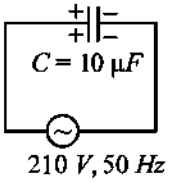


Then the correct relation is:

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

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

43 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 $(\pi = 3.14)$:

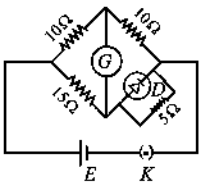


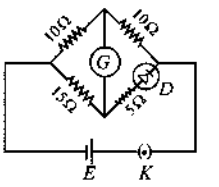
210 *V*, 50 *Hz*

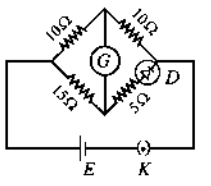
(1) 1.20 *A* (2) 0.35 *A*

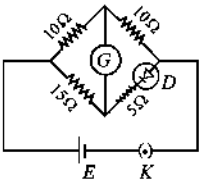
(3) 0.58 *A* (4) 0.93 *A*

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

(1) 

(2) 

(3) 

(4) 

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

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

(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.

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

Chemistry : Section-A (Q. No. 51 to 85)

47 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.

Choose the most appropriate answer from the options given below:

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

48 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) $\alpha\beta / t$
(3) $\beta t / \alpha$ (4) $\alpha t / \beta$

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

50 An iron bar of length L has magnetic moment M. It is bent at the middle of its length such that the two arms make an angle 60^0 with each other. The magnetic moment of this new magnet is:

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

51 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 options given below:

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

52 Given below are two statements:

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

n-pentane > isopentane > neopentane

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

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

(1) Statement I is 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.

53 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 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

Choose the correct answer from the options given below:

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

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

(1) $CH_3-\underset{\displaystyle CH_3}{\overset{|}{CH}}-CH_2OH$

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

(3) $CH_3-CH_2-CH_2-CH_2OH$

(4) $CH_3-CH_2-\underset{\displaystyle CH_3}{\overset{|}{CH}}-OH$

55 Match List I with List II.

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

Choose the correct answer from the options given below:

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

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

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

Choose the most appropriate answer from the options given below:

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

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

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

58 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 :

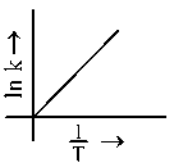
(1) $-4x$ (2) $-\frac{4}{9}x$

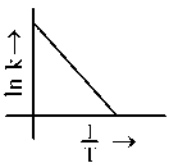
(3) $-x$ (4) $-\frac{x}{9}$

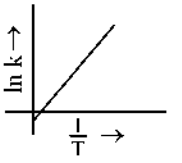
59 Activation energy of any chemical reaction can be calculated if one knows the value of

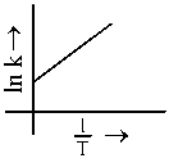
(1) orientation of reactant molecules during collision.
(2) rate constant at two different temperatures.
(3) rate constant at standard temperature.
(4) probability of collision.

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

(1) 

(2) 

(3) 

(4) 

61 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.

62 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 E (2) E and D
(3) B and C (4) A and D

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

Li, Be, B, C, N

Choose the correct answer from the options given below:

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

64 Arrange the following elements in increasing order of electronegativity:

N, O, F, C, Si

Choose the correct answer from the options given below:

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

65 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

66 Match List I with List II.

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

Choose the correct answer from the options given below:

(1) A-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

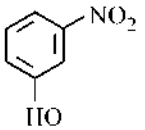
67 Match List I with List II.

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

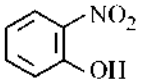
Choose the correct answer from the options given below:

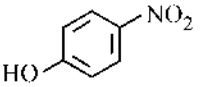
(1) A-I, B-IV, C-III, D-II
(2) A-II, B-IV, C-III, D-I
(3) A-II, B-III, C-IV, D-I
(4) A-I, B-III, C-IV, D-II

68 Intramolecular hydrogen bonding is present in

(1) 

(2) HF

(3) 

(4) 

69 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.

70 The highest number of helium atoms is in

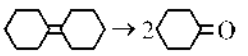
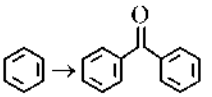
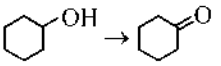
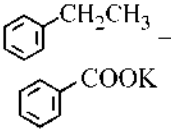
(1) 4 g of helium

(2) 2.271098 L of helium at STP

(3) 4 mol of helium

(4) 4 u of helium

71 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, Δ
D. 	IV. (i) O_3 (ii) Zn-H_2O

Choose the correct answer from the options given below:

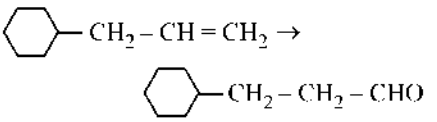
(1) A-IV, B-I, C-II, D-III

(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

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



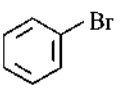
(1) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) alk. $KMnO_4$
(iv) $H_3O^{\oplus}$

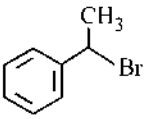
(2) (i) H_2O/H^+
(ii) PCC

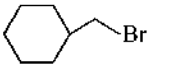
(3) (i) H_2O/H^+
(ii) CrO_3

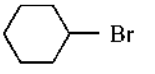
(4) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) PCC

73 The compound that will undergo S_N1 reaction with the fastest rate is

(1) 

(2) 

(3) 

(4) 

74 Fehling's solution 'A' is

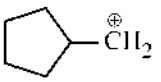
(1) alkaline solution of sodium potassium tartrate (Rochelle's salt)

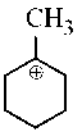
(2) aqueous sodium citrate

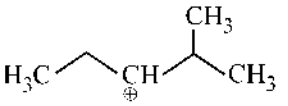
(3) aqueous copper sulphate

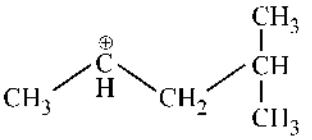
(4) alkaline copper sulphate

75 The most stable carbocation among the following is:

(1) 

(2) 

(3) 

(4) 

76 For the reaction $2A \rightleftharpoons B + C$, $K_c = 4\times10^{-3}$. At a given time, the composition of reaction mixture is : $[A] = [B] = [C] = 2\times10^{-3}$ 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.

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

(1) A > C > B (2) A > B > C

(3) B > A > C (4) B > C > A

78 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

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

(1) $CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$

(2) $2\ BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$

(3) $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

(4) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2\ HI_{(g)}$

80 Which reaction is **NOT** a redox reaction?

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

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

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

(4) $2\ KClO_3 + I_2 \rightarrow 2\ KIO_3 + Cl_2$

81 Given below are two statements :

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

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

82 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

83 Among Group 16 elements, which one does **NOT** show –2 oxidation state?

(1) Te (2) Po

(3) O (4) Se

84 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. $2\,NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$

D. $Cl_{2(g)} \rightarrow 2\,Cl_{(g)}$

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

85 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:

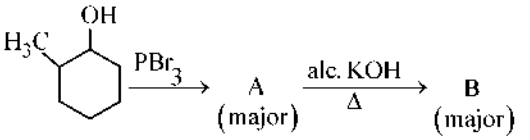
(1) A-II, B-III, C-I, D-IV

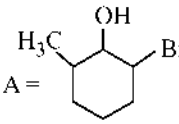
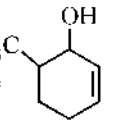
(2) A-III, B-IV, C-II, D-I

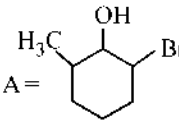
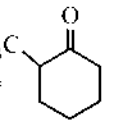
(3) A-II, B-IV, C-I, D-III

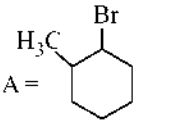
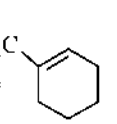
(4) A-III, B-IV, C-I, D-II

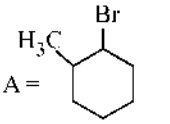
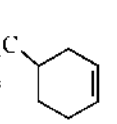
86 Major products A and B formed in the following reaction sequence, are



(1) A =  ; B = 

(2) A =  ; B = 

(3) A =  ; B = 

(4) A =  ; B = 

87 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.

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

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

(1) 0.8889 (2) 0.717

(3) 0.00889 (4) 0.0889

88 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) H_3PO_4 and $POCl_3$

(2) H_3PO_3 and $POCl_3$

(3) $POCl_3$ and H_3PO_3

(4) $POCl_3$ and H_3PO_4

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

A. Al^{3+} B. Cu^{2+}

C. Ba^{2+} D. Co^{2+}

E. Mg^{2+}

Choose the correct answer from the options given below:

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

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

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

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

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

(1) dilute nitric acid

(2) dilute sulphuric acid

(3) dilute hydrochloric acid

(4) concentrated sulphuric acid

91 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})

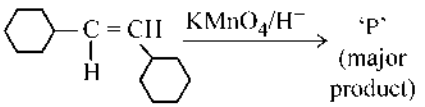
(1) 413.14 calories

(2) 100 calories

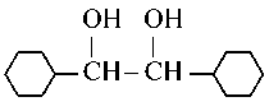
(3) 0 calorie

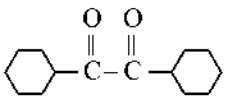
(4) – 413.14 calories

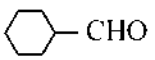
92 For the given reaction:

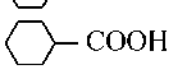


'P' is

(1) 

(2) 

(3) 

(4) 

93 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

94 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) butanamide

(2) α – bromobutanoic acid

(3) propylamine

(4) butylamine

95 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 = 32 u)

(1) AB_2C_2 (2) ABC_4

(3) A_2BC_2 (4) ABC_3

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

Given R = 8.314 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

Botany : Section-A (Q. No. 101 to 135)

97 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.

98 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+}

99 Given below are two statements :

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

Statement II : Complex $\left[Co(NH_3)_6\right]^{3+}$ has only one kind of ligands but $\left[Co(NH_3)_4Cl_2\right]^{+}$ has more than one kind of ligands.

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

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

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

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

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

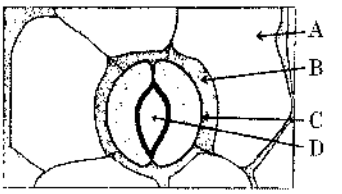
100 Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is:

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

(1) 31.5 g (2) 0.0315 g

(3) 3.15 g (4) 0.315 g

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



(1) A (2) B

(3) C (4) D

102 List of endangered species was released by-

(1) FOAM (2) IUCN

(3) GEAC (4) WWF

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

(1) Semi-conservative method

(2) Sustainable development

(3) *in-situ* conservation

(4) Biodiversity conservation

104 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.

Choose the correct answer from the options given below:

(1) B, C and D only

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

(3) A, B and C only

(4) A, C, D and E only

105 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

106 Match List I with List II

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

Choose the correct answer from the options given below:
(1) A-III, B-I, C-IV, D-II
(2) A-IV, B-I, C-III, D-II
(3) A-III, B-I, C-II, D-IV
(4) A-II, B-IV, C-III, D-I

107 The equation of Verhulst-Pearl logistic growth is

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

From this equation, K indicates:
(1) Carrying capacity
(2) Population density
(3) Intrinsic rate of natural increase
(4) Biotic potential

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

109 Formation of interfascicular cambium from fully developed parenchyma cells is an example for
(1) Dedifferentiation
(2) Maturation
(3) Differentiation
(4) Redifferentiation

110 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-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

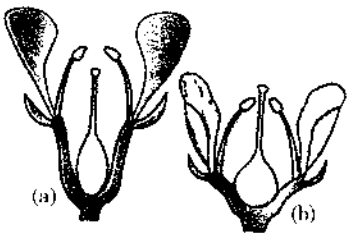
111 What is the fate of a piece of DNA carrying only gene of interest which is transferred into an alien organism?
A. The piece of DNA would be able to multiply itself independently in the progeny cells of the organism.
B. It may get integrated into the genome of the recipient.
C. It may multiply and 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) B and C only
(2) A and E only
(3) A and B only
(4) D and E only

112 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

Choose the correct answer from the options given below:
(1) A-III, B-IV, C-II, D-I
(2) A-I, B-II, C-III, D-IV
(3) A-III, B-II, C-IV, D-I
(4) A-II, B-III, C-I, D-IV

113 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

114 Spindle fibers attach to kinetochores of chromosomes during
(1) Anaphase (2) Telophase
(3) Prophase (4) Metaphase

115 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

116 Lecithin, a small molecular weight organic compound found in living tissues, is an example of:
(1) Glycerides
(2) Carbohydrates
(3) Amino acids
(4) Phospholipids

117 Identify the set of correct statements:
A. The flowers of *Vallisneria* are colourful and produce nectar.
B. The flowers of waterlily are not pollinated by water.
C. In most of water-pollinated species, the pollen grains are protected from wetting.
D. Pollen grains of some hydrophytes are long and ribbon like.
E. In some hydrophytes, the pollen grains are carried passively inside water.
Choose the correct answer from the options given below:
(1) A, C, D and E only
(2) B, C, D and E only
(3) C, D and E only
(4) A, B, C and D only

118 The cofactor of the enzyme carboxypeptidase is:
(1) Flavin (2) Haem
(3) Zinc (4) Niacin

119 Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:
(1) Competitive inhibition
(2) Enzyme activation
(3) Cofactor inhibition
(4) Feedback inhibition

120 Which of the following is an example of actinomorphic flower?
(1) *Pisum* (2) *Sesbania*
(3) *Datura* (4) *Cassia*

121 Given below are two statements:
Statement I : Chromosomes become gradually visible under light microscope during leptotene stage.
Statement II : The begining of diplotene stage is recognized by dissolution of synaptonemal complex.
In the light of the above statements, choose the correct answer from the options given below:
(1) Statement I is true but Statement II is false
(2) Statement I is false but Statement II is true
(3) Both Statement I and Statement II are true
(4) Both Statement I and Statement II are false

122 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

123 Given below are two statements:

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

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

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

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

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

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

124 Given below are two statements:

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

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

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

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

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

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

125 Which one of the following is <u>not</u> a criterion for classification of fungi?

(1) Mode of spore formation

(2) Fruiting body

(3) Morphology of mycelium

(4) Mode of nutrition

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

(1) Differentiation

(2) Somatic hybridization

(3) Totipotency

(4) Micropropagation

127 Which of the following are required for the dark reaction of photosynthesis?

A. Light

B. Chlorophyll

C. CO_2

D. ATP

E. NADPH

Choose the correct answer from the options given below:

(1) C, D and E only

(2) D and E only

(3) A, B and C only

(4) B, C and D only

128 Tropical regions show greatest level of species richness because

A. Tropical latitudes have remained relatively undisturbed for millions of years, hence more time was available for species diversification.

B. Tropical environments are more seasonal.

C. More solar energy is available in tropics.

D. Constant environments promote niche specialization.

E. Tropical environments are constant and predictable.

Choose the correct answer from the options given below:

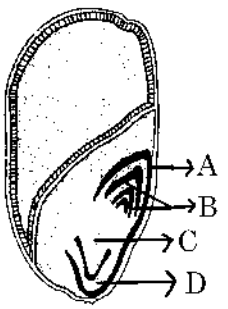
(1) A, B and E only

(2) A, B and D only

(3) A, C, D and E only

(4) A and B only

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



(1) C (2) D

(3) A (4) B

130 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

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

(1) Bb (2) BB/Bb

(3) BB (4) bb

132 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

133 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.

134 Match List I with List II

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

Choose the correct answer from the options given below:

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

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

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

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

135 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.

Botany : Section-B (Q. No. 136 to 150)

136 Match List I with List II

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

Choose the correct answer from the options given below:

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

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

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

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

137 The DNA present in chloroplast is:

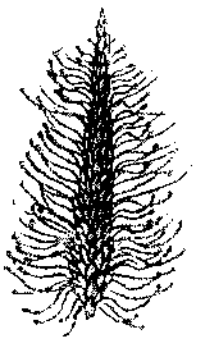
(1) Linear, single stranded

(2) Circular, single stranded

(3) Linear, double stranded

(4) Circular, double stranded

138 Identify the correct description about the given figure:



(1) Cleistogamous flowers showing autogamy.

(2) Compact inflorescence showing complete autogamy.

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

(4) Water pollinated flowers showing stamens with mucilaginous covering.

139 Match List I with List II

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

Choose the correct answer from the options given below:

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

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

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

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

140 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) 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

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

(1) Succinyl-CoA → Succinic acid

(2) Isocitrate → α-ketoglutaric acid

(3) Malic acid → Oxaloacetic acid

(4) Succinic acid → Malic acid

142 Match List I with List II

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

Choose the correct answer from the options given below:

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

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

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

144 Match List I with List II

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

Choose the correct answer from the options given below:

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

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

146 Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae,

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

Choose the correct answer from the options given below:

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

147 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-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

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

(1) The DNA dependent DNA polymerase catalyses polymerization in 5' → 3' as well as 3' → 5' direction.

(2) The DNA dependent DNA polymerase catalyses polymerization in 5' → 3' direction.

(3) The DNA dependent DNA polymerase catalyses polymerization in one direction that is 3' → 5'.

(4) The DNA dependent RNA polymerase catalyses polymerization in one direction, that is 5' → 3'.

149 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

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

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

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

151 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-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

152 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 from the options given below :

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

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

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

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

153 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

154 Match List I with List II :

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

Choose the correct answer from the options given below :

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

155 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-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

156 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

157 Given below are two statements :

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

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

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

(1) Statement I is 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 of the following is not a steroid hormone?

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

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

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

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

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

(1) A is 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.

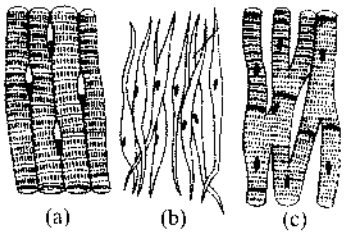
160 Given below are some stages of human evolution. Arrange them in correct sequence. (Past to Recent)

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

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



Name of muscle/location

(1) (a) 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.

162 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*

Choose the correct answer from the options given below :

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

163 The "Ti plasmid" of *Agrobacterium tumefaciens* stands for

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

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

3'TACATGGCAAATATCCATTCA5'

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

165 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-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

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

167 The flippers of the Penguins and Dolphins are the example of the

(1) Convergent evolution

(2) Divergent evolution

(3) Adaptive radiation

(4) Natural selection

168 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

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

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

169 Match List I with List II :

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

Choose the correct answer from the options given below :

(1) A-II, B-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

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

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

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

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

(1) A is 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.

171 Which of the following is not a component of Fallopian tube?

(1) Infundibulum

(2) Ampulla

(3) Uterine fundus

(4) Isthmus

172 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.

173 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

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

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

176 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

177 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 from the options given below :

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

178 Match List I with List II :

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

Choose the correct answer from the options given below :

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

179 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

180 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) 5^{th} segment

(4) 10^{th} segment

181 Given below are two statements :

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

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

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

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

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

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

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

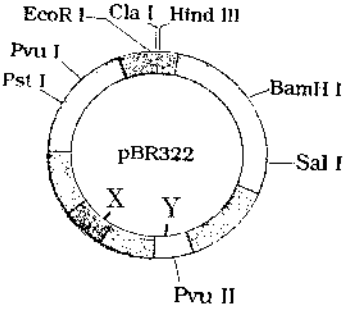
(1) Gene migration

(2) Constant gene pool

(3) Genetic recombination

(4) Genetic drift

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



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

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

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

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

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

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

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

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

185 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

Zoology : Section-B (Q. No. 186 to 200)

186 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.

187 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

188 Given below are two statements :

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

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

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

(1) Statement I is 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 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, D, C, B

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

190 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-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

191 Given below are two statements :

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

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

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

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

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

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

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

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

193 Given below are two statements :

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

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

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

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

194 Match List I with List II :

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

Choose the correct answer from the options given below :

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

195 Match List I with List II :

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

Choose the correct answer from the options given below :

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

196 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.

197 Match List I with List II :

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

Choose the correct answer from the options given below :

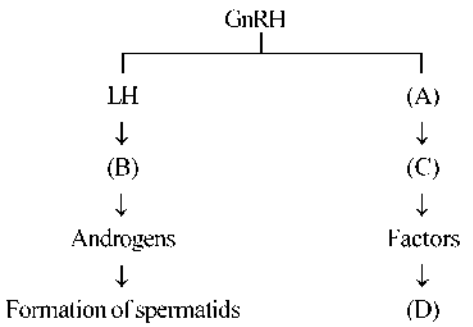
(1) A-III, B-IV, C-II, D-I

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

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

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

198 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.

199 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) C & B only (2) D & E only

(3) A only (4) B only

200 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-III, C-II, D-I

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

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

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

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

परीक्षा पुस्तिका संकेत
Test Booklet Code

GUDRI

← Test Booklet No. परीक्षा पुस्तिका सं. **Hindi+English**

T6

इस परीक्षा पुस्तिका को तब तक न खोलें जब तक कहा न जाए।
Do not open this Test Booklet until you are asked to do so.

इस परीक्षा पुस्तिका के पिछले आवरण पर दिए निर्देशों को ध्यान से पढ़ें।
Read carefully the Instructions on the Back Cover of this Test Booklet.

इस पुस्तिका में रफ कार्य पृष्ठ सहित **48** पृष्ठ हैं ।
This Booklet contains **48** pages including Rough Page.

महत्वपूर्ण निर्देश :

1. उत्तर पत्र इस परीक्षा पुस्तिका के अन्दर रखा है। जब आपको परीक्षा पुस्तिका खोलने को कहा जाए, तो उत्तर पत्र निकाल कर ध्यानपूर्वक मूल प्रतिलिपि पर केवल **नीले/काले** बॉल पॉइंट पेन से विवरण भरें।
2. परीक्षा की अवधि **3 घंटा 20 मिनट** है एवं परीक्षा पुस्तिका में **भौतिकी, रसायनशास्त्र एवं जीवविज्ञान (वनस्पतिविज्ञान एवं प्राणिविज्ञान)** विषयों से 200 बहुविकल्पीय प्रश्न हैं (4 विकल्पों में से एक सही उत्तर है)। प्रत्येक विषय में 50 प्रश्न है जिनको निम्न वर्णानुसार **दो अनुभागों (A तथा B)** में विभाजित किया गया है :
   (a) **अनुभाग A** के प्रत्येक विषय में **35 (पैंतीस)** (प्रश्न संख्या 1 से 35, 51 से 85, 101 से 135 एवं 151 से 185) प्रश्न है। सभी प्रश्न अनिवार्य हैं।
   (b) **अनुभाग B** के प्रत्येक विषय में **15 (पंद्रह)** (प्रश्न संख्या 36 से 50, 86 से 100, 136 से 150 एवं 186 से 200) प्रश्न है। अनुभाग B से परीक्षार्थियों को प्रत्येक विषय से 15 **(पंद्रह)** में से **कोई 10 (दस)** प्रश्न करने होंगे।

   परीक्षार्थियों को सुझाव है कि प्रश्नों के उत्तर देने के पूर्व अनुभाग B में प्रत्येक विषय के सभी 15 प्रश्नों को पढ़ें। यदि कोई परीक्षार्थी 10 प्रश्न से अधिक प्रश्नों का उत्तर देता है तो उसके द्वारा **उत्तरित प्रथम 10 प्रश्नों का ही मूल्यांकन किया जाएगा।**
3. प्रत्येक प्रश्न 4 अंक का है। प्रत्येक सही उत्तर के लिए परीक्षार्थी को 4 अंक दिए जाएंगे। प्रत्येक गलत उत्तर के लिए कुल योग में से **एक अंक** घटाया जाएगा। **अधिकतम अंक 720 हैं।**
4. इस पृष्ठ पर विवरण अंकित करने एवं उत्तर पत्र पर निशान लगाने के लिए **केवल नीले/काले बॉल पॉइंट पेन** का प्रयोग करें।
5. रफ कार्य इस परीक्षा पुस्तिका में निर्धारित स्थान पर ही करें।

Important Instructions :

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with **blue/black** ball point pen only.
2. 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**.
3. 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.**
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purpose in the Test Booklet only.

प्रश्नों के अनुवाद में किसी अस्पष्टता की स्थिति में, अंग्रेजी संस्करण को ही अंतिम माना जायेगा ।
In case of any ambiguity in translation of any question. English version shall be treated as final.

परीक्षार्थी का नाम (बड़े अक्षरों में) :
Name of the Candidate (in Capitals) : _____

अनुक्रमांक : अंकों में
Roll Number : in figures _____
: शब्दों में
: in words _____

परीक्षा केन्द्र (बड़े अक्षरों में) :
Centre of Examination (in Capitals) : _____

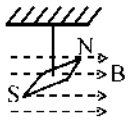
परीक्षार्थी के हस्ताक्षर :
Candidate's Signature : _____

निरीक्षक के हस्ताक्षर :
Invigilator's Signature : _____

केन्द्र अधीक्षक की प्रतिकृति हस्ताक्षर मोहर
Facsimile signature stamp of Centre Superintendent : _____

Physics : Section-A (Q. No. 1 to 35)

1 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 9.8×10^{-6} kg m^2. If the magnitude of magnetic moment of the needle is $x \times 10^{-5}$ Am^2; then the value of 'x' is :



(1) $50\,\pi^2$ (2) $1280\,\pi^2$

(3) $5\,\pi^2$ (4) $128\,\pi^2$

2 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, 4×10^{-6} C m, is $\pm 9\times10^3\ V$.

(Take $\frac{1}{4\pi\epsilon_0} = 9\times10^9$ SI units)

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

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

(1) A is true but R is false.
(2) A is false but R is true.
(3) Both A and R 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.

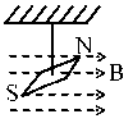
3 Match List I with List II.

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

Choose the correct answer from the options given below :

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

1 0.049 T के एक एकसमान चुम्बकीय क्षेत्र में एक चुम्बकीय सुई 5 सेकंड में 20 दोलन पूर्ण करती है (चित्रानुसार)। सुई का जड़त्व आघूर्ण 9.8×10^{-6} kg m^2 है। यदि सुई का चुम्बकीय आघूर्ण का परिमाण $x \times 10^{-5}$ Am^2 हो तो 'x' का मान है:



(1) $50\,\pi^2$ (2) $1280\,\pi^2$

(3) $5\,\pi^2$ (4) $128\,\pi^2$

2 नीचे दो कथन दिये गये हैं: एक को **अभिकथन A** तथा दूसरे को **कारण R** से चिन्हित किया गया है।

अभिकथन A : 4×10^{-6} C m परिमाण, द्विध्रुव आघूर्ण सदिश $\vec{P}$ वाले द्विध्रुव के केन्द्र से 2 मी दूरी (r) पर अक्षीय बिन्दु A पर विभव $\pm 9\times10^3\ V$ है।

(यदि $\frac{1}{4\pi\epsilon_0} = 9\times10^9$ SI मात्रक)

कारण R : $V = \pm\frac{2P}{4\pi\epsilon_0 r^2}$ जहाँ r, द्विध्रुव के केन्द्र से 2 m की दूरी पर स्थित अक्षीय बिन्दु A की दूरी है।

उपरोक्त कथनों के आधार पर, नीचे दिये गये विकल्पों से सही उत्तर चुनिए:

(1) A सही है परन्तु R गलत है।
(2) A गलत है परन्तु R सही है।
(3) दोनों A व R सही हैं तथा R, A की सही व्याख्या है।
(4) दोनों A व R सही हैं तथा R, A की सही व्याख्या नहीं है।

3 सूची I का सूची II से मिलान कीजिए:

सूची I (निम्नलिखित स्तरों के संक्रमणों के लिए हाइड्रोजन की स्पैक्ट्रमी रेखाएँ)		**सूची II (तरंगदैर्ध्य (nm))**
A.	$n_2 = 3$ से $n_1 = 2$	I. 410.2
B.	$n_2 = 4$ से $n_1 = 2$	II. 434.1
C.	$n_2 = 5$ से $n_1 = 2$	III. 656.3
D.	$n_2 = 6$ से $n_1 = 2$	IV. 486.1

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(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

4 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

5 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 :

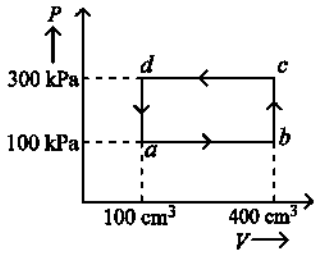
(1) 4:1 (2) 1:4
(3) 1:2 (4) 2:1

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

(1) $100N$ (2) $10\,(N + 1)$

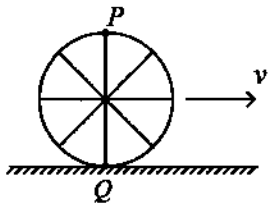
(3) $\frac{1}{10N}$ (4) $\frac{1}{100(N+1)}$

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



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

8 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.

4 1 मी लम्बाई के स्टील के तार की स्टील की प्रत्यास्थता सीमा तथा इसका प्रत्यास्थता गुणांक क्रमशः 8×10^8 N m^{-2} तथा 2×10^{11} N m^{-2} हैं तो इस तार की लम्बाई में वृद्धि है:

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

5 समान द्रव्यमान के दो पिण्ड A व B पूर्णतया अप्रत्यास्थ एक विमीय संघट्ट करते हैं। संघट्ट से पूर्व पिण्ड A वेग v_1 से गति करता है जबकि पिण्ड B विराम में है। संघट्ट के पश्चात् निकाय का वेग v_2 है। अनुपात $v_1 : v_2$ है:

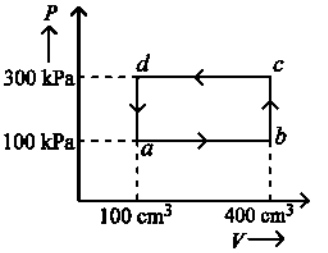
(1) 4:1 (2) 1:4
(3) 1:2 (4) 2:1

6 एक वर्नियर कैलीपर्स में वर्नियर पैमाने के $(N + 1)$ खानों का मान मुख्य पैमाने के N खानों के मान के बराबर है। यदि मुख्य पैमाने के एक खाने का मान 0.1 मिमी हो तो वर्नियर नियतांक (सेमी में) है:

(1) $100N$ (2) $10\,(N + 1)$

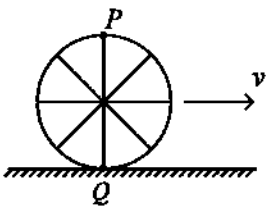
(3) $\frac{1}{10N}$ (4) $\frac{1}{100(N+1)}$

7 एक ऊष्मागतिक निकाय के चक्रीय प्रक्रम *abcda* से ले जाया जाता है। *bc* पथ के अनुदिश गैस द्वारा कृत कार्य है:



(1) $-90\,J$ (2) $-60\,J$
(3) शून्य (4) $30\,J$

8 एक बैलगाड़ी का पहिया चित्र अनुसार एक समतल सड़क पर लुढ़क रहा है। यदि दिखाई गई दिशा में इसकी रेखीय चाल v हो तो निम्नलिखित में से कौन सा विकल्प सही है: (चक्र पर P और Q क्रमशः कोई उच्चतम एवं न्यूनतम बिंदु हैं।)



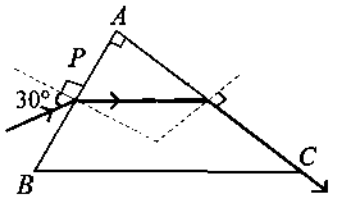
(1) दोनों बिन्दु P व Q समान चाल से गति करते हैं।
(2) बिन्दु P की चाल शून्य है।
(3) बिन्दु P, बिन्दु Q से धीरे गति करता है।
(4) बिन्दु P, बिन्दु Q से तेज गति करता है।

9 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) $\sqrt{2}T$

(3) T (4) $4T$

10 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) $\frac{\sqrt{5}}{2}$

11 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.	$\chi >> 1$
D.	Non-magnetic	IV.	$0 < \chi < \varepsilon$ (a small positive number)

Choose the correct answer from the options given below:

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

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

(1) 5 cm, 1 s (2) 5 m, 1 s

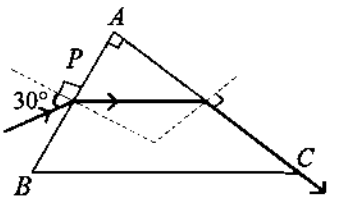
(3) 5 cm, 2 s (4) 5 m, 2 s

9 एक गोलक को डोरी से क्षैतिज तल में इस प्रकार घुमाया जाता है कि इसकी प्रारम्भिक चाल ω rpm है। डोरी में तनाव T है। यदि त्रिज्या को समान रखकर चाल 2ω हो जाती हो तो डोरी में तनाव होगा:

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

(3) T (4) $4T$

10 एक प्रकाश किरण समकोणीय प्रिज्म के बिन्दु P पर 30° के आपतन कोण से प्रवेश करती है जैसा कि चित्र में दर्शाया गया है। यह प्रिज्म के आधार BC के समान्तर चलकर AC सतह के अनुदिश पारगमित होती है। प्रिज्म का अपवर्तनांक है:



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

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

11 सूची I का सूची II से मिलान कीजिए:

	सूची I (पदार्थ)		**सूची II (चुम्बकीय प्रवृत्ति- χ)**
A.	प्रतिचुम्बकीय	I.	$\chi = 0$
B.	लौह चुम्बकीय	II.	$0 > \chi \geq -1$
C.	अनुचुम्बकीय	III.	$\chi >> 1$
D.	अचुम्बकीय	IV.	$0 < \chi < \varepsilon$ (एक सूक्ष्म धनात्मक संख्या)

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

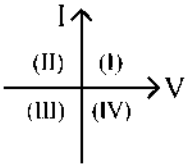
(1) A-III, B-II, C-I, D-IV
(2) A-IV, B-III, C-II, D-I
(3) A-II, B-III, C-IV, D-I
(4) A-II, B-I, C-III, D-IV

12 यदि $x = 5\sin\left(\pi t + \frac{\pi}{3}\right) m$ सरल आवर्त गति करते हुए एक कण की गति को प्रदर्शित करती है, गति का आयाम तथा आवर्त काल क्रमशः है:

(1) 5 cm, 1 s (2) 5 m, 1 s

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

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

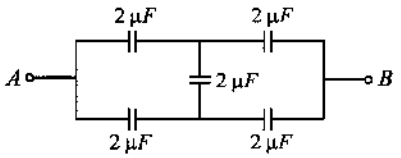


A. For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.

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.

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



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

15 In an ideal transformer, the turns ratio is $\frac{N_p}{N_s} = \frac{1}{2}$.

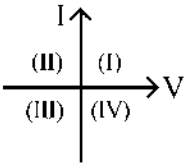
The ratio $V_s : V_p$ is equal to (the symbols carry their usual meaning) :
(1) 1 : 1 (2) 1 : 4
(3) 1 : 2 (4) 2 : 1

16 A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If surface tension of water is 0.07 Nm^{-1}, then the excess force required to take it away from the surface is :
(1) 1.98 mN (2) 99 N
(3) 19.8 mN (4) 198 N

17 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) $55\ \Omega$ (2) $60\ \Omega$
(3) $26\ \Omega$ (4) $52\ \Omega$

13 निम्नलिखित कथनों A व B को लेकर सही उत्तर चुनिए:

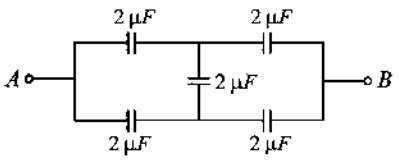


A. सोलर सेल के लिए I-V अभिलाक्षणिक दिये गये ग्राफ के चौथे चतुर्थांश में होते है।

B. उत्क्रम अभिनत *pn* जंकशन डायोड में धारा बहुसंख्यक आवेश वाहकों के कारण (μA) में मापी जाती है।

(1) दोनों A व B सही हैं।
(2) दोनों A व B गलत हैं।
(3) A सही है एवं B गलत है।
(4) A गलत है एवं B सही है।

14 निम्नलिखित परिपथ में टर्मिनल A व टर्मिनल B के बीच तुल्य धारिता है:



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

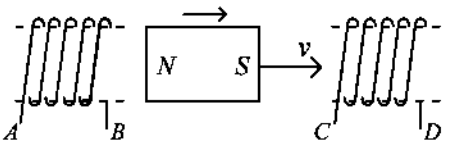
15 एक आदर्श ट्रांसफार्मर में फेरों की संख्याओं का अनुपात $\frac{N_p}{N_s} = \frac{1}{2}$ है। अनुपात $V_s : V_p$ किसके बराबर है ? (प्रतीकों का प्रचलित अर्थ प्रयुक्त किया गया है)
(1) 1 : 1 (2) 1 : 4
(3) 1 : 2 (4) 2 : 1

16 4.5 सेमी त्रिज्या की एक बारीक समतल वृत्ताकार चकती को पानी की सतह पर धीरे से रख दिया गया है। यदि पानी का पृष्ठ तनाव 0.07 Nm^{-1} हो तो इसको पानी की सतह से अलग करने के लिए आवश्यक आधिक्य बल है:
(1) 1.98 mN (2) 99 N
(3) 19.8 mN (4) 198 N

17 'l' लम्बाई तथा $100\ \Omega$ प्रतिरोध के एक तार को 10 बराबर भागों में विभाजित किया गया है। प्रथम 5 भागों को श्रेणीक्रम में तथा बाकी 5 भागों को समान्तर क्रम में जोड़ा गया है। दोनों संयोगों को पुनः श्रेणीक्रम में जोड़ा गया है। इस अन्तिम संयोजन का प्रतिरोध है:

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

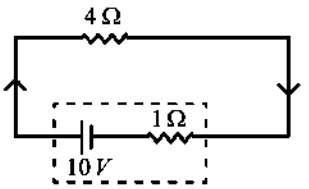
18 The quantities which have the same dimensions as those of solid angle are :
(1) strain and arc
(2) angular speed and stress
(3) strain and angle
(4) stress and angle

19 

Solenoid - 1 Solenoid - 2

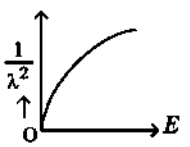
In the above diagram, a strong bar magnet is moving towards solenoid-2 from solenoid-1. The direction of induced current in solenoid-1 and that in solenoid-2, respectively, are through the directions:
(1) *AB* and *CD* (2) *BA* and *DC*
(3) *AB* and *DC* (4) *BA* and *CD*

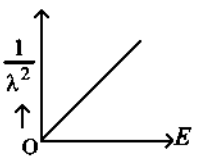
20 The terminal voltage of the battery, whose emf is $10V$ and internal resistance $1\,\Omega$, when connected through an external resistance of $4\,\Omega$ as shown in the figure is :

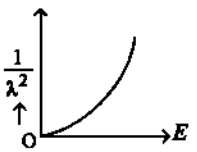


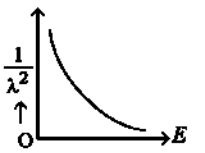
(1) $8\ V$ (2) $10\ V$
(3) $4\ V$ (4) $6\ V$

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

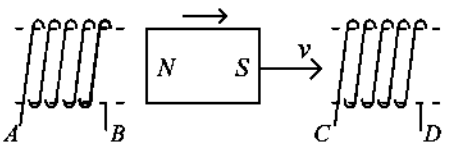
(1) 

(2) 

(3) 

(4) 

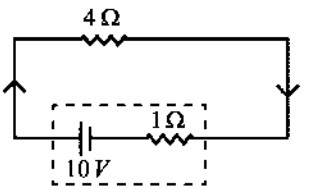
18 वह राशियाँ जिनकी विमाएं घन कोण के समान हैं:
(1) विकृति तथा चाप
(2) कोणीय चाल तथा प्रतिबल
(3) विकृति तथा कोण
(4) प्रतिबल तथा कोण

19 

परिनालिका–1 परिनालिका–2

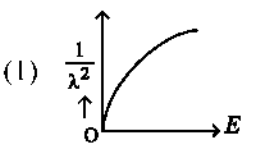
उपरोक्त चित्र में एक तीव्र छड़ चुम्बक परिनालिका–1 से परिनालिका–2 की ओर गति कर रही है। परिनालिका–1 में प्रेरित धारा की दिशा तथा परिनालिका–2 में प्रेरित धारा की दिशा क्रमशः दिशाओं में हैं:
(1) *AB* एवं *CD* (2) *BA* एवं *DC*
(3) *AB* एवं *DC* (4) *BA* एवं *CD*

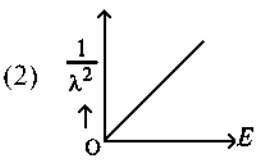
20 $1\,\Omega$ आन्तरिक प्रतिरोध तथा $10V$ वि.बा. बल की बैटरी का टर्मिनल वोल्टेज क्या है जब इसे चित्र अनुसार $4\,\Omega$ के बाह्य प्रतिरोध से जोड़ा गया है:

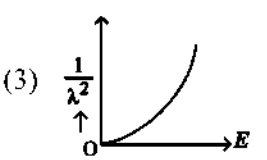


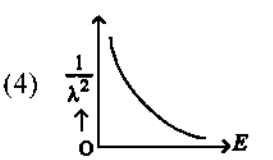
(1) $8\ V$ (2) $10\ V$
(3) $4\ V$ (4) $6\ V$

21 निम्न में से कौन सा ग्राफ $\left(\frac{1}{\lambda^2}\right)$ तथा इसकी गतिज ऊर्जा *(E)* के परिवर्तन को दर्शाता है (जहाँ λ एक मुक्त कण की डी ब्रॉग्ली तरंगदैर्ध्य है) :

(1) 

(2) 

(3) 

(4) 

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

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

B. The velocity of a photon is c.

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

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

E. Photon possesses positive charge.

Choose the correct answer from the options given below :

(1) A, C and D only

(2) A, B, D and E only

(3) A and B only

(4) A, B, C and D only

23 $^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$

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

(1) 288, 82 (2) 286, 81

(3) 280, 81 (4) 286, 80

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

(1) 7 (2) 6

(3) 10 (4) 5

25 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) 20.7 cm (2) 72.0 cm

(3) 8.5 cm (4) 17.5 cm

26 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.

22 यदि मुक्त आकाश में प्रकाश का वेग c है, फोटान के लिए निम्नलिखित में सही कथन है:

A. फोटान की ऊर्जा $E = hv$ है।

B. फोटान का वेग c है।

C. फोटान का संवेग $p = \frac{hv}{c}$ है।

D. फोटान–इलैक्ट्रान संघट्ट में, दोनों कुल ऊर्जा व कुल संवेग संरक्षित रहते हैं।

E. फोटान पर धनात्मक आवेश होता है।

निम्नलिखित विकल्पों से सही उत्तर चुनिए:

(1) केवल A, C व D

(2) केवल A, B, D व E

(3) केवल A व B

(4) केवल A, B, C व D

23 $^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$

उपरोक्त नाभिकीय उत्सर्जन के लिए उत्पाद Q की द्रव्यमान संख्या व परमाणु क्रमांक क्रमशः है:

(1) 288, 82 (2) 286, 81

(3) 280, 81 (4) 286, 80

24 किसी क्षण t पर $5N$ बल के अन्तर्गत किसी कण का विस्थापन $2t - 1$ (SI मात्रक में) दिया गया है। क्षणिक शक्ति का मान (SI मात्रक में) है:

(1) 7 (2) 6

(3) 10 (4) 5

25 एक पतली छड़ का इसके मध्य बिन्दु से गुजरने वाली छड़ के लम्बवत् अक्ष के परितः जड़त्व आघूर्ण 2400 g cm^2 है। 400 g की छड़ की लम्बाई लगभग है:

(1) 20.7 cm (2) 72.0 cm

(3) 8.5 cm (4) 17.5 cm

26 यदि यंग द्वि झिर्री प्रयोग में एकवर्णी स्रोत को श्वेत प्रकाश से परिवर्तित कर दिया गया हो तो:

(1) कुछ रंगीन फ्रिंजों से घिरी एक दीप्ति केन्द्रीय फ्रिंज होगी।

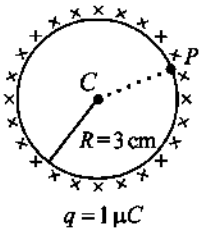
(2) सभी दीप्ति फ्रिंजें समान चौड़ाई की होगी।

(3) व्यतिकरण प्रारूप अदृश्य होगा।

(4) कुछ रंगीन फ्रिंजों से घिरी एक अदीप्ति केन्द्रीय फ्रिंज होगी।

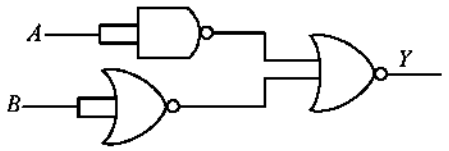
27 A thin spherical shell is charged by some source. The potential difference between the two points C and P (in V) shown in the figure is:

(Take $\frac{1}{4\pi\epsilon_0} = 9\times10^9$ SI units)



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

28 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

29 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 :

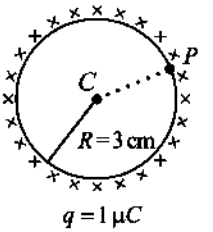
(1) $\overline{B}$ (2) B
(3) $A.B + \overline{A}$ (4) $A.\overline{B} + \overline{A}$

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 $4\pi\times10^{-7}$ SI units):

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

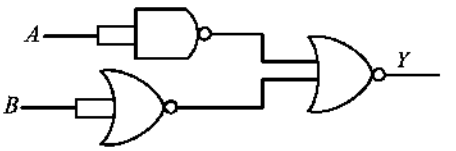
27 एक पतला गोलीय कोश किसी स्रोत द्वारा आवेशित किया गया है। प्रदर्शित चित्र के अनुसार दो बिन्दुओं C व P के बीच विभवान्तर (वोल्ट में) है:

(दिया है $\frac{1}{4\pi\epsilon_0} = 9\times10^9$ SI मात्रक में)



(1) 0.5×10^5 (2) शून्य
(3) 3×10^5 (4) 1×10^5

28 दिये गये लॉजिक परिपथ का निर्गत (Y) किसके निर्गत के समान है:



(1) OR गेट (2) AND गेट
(3) NAND गेट (4) NOR गेट

29 निम्नलिखित सत्यता सारणी के अनुसार एक लॉजिक परिपथ निर्गत Y प्रदान करता है:

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

निर्गत Y के लिए व्यंजक है:

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

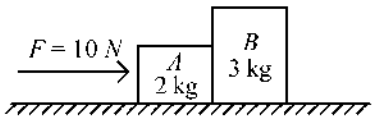
30 10 सेमी त्रिज्या की कसकर लिपटी 100 फेरों वाली एक कुंडली में प्रवाहित धारा 7 A है। कुंडली के केन्द्र पर चुम्बकीय क्षेत्र का परिमाण है (दिया है, निर्वात की चुम्बकशीलता = $4\pi\times10^{-7}$ SI मात्रक) :

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

31 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 s^{-2} (2) 3.92 m s^{-2}
(3) 19.6 m s^{-2} (4) 9.8 m s^{-2}

32 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.

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



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

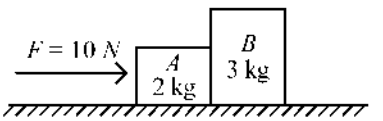
34 An unpolarised light beam strikes a glass surface at Brewster's angle. Then
(1) both the reflected and refracted light will be completely polarised.
(2) the reflected light will be completely polarised but the refracted light will be partially polarised.
(3) the reflected light will be partially polarised.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

35 Given below are two statements :
Statement I : Atoms are electrically neutral as they contain equal number of positive and negative charges.
Statement II : Atoms of each element are stable and emit their characteristic spectrum.
In the light of the above statements, choose the *most appropriate* answer from the options given below :
(1) Statement I is 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.

31 एक ग्रह का द्रव्यमान पृथ्वी के द्रव्यमान का $\frac{1}{10}$ वाँ भाग है तथा इसका व्यास पृथ्वी के व्यास का आधा है। उस ग्रह पर गुरुत्वीय त्वरण है:
(1) 4.9 m s^{-2} (2) 3.92 m s^{-2}
(3) 19.6 m s^{-2} (4) 9.8 m s^{-2}

32 एक वृत्ताकार पथ पर एकसमान चाल से गतिमान एक कण जारी रखता है :
(1) नियत वेग परन्तु परिवर्ती त्वरण
(2) परिवर्ती वेग एवं परिवर्ती त्वरण
(3) नियत वेग
(4) नियत त्वरण

33 प्रदर्शित चित्र में एक गुटका A पर 10 N क्षैतिज बल आरोपित किया जाता है। गुटका A व B के द्रव्यमान क्रमशः 2 किग्रा व 3 किग्रा हैं। गुटके एक घर्षणरहित तल के ऊपर खिसकते हैं। गुटका A द्वारा गुटका B पर लगाया गया बल है:



(1) 6 N (2) 10 N
(3) शून्य (4) 4 N

34 एक अध्रुवित प्रकाश पुँज किसी काँच की सतह पर ब्रूस्टर कोण पर टकराता है। तबः
(1) दोनों परावर्तित व अपवर्तित प्रकाश पूर्णतः ध्रुवित होगा।
(2) परावर्तित प्रकाश पूर्णतः ध्रुवित परन्तु अपवर्तित प्रकाश आंशिक ध्रुवित होगा।
(3) परावर्तित प्रकाश आंशिक ध्रुवित होगा।
(4) अपवर्तित प्रकाश पूर्णतः ध्रुवित होगा।

35 नीचे दो कथन दिए गए हैं:
कथन I : परमाणु वैधुत उदासीन होते हैं क्योंकि इनमें समान संख्या में धनात्मक तथा ऋणात्मक आवेश होते हैं।
कथन II : प्रत्येक तत्व के परमाणु स्थाई होते हैं तथा अपना अभिलाक्षणिक स्पैक्ट्रम उत्सर्जित करते हैं।
उपरोक्त कथनों के आधार पर, नीचे दिए गए विकल्पों में से सबसे उचित उत्तर चुनिए:
(1) कथन I सही है परंतु कथन II गलत है।
(2) कथन I गलत है परंतु कथन II सही है।
(3) कथन I व कथन II दोनों सही हैं।
(4) कथन I व कथन II दोनों गलत हैं।

Physics : Section-B (Q. No. 36 to 50)

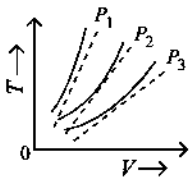
36 If the plates of a parallel plate capacitor connected to a battery are moved close to each other, then

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.

Choose the most appropriate answer from the options given below:

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

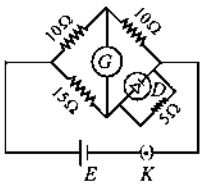
37 The following graph represents the T-V curves of an ideal gas (where T is the temperature and V the volume) at three pressures P_1, P_2 and P_3 compared with those of Charles's law represented as dotted lines.

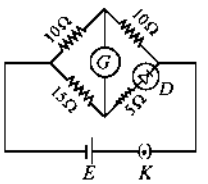


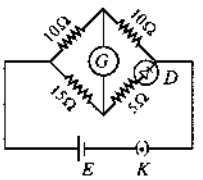
Then the correct relation is:

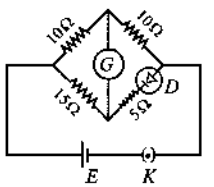
(1) $P_2 > P_1 > P_3$ (2) $P_1 > P_2 > P_3$
(3) $P_3 > P_2 > P_1$ (4) $P_1 > P_3 > P_2$

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

(1) 

(2) 

(3) 

(4) 

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

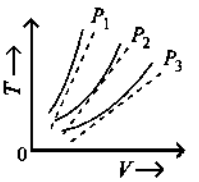
36 यदि एक बैटरी से जुड़े समान्तर प्लेट संधारित्र की प्लेटे एक दूसरे की ओर गति करती हैं, तब:

A. इसमें संचित आवेश बढ़ता है
B. इसमें संचित ऊर्जा घटती है
C. इसकी धारिता बढ़ती है
D. इसके आवेश तथा वोल्टेज का अनुपात समान रहता है
E. आवेश तथा वोल्टेज का गुणनफल बढ़ता है

नीचे दिये गये विकल्पों से सबसे उचित उत्तर चुनिए:

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

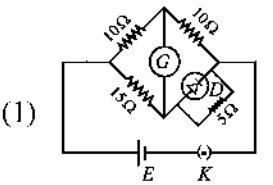
37 निम्नलिखित ग्राफ में एक आदर्श गैस के तीन दाबों P_1, P_2 व P_3 पर T-V वक्र प्रदर्शित करता है (जहाँ T तापमान, V आयतन) जिसकी चार्ल्स नियम की बिन्दु रेखा द्वारा तुलना की गई है।

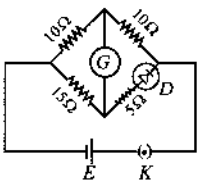


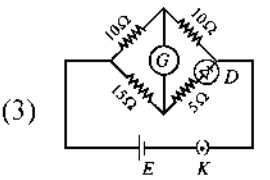
तब सही संबन्ध है:

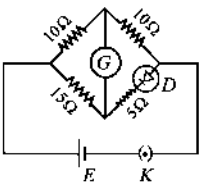
(1) $P_2 > P_1 > P_3$ (2) $P_1 > P_2 > P_3$
(3) $P_3 > P_2 > P_1$ (4) $P_1 > P_3 > P_2$

38 वह परिपथ चुनिए जो ब्रिज की सन्तुलन प्राप्त कर सके:

(1) 

(2) 

(3) 

(4) 

39 एक तीव्र चुम्बकीय ध्रुव के सामने एक क्षैतिज तल पर एक चादर रखी गई है। एक बल आवश्यक है:

A. यदि यह चुम्बक है तो चादर को वहाँ रखने के लिए
B. यदि यह अचुम्बक है तो चादर को वहाँ रखने के लिए
C. यदि यह चालक है तो चादर को ध्रुव से दूर एकसमान वेग से ले जाने के लिए
D. यदि यह कुचालक एवं अध्रुवित है तो चादर को ध्रुव से दूर एकसमान वेग से ले जाने के लिए

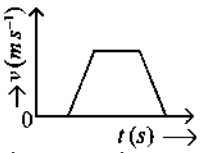
नीचे दिये विकल्पों से सही कथन चुनिए:

(1) केवल A, C व D (2) केवल C
(3) केवल B व D (4) केवल A व C

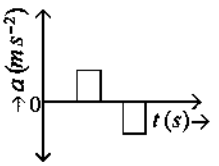
40 A parallel plate capacitor is charged by connecting it to a battery through a resistor. If I is the current in the circuit, then in the gap between the plates :
(1) displacement current of magnitude equal to I flows in a direction opposite to that of I.
(2) displacement current of magnitude greater 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.

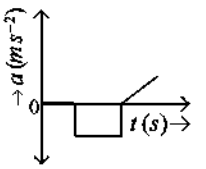
41 A small telescope has an objective of focal length 140 cm and an eye piece of focal length 5.0 cm. The magnifying power of telescope for viewing a distant object is:
(1) 17 (2) 32
(3) 34 (4) 28

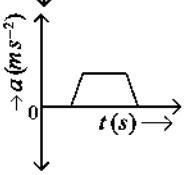
42 The velocity (v) – time (t) plot of the motion of a body is shown below :

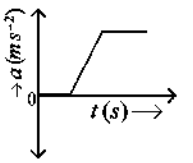


The acceleration (a) – time (t) graph that best suits this motion is :

(1) 

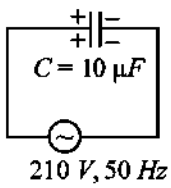
(2) 

(3) 

(4) 

43 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

44 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 $(\pi = 3.14)$:

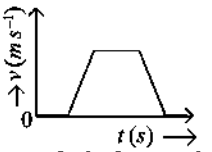


(1) 1.20 A (2) 0.35 A
(3) 0.58 A (4) 0.93 A

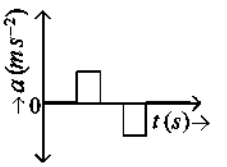
40 एक समान्तर प्लेट संधारित्र को एक प्रतिरोध द्वारा एक बैटरी से जोड़कर आवेशित किया गया है। यदि परिपथ में धारा I हो तो प्लेटों के बीच अन्तराल में –
(1) I की विपरीत दिशा में I के बराबर परिमाण की विस्थापन धारा प्रवाहित होती है।
(2) किसी भी दिशा में परन्तु I से अधिक परिमाण की विस्थापन धारा प्रवाहित होती है।
(3) कोई धारा नहीं है।
(4) I परिमाण की समान विस्थापन धारा I की समान दिशा में बहती है।

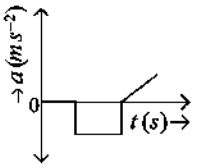
41 एक सूक्ष्म दूरदर्शी के अभिदृश्यक लैंस की फोकस दूरी 140 सेमी तथा नेत्रिका की फोकस दूरी 5.0 सेमी है। दूर स्थित वस्तु को देखने के लिए दूरदर्शी की आवर्धन क्षमता है:
(1) 17 (2) 32
(3) 34 (4) 28

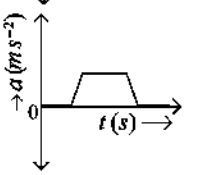
42 एक वस्तु की गति का वेग (v) – समय (t) ग्राफ नीचे प्रदर्शित है:

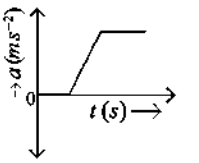


इस गति के लिए सबसे उचित त्वरण (a) – समय (t) ग्राफ है:

(1) 

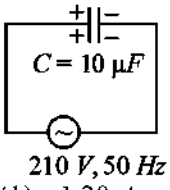
(2) 

(3) 

(4) 

43 0.5×10^{11} N m^{-2} यंग प्रत्यास्थता गुणांक तथा 10^{-5} °C^{-1} रेखीय ऊष्मीय प्रसार गुणांक की 1 मी लम्बी व 10^{-3} m^2 अनुप्रस्थ परिच्छेद क्षेत्रफल की एक धात्विक छड़ को 0°C से 100°C तक बिना विस्तार या मोड़ के गर्म किया जाता है। इसमें उत्पन्न संपीडित बल है:
(1) 100×10^3 N (2) 2×10^3 N
(3) 5×10^3 N (4) 50×10^3 N

44 एक 10 μF के संधारित्र को चित्र अनुसार एक 210 V, 50 Hz स्रोत से जोड़ा गया है। परिपथ में धारा का शिखर मान लगभग है $(\pi = 3.14)$:



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

45 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 : 2 (2) 2 : 3
(3) 1 : 1 (4) 2 : 9

46 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) $\alpha\beta/t$
(3) $\beta t/\alpha$ (4) $\alpha t/\beta$

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

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

48 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^o with each other. The magnetic moment of this new magnet is:

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

49 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) $2\sqrt{3}$ (2) 4
(3) $\sqrt{3}$ (4) $\sqrt{2}$

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

45 दो हीटर A व B की शक्ति दर क्रमशः 1 kW तथा 2 kW है। वे दोनों पहले श्रेणी क्रम में तथा फिर समान्तर क्रम में एक स्थिर शक्ति स्रोत से जोड़े जाते हैं। इन दोनों स्थितियों में निर्गत शक्तियों का अनुपात है:

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

46 $F = \alpha t^2 + \beta t$ द्वारा परिभाषित एक बल दिये गये समय t पर एक कण पर आरोपित होता है। यदि α तथा β नियतांक हो तो निम्न में से कौन सा घटक विमाहीन है ?

(1) $\alpha\beta t$ (2) $\alpha\beta/t$
(3) $\beta t/\alpha$ (4) $\alpha t/\beta$

47 मुक्त आकाश में संचरित विद्युत चुम्बकीय तरंग में कौन सा गुण नहीं होता :

(1) वे $\frac{1}{\sqrt{\mu_0 \in_0}}$ के बराबर चाल से गति करती हैं।
(2) वे एकसमान चाल से गतिमान आवेशों द्वारा उत्पन्न होती है।
(3) वे अनुप्रस्थ प्रवृत्ति की हैं।
(4) वैद्युत क्षेत्र में ऊर्जा घनत्व, चुम्बकीय क्षेत्र में ऊर्जा घनत्व के बराबर होता है।

48 L लम्बाई की एक लौह छड़ चुम्बक का चुम्बकीय आघूर्ण M है। यह लम्बाई के मध्य से इस प्रकार मोड़ा गया है कि दोनों भुजाएँ एक दूसरे के साथ 60^o का कोण बनाती है। इस नई चुम्बक का चुम्बकीय आघूर्ण है:

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

49 यदि एक सरल लोलक में गोलक का द्रव्यमान इसके मूल द्रव्यमान के तीन गुने तक बढ़ा दिया जाता है तथा इसकी प्रारम्भिक लंबाई आधी कर दी जाये, तो दोलन का नया आवर्तकाल प्रारम्भिक आवर्तकाल का $\frac{x}{2}$ गुना हो जाता है। तब x का मान है:

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

50 M द्रव्यमान तथा R त्रिज्या की पृथ्वी के तल से $2R$ ऊँचाई पर स्थित एक वृत्ताकार कक्षा में m द्रव्यमान के किसी उपग्रह को पृथ्वी तल से प्रक्षेपित करने के लिए न्यूनतम आवश्यक ऊर्जा है:

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

Chemistry : Section-A (Q. No. 51 to 85)

51 Among Group 16 elements, which one does **NOT** show –2 oxidation state?

(1) Te (2) Po

(3) O (4) Se

52 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

53 Given below are two statements:

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

n-pentane > isopentane > neopentane

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

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

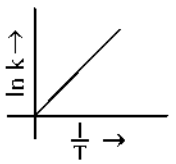
(1) Statement I is correct but Statement II is incorrect.

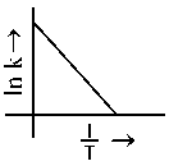
(2) Statement I is incorrect but Statement II is correct.

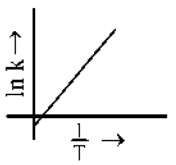
(3) Both Statement I and Statement II are correct.

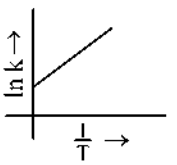
(4) Both Statement I and Statement II are incorrect.

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

(1) 

(2) 

(3) 

(4) 

51 समूह 16 तत्वों में से कौन–सा –2 ऑक्सीकरण अवस्था नहीं दर्शाता है ?

(1) Te (2) Po

(3) O (4) Se

52 हीलियम परमाणुओं की अधिकतम संख्या है:

(1) हीलियम के 4 g में

(2) एस.टी.पी. पर हीलियम के 2.271098 L में

(3) हीलियम के 4 मोलों में

(4) हीलियम के 4 u में

53 नीचे दो कथन दिए गए है:

कथन I : तीन समावयवी पेन्टेनों के क्वथनांक निम्नलिखित क्रम का पालन करते हैं:

n-पेन्टेन > आइसोपेन्टेन > निओपेन्टेन

कथन II : जब शाखन बढ़ता है, तब अणु एक गोले का आकार ले लेता है। इसके परिणामस्वरूप, संस्पर्श के लिए पृष्ठ क्षेत्रफल कम हो जाता है जिसके कारण गोलीय अणुओं के बीच अंतराअणुक बल दुर्बल हो जाते हैं और इस कारण क्वथनांक कम हो जाता है।

उपर दिए गए कथनों के आधार पर, नीचे दिए गए विकल्पों से सर्वाधिक उपयुक्त उत्तर चुनिए:

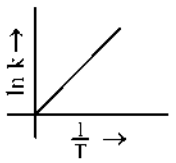
(1) कथन I सही है परंतु कथन II गलत है।

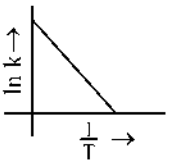
(2) कथन I गलत है परंतु कथन II सत्य है।

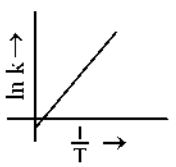
(3) कथन I और कथन II दोनों सत्य हैं।

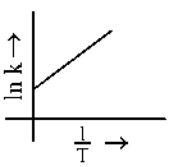
(4) कथन I और कथन II दोनों गलत हैं।

54 निम्नलिखित में से कौन सा ln k और $\frac{1}{T}$ के बीच आरेख आरेनियस समीकरण के अनुसार है ?

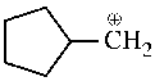
(1) 

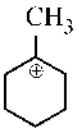
(2) 

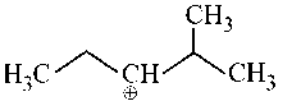
(3) 

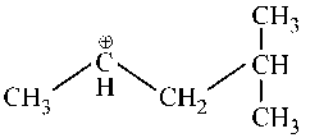
(4) 

55 The most stable carbocation among the following is:

(1) 

(2) 

(3) 

(4) 

56 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

57 Arrange the following elements in increasing order of first ionization enthalpy:
Li, Be, B, C, N
Choose the correct answer from the options given below:

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

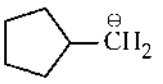
58 Match List I with List II.

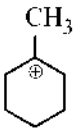
List I (Complex)	**List II (Type of isomerism)**
A. $\left[Co(NH_3)_5(NO_2)\right]Cl_2$	I. Solvate isomerism
B. $\left[Co(NH_3)_5(SO_4)\right]Br$	II. Linkage isomerism
C. $\left[Co(NH_3)_6\right]\left[Cr(CN)_6\right]$	III. Ionization isomerism
D. $\left[Co(H_2O)_6\right]Cl_3$	IV. Coordination isomerism

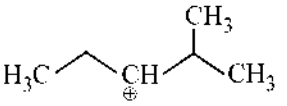
Choose the correct answer from the options given below:

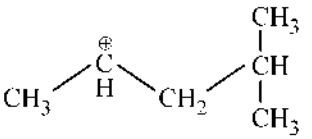
(1) A-I, B-IV, C-III, D-II
(2) A-II, B-IV, C-III, D-I
(3) A-II, B-III, C-IV, D-I
(4) A-I, B-III, C-IV, D-II

55 निम्नलिखित में से सबसे अधिक स्थायी कार्बधनायन है:

(1) 

(2) 

(3) 

(4) 

56 Mn^{3+}/Mn^{2+} युगल के लिए E° मान Cr^{3+}/Cr^{2+} या Fe^{3+}/Fe^{2+} से निम्नलिखित परिवर्तन के कारण अधिक धनात्मक होते हैं

(1) d^4 से d^5 विन्यास
(2) d^3 से d^5 विन्यास
(3) d^5 से d^4 विन्यास
(4) d^5 से d^2 विन्यास

57 निम्नलिखित तत्वों को प्रथम आयनन एन्थैल्पी के बढ़ते क्रम में व्यवस्थित कीजिए:
Li, Be, B, C, N
नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

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

58 सूची I का सूची II के साथ मिलान कीजिए:

सूची I (संकुल)	**सूची II (समावयवता का प्रकार)**
A. $\left[Co(NH_3)_5(NO_2)\right]Cl_2$	I. विलायकयोजन समावयवता
B. $\left[Co(NH_3)_5(SO_4)\right]Br$	II. बंधनी समावयवता
C. $\left[Co(NH_3)_6\right]\left[Cr(CN)_6\right]$	III. आयनन समावयवता
D. $\left[Co(H_2O)_6\right]Cl_3$	IV. उपसहसंयोजन समावयवता

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(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

59 Which reaction is **NOT** a redox reaction?
(1) $H_2 + Cl_2 \rightarrow 2\ HCl$
(2) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2\ NaCl$
(3) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
(4) $2\ KClO_3 + I_2 \rightarrow 2\ KIO_3 + Cl_2$

60 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.

61 Match List I with List II.

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

Choose the correct answer from the options given below:
(1) A-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

62 Which one of the following alcohols reacts instantaneously with Lucas reagent?
(1) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2OH$
(2) $CH_3-\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}-OH$
(3) $CH_3-CH_2-CH_2-CH_2OH$
(4) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-OH$

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

59 निम्नलिखित में से कौन-सी अभिक्रिया रेडॉक्स अभिक्रिया **नहीं** है ?
(1) $H_2 + Cl_2 \rightarrow 2\ HCl$
(2) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2\ NaCl$
(3) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
(4) $2\ KClO_3 + I_2 \rightarrow 2\ KIO_3 + Cl_2$

60 नीचे दो कथन दिए गए है:
कथन I : ऐनिलीन फ्रीडेल-क्राफ्ट्स ऐल्किलीकरण अभिक्रिया नहीं करती है।
कथन II : ऐनिलीन को गैब्रील संश्लेषण द्वारा नहीं बनाया जा सकता है।
उपर दिए गए कथनों के आधार पर, नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:
(1) कथन I सही है परंतु कथन II गलत है।
(2) कथन I गलत है परंतु कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों गलत हैं।

61 सूची I का सूची II के साथ मिलान कीजिए:

सूची I (यौगिक)	**सूची II (आकृति/ ज्यामिति)**
A. NH_3	I. त्रिकोणीय पिरैमिडी
B. BrF_5	II. वर्ग समतलीय
C. XeF_4	III. अष्टफलकीय
D. SF_6	IV. वर्ग पिरैमिडी

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:
(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

62 निम्नलिखित ऐल्कोहॉलों में से कौन-सा ल्यूकैस अभिकर्मक के साथ तात्क्षणिक अभिक्रिया करेगा ?
(1) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2OH$
(2) $CH_3-\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}-OH$
(3) $CH_3-CH_2-CH_2-CH_2OH$
(4) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-OH$

63 तीन गैसों (A, B, C) के लिए हेनरी नियम स्थिरांक (K_H) मान क्रमशः 145, 2×10^{-5} और 35 kbar है। इन गैसों का जल में विलेयताएँ निम्नलिखित क्रम का पालन करती है:
(1) A > C > B (2) A > B > C
(3) B > A > C (4) B > C > A

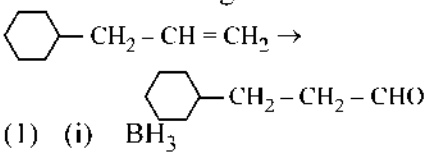
64 The reagents with which glucose does **not** react to give the corresponding tests/products are

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 E (2) E and D
(3) B and C (4) A and D

65 Identify the correct reagents that would bring about the following transformation.



(1) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) alk. $KMnO_4$
(iv) $H_3O^{\oplus}$
(2) (i) H_2O/H^+
(ii) PCC
(3) (i) H_2O/H^+
(ii) CrO_3
(4) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) PCC

66 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

67 Match List I with List II.

List I		**List II**	
Quantum Number		**Information provided**	
A.	m_l	I.	shape of orbital
B.	m_s	II.	size of orbital
C.	l	III.	orientation of orbital
D.	n	IV.	orientation of spin of electron

Choose the correct answer from the options given below:

(1) A-III, B-IV, C-II, D-I
(2) A-II, B-I, C-IV, D-III
(3) A-I, B-III, C-II, D-IV
(4) A-III, B-IV, C-I, D-II

68 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

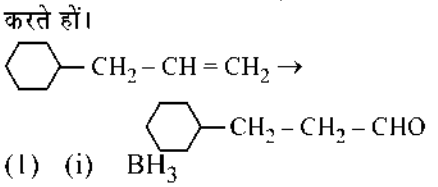
64 वे अभिकर्मक जिनके साथ ग्लूकोस अभिक्रिया नहीं करता है और संगत परीक्षण/उत्पाद नहीं देता है, हैं:

A. टॉलेन्स अभिकर्मक B. शिफ अभिकर्मक
C. HCN D. NH_2OH
E. $NaHSO_3$

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(1) B और E (2) E और D
(3) B और C (4) A और D

65 सही अभिकर्मकों को पहचानिए जो निम्नलिखित रूपांतरण करते हों।



(1) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) क्षारीय $KMnO_4$
(iv) $H_3O^{\oplus}$
(2) (i) H_2O/H^+
(ii) पी.सी.सी.
(3) (i) H_2O/H^+
(ii) CrO_3
(4) (i) BH_3
(ii) $H_2O_2/\overset{\ominus}{O}H$
(iii) पी.सी.सी.

66 फेलिंग विलयन 'A' होता है:

(1) सोडियम पोटैशियम टार्टरेट (रोशेल लवण) का क्षारीय विलयन
(2) जलीय सोडियम सिट्रेट
(3) जलीय कॉपर सल्फेट
(4) क्षारीय कॉपर सल्फेट

67 सूची I का सूची II के साथ मिलान कीजिए:

सूची I		**सूची II**	
(क्वांटम संख्या)		**(उपलब्ध जानकारी)**	
A.	m_l	I.	कक्षक की आकृति
B.	m_s	II.	कक्षक का आकार
C.	l	III.	कक्षक का अभिविन्यास
D.	n	IV.	इलेक्ट्रॉन के चक्रण का अभिविन्यास

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(1) A-III, B-IV, C-II, D-I
(2) A-II, B-I, C-IV, D-III
(3) A-I, B-III, C-II, D-IV
(4) A-III, B-IV, C-I, D-II

68 सोडियम हाइड्रॉक्साइड के 1g को 0.75 M HCl विलयन के 25 mL के साथ उपचारित किया गया, शेष अनअभिक्रियित सोडियम हाइड्रॉक्साइड का द्रव्यमान बराबर होगा:

(1) Zero mg (2) 200 mg
(3) 750 mg (4) 250 mg

69 On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for the purification of such solid substances based on the above principle is known as

(1) Distillation (2) Chromatography
(3) Crystallization (4) Sublimation

70 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. $2\ NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$
D. $Cl_{2(g)} \rightarrow 2\ Cl_{(g)}$

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

71 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 options given below:

(1) A-I, B-II, C-III, D-IV
(2) A-II, B-III, C-IV, D-I
(3) A-IV, B-III, C-II, D-I
(4) A-IV, B-II, C-III, D-I

72 Arrange the following elements in increasing order of electronegativity:

N, O, F, C, Si

Choose the correct answer from the options given below:

(1) O < F < N < C < Si
(2) F < O < N < C < Si
(3) Si < C < N < O < F
(4) Si < C < O < N < F

69 गर्म करने पर, कुछ ठोस पदार्थ से बिना द्रव अवस्था से गुज़रते हुए वाष्प अवस्था में परिवर्तित हो जाते हैं। ऊपर दिए सिद्धांत के आधार पर ऐसे ठोस पदार्थों के शोधन के लिए प्रयुक्त तकनीक कहलाती है:

(1) आसवन (2) वर्णलेखिकी
(3) क्रिस्टलन (4) ऊर्ध्वपातन

70 निम्नलिखित में से किन प्रक्रमों में एन्ट्रॉपी बढ़ती है ?

A. एक द्रव वाष्प में वाष्पित होता है।
B. एक क्रिस्टलीय ठोस का ताप 130 K से 0 K तक घटता है।
C. $2\ NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$
D. $Cl_{2(g)} \rightarrow 2\ Cl_{(g)}$

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(1) A, C और D (2) C और D
(3) A और C (4) A, B और D

71 सूची I का सूची II के साथ मिलान कीजिए:

सूची I (प्रक्रम)		सूची II (स्थिति)
A. समतापीय प्रक्रम	I.	कोई ऊष्मा विनिमय नहीं
B. समायतनिक प्रक्रम	II.	स्थिर ताप पर की जाती है।
C. समदाबीय प्रक्रम	III.	स्थिर आयतन पर की जाती है।
D. रूद्धोष्म प्रक्रम	IV.	स्थिर दाब पर की जाती है।

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(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-IV, B-II, C-III, D-I

72 निम्नलिखित तत्वों को विद्युत ऋणात्मकता के बढ़ते क्रम में व्यवस्थित कीजिए:

N, O, F, C, Si

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(1) O < F < N < C < Si
(2) F < O < N < C < Si
(3) Si < C < N < O < F
(4) Si < C < O < N < F

73 Given below are two statements :

Statement I : Both $\left[Co(NH_3)_6\right]^{3+}$ and $\left[CoF_6\right]^{3-}$ complexes are octahedral but differ in their magnetic behaviour.

Statement II : $\left[Co(NH_3)_6\right]^{3+}$ is diamagnetic whereas $\left[CoF_6\right]^{3-}$ 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.

74 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 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

Choose the correct answer from the options given below:

(1) A-III, B-IV, C-II, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-I, B-IV, C-II, D-III
(4) A-IV, B-III, C-II, D-I

75 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.

76 In which of the following equilibria, K_p and K_c are **NOT** equal?

(1) $CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$
(2) $2\ BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$
(3) $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$
(4) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2\ HI_{(g)}$

73 नीचे दो कथन दिए गए है:

कथन I : $\left[Co(NH_3)_6\right]^{3+}$ और $\left[CoF_6\right]^{3-}$ दोनों संकुल अष्टफलकीय हैं परंतु चुंबकीय व्यवहार में भिन्न होते हैं।

कथन II : $\left[Co(NH_3)_6\right]^{3+}$ प्रतिचुंबकीय है जबकि $\left[CoF_6\right]^{3-}$ अनुचुंबकीय है।

उपर दिए गए कथनों के आधार पर, नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(1) कथन I सही है परंतु कथन II गलत है।
(2) कथन I गलत है परंतु कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों गलत हैं।

74 सूची I का सूची II के साथ मिलान कीजिए:

सूची I (अणु)	**सूची II (दो कार्बन परमाणुओं के आबंधों की संख्या और प्रकार)**
A. एथेन	I. एक σ-आबंध और दो π-आबंध
B. एथीन	II. दो π-आबंध
C. कार्बन अणु C_2	III. एक σ-आबंध
D. एथाइन	IV. एक σ-आबंध और एक π-आबंध

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(1) A-III, B-IV, C-II, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-I, B-IV, C-II, D-III
(4) A-IV, B-III, C-II, D-I

75 किसी भी रासायनिक अभिक्रिया की सक्रियण ऊर्जा परिकलित की जा सकती है यदि निम्नलिखित का मान ज्ञात हो:

(1) संघट्टन के दौरान अभिकारक अणुओं का अभिविन्यास
(2) दो भिन्न तापों पर वेग स्थिरांक
(3) मानक ताप पर वेग स्थिरांक
(4) संघट्टन की प्रायिकता

76 निम्नलिखित साम्यों में से किसमें K_p और K_c समान **नहीं** हैं ?

(1) $CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$
(2) $2\ BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$
(3) $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$
(4) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2\ HI_{(g)}$

77 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:

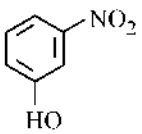
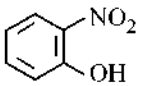
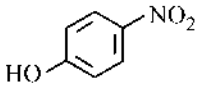
(1) A-II, B-III, C-I, D-IV
(2) A-III, B-IV, C-II, D-I
(3) A-II, B-IV, C-I, D-III
(4) A-III, B-IV, C-I, D-II

78 For the reaction $2A \rightleftharpoons B + C$, $K_c = 4\times10^{-3}$. At a given time, the composition of reaction mixture is : $[A] = [B] = [C] = 2\times10^{-3}M$.

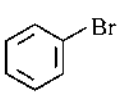
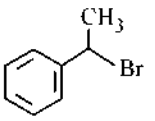
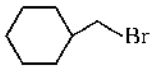
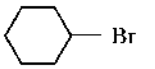
Then, which of the following is correct?

(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.

79 Intramolecular hydrogen bonding is present in

(1) 
(2) HF
(3) 
(4) 

80 The compound that will undergo S_N1 reaction with the fastest rate is

(1) 
(2) 
(3) 
(4) 

77 सूची I का सूची II के साथ मिलान कीजिए:

सूची I (रूपांतरण)	सूची II (आवश्यक फैराडे की संख्या)
A. H_2O के 1 मोल के O_2 में	I. 3F
B. MnO_4^- के 1 मोल के Mn^{2+} में	II. 2F
C. गलित $CaCl_2$ से Ca के 1.5 मोल	III. 1F
D. 1 मोल FeO से Fe_2O_3 में	IV. 5F

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:

(1) A-II, B-III, C-I, D-IV
(2) A-III, B-IV, C-II, D-I
(3) A-II, B-IV, C-I, D-III
(4) A-III, B-IV, C-I, D-II

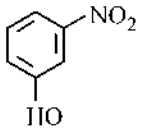
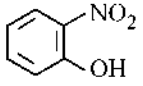
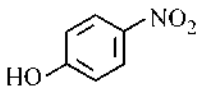
78 अभिक्रिया $2A \rightleftharpoons B + C$ के लिए $K_c = 4\times10^{-3}$ है। किसी दिए गए समय पर, अभिक्रिया मिश्रण का संघटन है:

$[A] = [B] = [C] = 2\times10^{-3}M$.

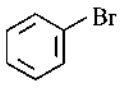
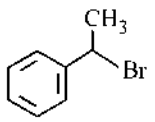
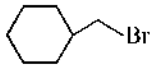
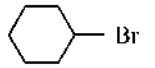
तब, निम्नलिखित में से कौन–सा सही है ?

(1) अभिक्रिया की पश्च दिशा में जाने की प्रवृत्ति है।
(2) अभिक्रिया अग्र दिशा में पूर्ण हो चुकी है।
(3) अभिक्रिया साम्य पर है।
(4) अभिक्रिया की अग्र दिशा में जाने की प्रवृत्ति है।

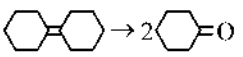
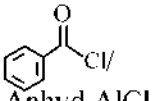
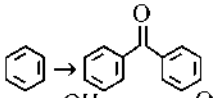
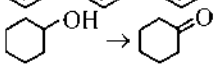
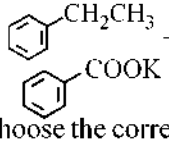
79 अंतः अणुक हाइड्रोजन आबंध किस में उपस्थित होता है ?

(1) 
(2) HF
(3) 
(4) 

80 वह यौगिक जो सबसे तीव्र वेग से S_N1 अभिक्रिया करेगा, है:

(1) 
(2) 
(3) 
(4) 

81 Match List I with List II.

List I (Reaction)	**List II (Reagents/ Condition)**
A. 	I. 
B. 	II. CrO_3
C. 	III. $KMnO_4$/ KOH, Δ
D. 	IV. (i) O_3 (ii) Zn-H_2O

Choose the correct answer from the options given below:
(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

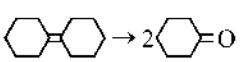
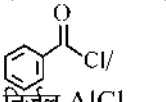
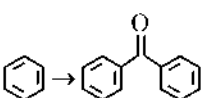
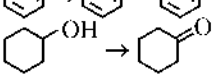
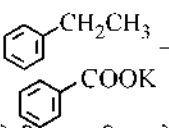
82 'Spin only' magnetic moment is same for which of the following ions?
A. Ti^{3+} B. Cr^{2+}
C. Mn^{2+} D. Fe^{2+}
E. Sc^{3+}
Choose the most appropriate answer from the options given below:
(1) B and C only (2) A and D only
(3) B and D only (4) A and E only

83 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

84 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) $-\frac{x}{9}$

85 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.

81 सूची I का सूची II के साथ मिलान कीजिए:

सूची I (अभिक्रिया)	**सूची II (अभिकर्मक/स्थिति)**
A. 	I. 
B. 	II. CrO_3
C. 	III. $KMnO_4$/ KOH, Δ
D. 	IV. (i) O_3 (ii) Zn-H_2O

नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:
(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

82 निम्नलिखित में से किन आयनों के लिए 'प्रचक्रण मात्र' चुंबकीय आघूर्ण समान होता है ?
A. Ti^{3+} B. Cr^{2+}
C. Mn^{2+} D. Fe^{2+}
E. Sc^{3+}
नीचे दिए गए विकल्पों से सबसे **सही** उत्तर चुनिए:
(1) केवल B और C (2) केवल A और D
(3) केवल B और D (4) केवल A और E

83 अणु सूत्र C_6H_{14} वाले एक यौगिक में दो तृतीयक कार्बन उपस्थित हैं। इसका आई.यू.पी.ए.सी. नाम है:
(1) 2,3-डाइमेथिलब्यूटेन
(2) 2,2-डाइमेथिलब्यूटेन
(3) n-हैक्सेन
(4) 2-मेथिलपेन्टेन

84 He^+ आयन की मूल अवस्था (n = 1) में किसी इलेक्ट्रॉन की ऊर्जा –x J है, तब Be^{3+} आयन की n = 2 अवस्था में उपस्थित इलेक्ट्रॉन के लिए J में ऊर्जा होती है:
(1) $-4x$ (2) $-\frac{4}{9}x$
(3) $-x$ (4) $-\frac{x}{9}$

85 नीचे दो कथन दिए गए है:
कथन I : समूह 16 तत्वों के हाइड्राइडों के क्वथनांक निम्नलिखित क्रम का पालन करते हैं:
$H_2O > H_2Te > H_2Se > H_2S$.
कथन II : आण्विक द्रव्यमान के आधार पर H_2O का अनुमानित क्वथनांक समूह के अन्य सदस्यों से कम होता है परंतु H_2O में विस्तृत H-आबंधन की उपस्थिति के कारण, इसका उच्चतर क्वथनांक होता है।
उपर दिए गए कथनों के आधार पर, नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:
(1) कथन I सही है परंतु कथन II गलत है।
(2) कथन I गलत है परंतु कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों गलत हैं।

Chemistry : Section-B (Q. No. 86 to 100)

86 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) 31.5 g (2) 0.0315 g
(3) 3.15 g (4) 0.315 g

87 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 = 32 u)
(1) AB_2C_2 (2) ABC_4
(3) A_2BC_2 (4) ABC_3

88 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.

$$2NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$$

If 0.1 mol L^{-1} of $NO_{(g)}$ is taken in a closed vessel, what will be degree of dissociation (α) of $NO_{(g)}$ at equilibrium?
(1) 0.8889 (2) 0.717
(3) 0.00889 (4) 0.0889

89 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) 413.14 calories (2) 100 calories
(3) 0 calorie (4) – 413.14 calories

90 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) H_3PO_4 and $POCl_3$
(2) H_3PO_3 and $POCl_3$
(3) $POCl_3$ and H_3PO_3
(4) $POCl_3$ and H_3PO_4

91 Given below are two statements :

Statement I : $\left[Co(NH_3)_6\right]^{3+}$ is a homoleptic complex whereas $\left[Co(NH_3)_4Cl_2\right]^{+}$ is a heteroleptic complex.

Statement II : Complex $\left[Co(NH_3)_6\right]^{3+}$ has only one kind of ligands but $\left[Co(NH_3)_4Cl_2\right]^{+}$ has more than one kind of ligands.
In the light of the above statements, choose the *correct* answer from the options given below:
(1) Statement I is true but Statement II is false.
(2) Statement I is false but Statement II is true.
(3) Both Statement I and Statement II are true.
(4) Both Statement I and Statement II are false.

86 कॉपर सल्फेट विलयन वाले किसी वोल्टमीटर से 100 सेकंड के लिए 9.6487 A विद्युत-धारा प्रवाहित करने पर निक्षेपित कॉपर का ग्राम में द्रव्यमान है:
(दिया गया है : Cu का मोलर द्रव्यमान :
63 g mol^{-1}, 1F = 96487 C)
(1) 31.5 g (2) 0.0315 g
(3) 3.15 g (4) 0.315 g

87 एक यौगिक X में A के 32%, B के 20% और शेष प्रतिशत C के हैं। तब X का मूलानुपाती सूत्र है:
(दिया गया है: आण्विक द्रव्यमान A = 64; B = 40; C = 32 u)
(1) AB_2C_2 (2) ABC_4
(3) A_2BC_2 (4) ABC_3

88 $N_2 = 3.0 \times 10^{-3}$ M, $O_2 = 4.2 \times 10^{-3}$ M और $NO = 2.8 \times 10^{-3}$ M सांद्रताओं के साथ किसी सीलबंद पात्र में निम्नलिखित साम्य पर विचार कीजिए:

$$2NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$$

यदि $NO_{(g)}$ के 0.1 mol L^{-1} को सीलबंद पात्र में लिया जाए, तो वियोजन मात्रा (α) क्या होगी ?
(1) 0.8889 (2) 0.717
(3) 0.00889 (4) 0.0889

89 25°C पर एक मोल हाइड्रोजन गैस के 20 ऐटमॉस्फियर दाब से 10 ऐटमॉस्फियर दाब तक उत्क्रमणीय समतापीय प्रसरण के दौरान किया गया कार्य है:
(दिया गया है: R = 2.0 cal K^{-1} mol^{-1})
(1) 413.14 calories (2) 100 calories
(3) 0 calorie (4) – 413.14 calories

90 निम्नलिखित अभिक्रियाओं में बने उत्पाद, A और B क्रमशः हैं:
$3ROH + PCl_3 \rightarrow 3RCl + A$
$ROH + PCl_5 \rightarrow RCl + HCl + B$
(1) H_3PO_4 एवं $POCl_3$
(2) H_3PO_3 एवं $POCl_3$
(3) $POCl_3$ एवं H_3PO_3
(4) $POCl_3$ एवं H_3PO_4

91 नीचे दो कथन दिए गए है:

कथन I : $\left[Co(NH_3)_6\right]^{3+}$ एक होमोलेप्टिक संकुल है जबकि $\left[Co(NH_3)_4Cl_2\right]^{+}$ एक हेटेरोलेप्टिक संकुल है।

कथन II : संकुल $\left[Co(NH_3)_6\right]^{3+}$ में केवल एक प्रकार के लिगन्ड हैं जबकि $\left[Co(NH_3)_4Cl_2\right]^{+}$ में एक से अधिक प्रकार के लिगन्ड हैं।
उपर दिए गए कथनों के आधार पर, नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:
(1) कथन I सही है परंतु कथन II गलत है।
(2) कथन I गलत है परंतु कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों गलत हैं।

92 Identify the major product C formed in the following reaction sequence :

$$CH_3-CH_2-CH_2-I \xrightarrow{NaCN} A$$

$$\xrightarrow[\text{Partial hydrolysis}]{OH^-} B \xrightarrow[Br_2]{NaOH} \underset{(\text{major})}{C}$$

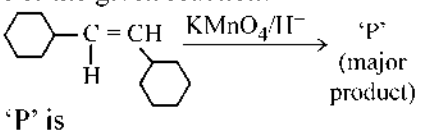
(1) butanamide
(2) α – bromobutanoic acid
(3) propylamine
(4) butylamine

93 During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis of Fe^{2+} ion?
(1) dilute nitric acid
(2) dilute sulphuric acid
(3) dilute hydrochloric acid
(4) concentrated sulphuric acid

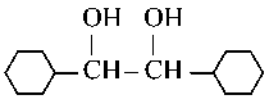
94 Identify the **correct** answer.
(1) Dipole moment of NF_3 is greater than that of NH_3.
(2) Three canonical forms can be drawn for CO_3^{2-} ion.
(3) Three resonance structures can be drawn for ozone.
(4) BF_3 has non-zero dipole moment.

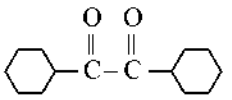
95 Given below are certain cations. Using inorganic qualitative analysis, arrange them in increasing group number from 0 to VI.
A. Al^{3+} B. Cu^{2+}
C. Ba^{2+} D. Co^{2+}
E. Mg^{2+}
Choose the correct answer from the options given below:
(1) E, C, D, B, A (2) E, A, B, C, D
(3) B, A, D, C, E (4) B, C, A, D, E

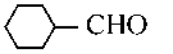
96 For the given reaction:

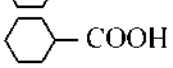


'P' is

(1) 

(2) 

(3) 

(4) 

92 निम्नलिखित अभिक्रिया क्रम में बना मुख्य उत्पाद C है:

$$CH_3-CH_2-CH_2-I \xrightarrow{NaCN} A$$

$$\xrightarrow[\text{आंशिक जलापघटन}]{OH^-} B \xrightarrow[Br_2]{NaOH} \underset{(\text{मुख्य})}{C}$$

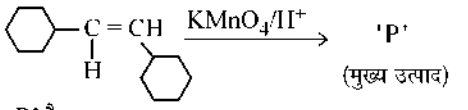
(1) ब्यूटेनैमाइड
(2) α – ब्रोमोब्यूटेनोइक अम्ल
(3) प्रोपिलऐमीन
(4) ब्यूटिलऐमीन

93 मोर लवण विलयन (फेरस अमोनियम सल्फेट) के विरचन के दौरान, निम्नलिखित में से किस अम्ल को Fe^{2+} आयन के जलापघटन को रोकने के लिए मिलाया जाता है ?
(1) तनु नाइट्रिक अम्ल
(2) तनु सल्फ्यूरिक अम्ल
(3) तनु हाइड्रोक्लोरिक अम्ल
(4) सांद्र सल्फ्यूरिक अम्ल

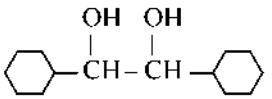
94 सही उत्तर चुनिए:
(1) NF_3 का द्वि–ध्रुव आघूर्ण NH_3 के द्वि–ध्रुव आघूर्ण से अधिक होता है।
(2) CO_3^{2-} आयन के लिए तीन विहित रूप आरेखित किए जा सकते हैं।
(3) ओज़ोन के लिए तीन अनुनाद संरचनाएँ आरेखित की जा सकती हैं।
(4) BF_3 का शून्येतर द्वि–ध्रुव आघूर्ण होता है।

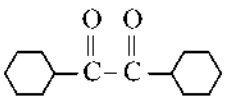
95 नीचे कुछ धनायन दिए गए हैं। अकार्बनिक गुणात्मक विश्लेषण के उपयोग द्वारा, उन्हें बढ़ती समूह संख्या 0 से VI तक में व्यवस्थित कीजिए:
A. Al^{3+} B. Cu^{2+}
C. Ba^{2+} D. Co^{2+}
E. Mg^{2+}
नीचे दिए गए विकल्पों से **सही** उत्तर चुनिए:
(1) E, C, D, B, A (2) E, A, B, C, D
(3) B, A, D, C, E (4) B, C, A, D, E

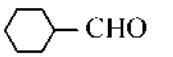
96 दी गई अभिक्रिया के लिए:

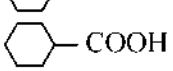


'P' है:

(1) 

(2) 

(3) 

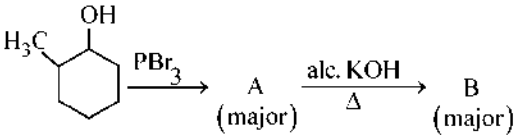
(4) 

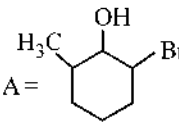
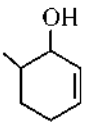
97 The pair of lanthanoid ions which are diamagnetic is

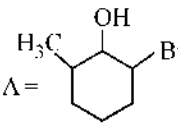
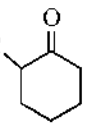
(1) Gd^{3+} and Eu^{3+} (2) Pm^{3+} and Sm^{3+}

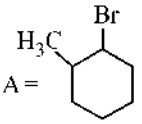
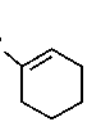
(3) Ce^{4+} and Yb^{2+} (4) Ce^{3+} and Eu^{2+}

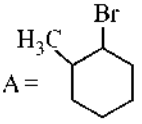
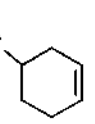
98 Major products A and B formed in the following reaction sequence, are



(1) A =  ; B = 

(2) A =  ; B = 

(3) A =  ; B = 

(4) A =  ; B = 

99 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

100 The rate of a reaction quadruples when temperature changes from 27°C to 57°C. Calculate the energy of activation.
Given R = 8.314 J K^{-1} mol^{-1}, log 4 = 0.6021

(1) 3.80 kJ/mol (2) 3804 kJ/mol

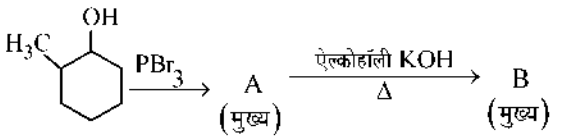
(3) 38.04 kJ/mol (4) 380.4 kJ/mol

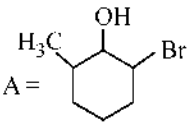
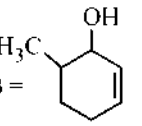
97 लैन्थेनॉयड आयनों का वह युगल जो प्रतिचुंबकीय हैं, है:

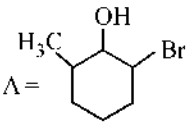
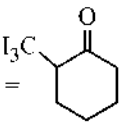
(1) Gd^{3+} और Eu^{3+} (2) Pm^{3+} और Sm^{3+}

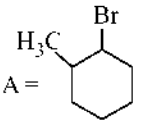
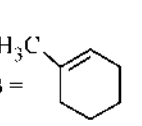
(3) Ce^{4+} और Yb^{2+} (4) Ce^{3+} और Eu^{2+}

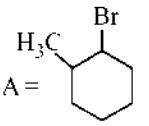
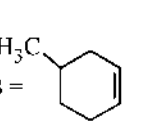
98 निम्नलिखित अभिक्रिया क्रम में बने मुख्य उत्पाद, A और B हैं:



(1) A =  ; B = 

(2) A =  ; B = 

(3) A =  ; B = 

(4) A =  ; B = 

99 किसी विलयन के लिए परासरण दाब (Π) और सांद्रता (मोल लीटर$^{-1}$ में) के बीच आलेख एक ऋजु रेखा देता है जिसकी ढ़ाल 25.73 L bar mol^{-1} है। वह ताप जिस पर परासरण दाब मापा गया है, है:

(R = 0.083 L bar mol^{-1} K^{-1} लीजिए)

(1) 25.73°C (2) 12.05°C

(3) 37°C (4) 310°C

100 जब ताप को 27°C से 57°C परिवर्तित किया जाता है तब किसी अभिक्रिया का वेग चार गुना हो जाता है। सक्रियण ऊर्जा परिकलित कीजिए।

दिया गया है: R = 8.314 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

Botany : Section-A (Q. No. 101 to 135)

101 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

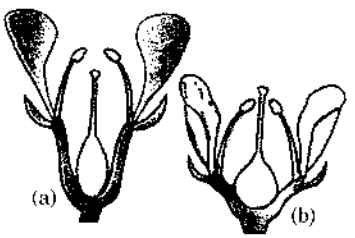
102 Match List I with List II

	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

Choose the correct answer from the options given below:
(1) A-III, B-IV, C-II, D-I
(2) A-I, B-II, C-III, D-IV
(3) A-III, B-II, C-IV, D-I
(4) A-II, B-III, C-I, D-IV

103 Tropical regions show greatest level of species richness because
A. Tropical latitudes have remained relatively undisturbed for millions of years, hence more time was available for species diversification.
B. Tropical environments are more seasonal.
C. More solar energy is available in tropics.
D. Constant environments promote niche specialization.
E. Tropical environments are constant and predictable.
Choose the correct answer from the options given below:
(1) A, B and E only
(2) A, B and D only
(3) A, C, D and E only
(4) A and B only

104 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

101 निम्नलिखित में से कौन सा कवकों के वर्गीकरण का एक मानदंड नहीं है ?
(1) बीजाणु निर्माण का तरीका
(2) फलन काया
(3) कवकजाल (माइसीलियम) की आकारिकी
(4) पोषण की विधि

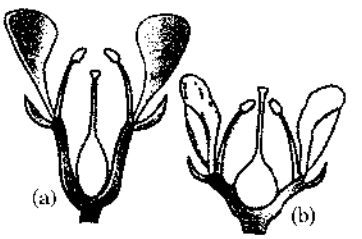
102 सूची I का सूची II से मिलान कीजिए:

	सूची I		सूची II
A.	न्यूक्लीओलस (केन्द्रिक)	I.	ग्लाइकोलिपिड के बनने का स्थल
B.	सेन्ट्रिओल	II.	गाड़ी के पहिए जैसा संगठन
C.	ल्यूकोप्लास्ट	III.	सक्रिय राइबोसोमी आरएनए संश्लेषण का स्थल
D.	गॉल्जी उपकरण	IV.	पोषकों के भंडारण के लिए

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:
(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

103 उष्णकटिबंधी क्षेत्र (ट्रोपिक्स) उच्चतम स्तर की जाति बहुलता को प्रदर्शित करते हैं, क्योंकि
A. उष्णकटिबंधीय अक्षांश लाखों वर्षों तक अपेक्षाकृत अविक्षुब्ध रहे हैं, अतः जाति विविधीकरण के लिए अधिक समय उपलब्ध था।
B. उष्णकटिबंधीय पर्यावरण में अधिक मौसम/ऋतुएं होती हैं।
C. उष्णकटिबंधी क्षेत्रों में अधिक सौर ऊर्जा उपलब्ध होती है।
D. स्थिर पर्यावरण निकेत विशिष्टीकरण को बढ़ावा देता है।
E. उष्णकटिबंधीय पर्यावरण स्थिर और पूर्वसूचनीय होते हैं।
नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:
(1) केवल A, B और E
(2) केवल A, B और D
(3) केवल A, C, D और E
(4) केवल A और B

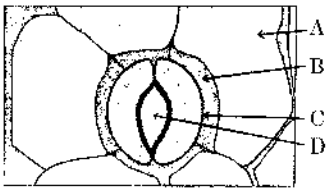
104 दिए गए चित्रों (a) और (b) से अंडाशय के संदर्भ में बाह्यदलपुंज (कैलिक्स), दलपुंज (कोरोला) और पुमंग (एन्ड्रोशियम) की स्थिति के आधार पर पुष्पों के प्रकार को पहचानिए।



(1) (a) परिजायांगी (b) जायांगोपरिक
(2) (a) परिजायांगी (b) परिजायांगी
(3) (a) जायांगोपरिक (b) जायांगाधर
(4) (a) जायांगाधर (b) जायांगोपरिक

105 Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:
(1) Competitive inhibition
(2) Enzyme activation
(3) Cofactor inhibition
(4) Feedback inhibition

106 In the given figure, which component has thin outer walls and highly thickened inner walls?



(1) A (2) B
(3) C (4) D

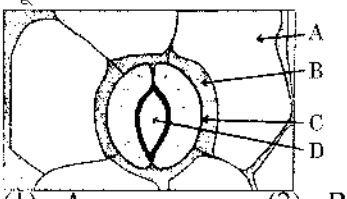
107 The type of conservation in which the threatened species are taken out from their natural habitat and placed in special setting where they can be protected and given special care is called;
(1) Semi-conservative method
(2) Sustainable development
(3) *in-situ* conservation
(4) Biodiversity conservation

108 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.
Choose the correct answer from the options given below:
(1) B, C and D only
(2) A, B, C, D and E
(3) A, B and C only
(4) A, C, D and E only

109 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.

105 मेलोनेट द्वारा सक्सीनिक डीहाइड्रोजिनेस एन्जाइम का संदमन _____ का उत्कृष्ट उदाहरण है।
(1) प्रतिस्पर्धी संदमन
(2) एन्जाइम सक्रियन
(3) कोफैक्टर (सहकारक) संदमन
(4) फीडबैक संदमन

106 दिए गए चित्र में, किस संघटक में पतली बाह्य भित्ति और अत्यधिक स्थूलित भीतरी भित्तियां होती हैं ?



(1) A (2) B
(3) C (4) D

107 संरक्षण का वह प्रकार जिसमें विलोपोन्मुखी जाति को उनके प्राकृतिक पर्यावास से बाहर निकालकर विशेष व्यवस्था (सेटिंग) में रखा जाता है जहां वे सुरक्षित रह सकती है और उनकी विशेष देखभाल की जाती है, वह कहलाता है:
(1) अर्ध–संरक्षी विधि
(2) सतत विकास/दीर्घोपयोगी विकास
(3) स्वस्थाने संरक्षण
(4) जैवविविधता संरक्षण

108 निम्नलिखित में से किनकी मेन्डल के प्रभाविता के नियम के आधार पर व्याख्या की जा सकती है ?
A. फैक्टर के एक जोड़े में से एक प्रभावी और दूसरा अप्रभावी होता है ?
B. एलील कोई अभिव्यक्ति प्रदर्शित नहीं करते हैं और F_2 पीढ़ी में दोनों गुण उसी रुप में प्रकट हो जाते हैं।
C. सामान्य द्विगुणित पादपों में फैक्टर जोड़ों में पाए जाते हैं।
D. किसी गुण विशेष को नियंत्रित करने वाली विविक्त इकाई फैक्टर कहलाती है।
E. एकलसंकर संकरण में केवल एक जनक के गुण की अभिव्यक्ति होती है।
नीचे दिए गए विकल्पों में से सही उत्तर को चुनिए:
(1) केवल B, C और D
(2) A, B, C, D और E
(3) केवल A, B और C
(4) केवल A, C, D और E

109 खरपतवार–मुक्त बगीचा निर्मित करने के लिए माली ऑक्सिन का उपयोग करते हैं। लेकिन इससे घास की कोई क्षति नहीं होती है क्योंकि ऑक्सिन:
(1) वयस्क एकबीजपत्री पादपों को प्रभावित नहीं करता है।
(2) घासों में कोशिका विभाजन में सहायक हो सकता है जिससे वृद्धि हो सके।
(3) शीर्ष प्रभाविता को प्रोत्साहित करता है।
(4) केवल परिपक्व पत्तियों के विलगन को ही प्रोत्साहित करता है।

110 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) Inducer, Repressor, Structural gene
(2) Promotor, Structural gene, Terminator
(3) Repressor, Operator gene, Structural gene
(4) Structural gene, Transposons, Operator gene

111 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

112 In a plant, black seed color (BB/Bb) is dominant over white seed color (bb). In order to find out the genotype of the black seed plant, with which of the following genotype will you cross it?
(1) Bb (2) BB/Bb
(3) BB (4) bb

113 The capacity to generate a whole plant from any cell of the plant is called:
(1) Differentiation
(2) Somatic hybridization
(3) Totipotency
(4) Micropropagation

114 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

115 The equation of Verhulst-Pearl logistic growth is $\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$.
From this equation, K indicates:
(1) Carrying capacity
(2) Population density
(3) Intrinsic rate of natural increase
(4) Biotic potential

110 डीएनए (DNA) में अनुलेखन (ट्रांसक्रिप्शन) इकाई को प्राथमिक रूप से डीएनए के तीन क्षेत्रों द्वारा निर्धारित किया जाता है और ये ऊर्ध्वप्रवाही (अपस्ट्रीम) और अधोप्रवाही (डाउन स्ट्रीम) सिरों के संदर्भ में/सापेक्ष हैं:
(1) इंड्यूसर (विप्रेरक), संदमक (रिप्रैसर), संरचनात्मक जीन
(2) प्रमोटर, संरचनात्मक जीन, समापक (टर्मिनेटर)
(3) संदमक (रिप्रैसर), प्रचालक (ऑपरेटर) जीन, संरचनात्मक जीन
(4) संरचनात्मक जीन, ट्रांसपोसोन, प्रचालक (ऑपरेटर) जीन

111 जीवाणुओं के वृद्धि माध्यम में उपस्थित लैक्टोस को कोशिका में _____ की क्रिया द्वारा अभिगमित किया जाता है।
(1) परमिएस
(2) पोलीमरेस
(3) बीटा–गैलेक्टोसाइडेस
(4) एसिटिलेस

112 एक पादप में, बीज का काला रंग (BB/Bb) सफेद रंग (bb) पर प्रभावी हैं। काले बीज वाले पादप का जीनप्ररुप ज्ञात करने के लिए, आप उसका संकरण निम्नलिखित में से किस जीनप्ररुप के पादप के साथ कराएंगे ?
(1) Bb (2) BB/Bb
(3) BB (4) bb

113 पादप की किसी भी कोशिका से पूर्ण पादप को विकसित करने की क्षमता कहलाती है:
(1) विभेदन
(2) कायिक संकरण
(3) पूर्णशक्तता (टोटीपोटेन्सी)
(4) सूक्ष्मप्रवर्धन (माइक्रोप्रोपेगेशन)

114 इनको जैवविविधता की हानि के मुख्य कारण माना जाता है:
A. अतिदोहन
B. सह–विलुप्ति
C. उत्परिवर्तन
D. पर्यावास हानि और खंडीभवन
E. प्रवासन
सही विकल्प को चुनिए:
(1) केवल A, B और E
(2) केवल A, B और D
(3) केवल A, C और D
(4) केवल A, B, C और D

115 वेरहल्स्ट–पर्ल वृद्धिघात वृद्धि (लॉजिस्टिक ग्रोथ) का समीकरण है $\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$.
इस समीकरण में K चिह्नित करता है:
(1) धारण क्षमता
(2) जनसंख्या घनत्व
(3) प्राकृतिक वृद्धि की नैज दर
(4) जैविक क्षमता

116 Given below are two statements:
Statement I : Chromosomes become gradually visible under light microscope during leptotene stage.
Statement II : The begining of diplotene stage is recognized by dissolution of synaptonemal complex.
In the light of the above statements, choose the correct answer from the options given below:
(1) Statement I is true but Statement II is false
(2) Statement I is false but Statement II is true
(3) Both Statement I and Statement II are true
(4) Both Statement I and Statement II are false

117 Formation of interfascicular cambium from fully developed parenchyma cells is an example for
(1) Dedifferentiation
(2) Maturation
(3) Differentiation
(4) Redifferentiation

118 The cofactor of the enzyme carboxypeptidase is:
(1) Flavin (2) Haem
(3) Zinc (4) Niacin

119 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.

120 Match List I with List II

	List I		**List II**
A.	*Clostridium butylicum*	I.	Ethanol
B.	*Saccharomyces cerevisiae*	II.	Streptokinase
C.	*Trichoderma polysporum*	III.	Butyric acid
D.	*Streptococcus* sp.	IV.	Cyclosporin-A

Choose the correct answer from the options given below:
(1) A-III, B-I, C-IV, D-II
(2) A-IV, B-I, C-III, D-II
(3) A-III, B-I, C-II, D-IV
(4) A-II, B-IV, C-III, D-I

121 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

116 नीचे दो कथन दिए गए हैं:
कथन I : लेप्टोटीन चरण/अवस्था के दौरान प्रकाश सूक्ष्मदर्शी से देखने पर गुणसूत्र (क्रोमोसोम) क्रमिक रूप से दिखाई देने लगते हैं।
कथन II : डिप्लोटीन चरण/अवस्था के आरंभ की पहचान सिनेप्टोनीमल कॉम्प्लैक्स के वियोजन से होती है।
उपर्युक्त कथनों के आलोक में, दिए गए विकल्पों में से **सही** उत्तर को चुनिए:
(1) कथन I सत्य है लेकिन कथन II असत्य है।
(2) कथन I असत्य है लेकिन कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों असत्य हैं।

117 पूर्णत: विकसित मृदूतकी कोशिकाओं से अंतरापूलीय कैम्बियम का बनना _____ का एक उदाहरण है।
(1) निर्विभेदन
(2) परिपक्वन
(3) विभेदन
(4) पुनर्विभेदन

118 एन्जाइम कार्बोक्सिपेप्टिडेस का सहकारक (कोफैक्टर) है:
(1) फ्लेविन (2) हीम
(3) जिंक (4) निआसिन

119 आवर्धत्वक कोशिकाएं (बुलीफॉर्म सेल) उत्तरदायी होती हैं:
(1) एकबीजपत्रियों (मोनोकोट्स) में वर्धित प्रकाश संश्लेषण के लिए।
(2) शर्कराओं के भंडारण के लिए अधिक स्थान प्रदान करने के लिए।
(3) एकबीजपत्रियों (मोनोकोट्स) में पत्तियों के अंदर की ओर मुड़ने के लिए।
(4) पादप को लवण तनाव से बचाने के लिए।

120 सूची I का सूची II से मिलान कीजिए:

	सूची I		**सूची II**
A.	*क्लोस्ट्रीडियम ब्यूटाइलिकम*	I.	एथेनॉल
B.	*सैकेरोमाइसीज सेरेविसी*	II.	स्ट्रेप्टोकाइनेस
C.	*ट्राइकोडर्मा पोलीस्पोरम*	III.	ब्यूटाइरिक अम्ल
D.	*स्ट्रेप्टोकॉकस स्पी.*	IV.	साइक्लोस्पोरिन-A

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:
(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

121 एक गुलाबी पुष्पों वाले स्नेपड्रैगन के पौधे का लाल पुष्पों वाले स्नेपड्रैगन के पौधे के साथ संकरण कराया गया। संतति में किस प्रकार के लक्षणप्ररुप के होने की उम्मीद की जाती है ?
(1) केवल गुलाबी पुष्प वाले पौधे
(2) लाल, गुलाबी के साथ ही सफेद पुष्प वाले पौधे
(3) केवल लाल पुष्प वाले पौधे
(4) दोनों लाल और गुलाबी पुष्प वाले पौधे

122 Given below are two statements:
Statement I : Bt toxins are insect group specific and coded by a gene *cry* IAc.
Statement II : Bt toxin exists as inactive protoxin in *B. thuringiensis*. However, after ingestion by the insect the inactive protoxin gets converted into active form due to acidic pH of the insect gut.
In the light of the above statements, choose the correct answer from the options given below:
(1) Statement I is true but Statement II is false
(2) Statement I is false but Statement II is true
(3) Both Statement I and Statement II are true
(4) Both Statement I and Statement II are false

123 Identify the set of correct statements:
A. The flowers of *Vallisneria* are colourful and produce nectar.
B. The flowers of waterlily are not pollinated by water.
C. In most of water-pollinated species, the pollen grains are protected from wetting.
D. Pollen grains of some hydrophytes are long and ribbon like.
E. In some hydrophytes, the pollen grains are carried passively inside water.
Choose the correct answer from the options given below:
(1) A, C, D and E only
(2) B, C, D and E only
(3) C, D and E only
(4) A, B, C and D only

124 Spindle fibers attach to kinetochores of chromosomes during
(1) Anaphase (2) Telophase
(3) Prophase (4) Metaphase

125 Match List I with List II

List I		List II
A. Two or more alternative forms of a gene	I.	Back cross
B. Cross of F_1 progeny with homozygous recessive parent	II.	Ploidy
C. Cross of F_1 progeny with any of the parents	III.	Allele
D. Number of chromosome sets in plant	IV.	Test cross

Choose the correct answer from the options given below:
(1) A-III, B-IV, C-I, D-II
(2) A-IV, B-III, C-II, D-I
(3) A-I, B-II, C-III, D-IV
(4) A-II, B-I, C-III, D-IV

122 नीचे दो कथन दिए गए है:
कथन I : Bt आविष (टॉक्सिन) कीट समूह विशिष्ट होते हैं और इनको जीन *cry* IAc द्वारा कूटलेखित (कोड) किया जाता है।
कथन II : Bt आविष (टॉक्सिन) *बी–थूरिन्जिएन्सिस* में निष्क्रिय प्राक्‌विष (प्रोटोटॉक्सिन) के रूप में पाए जाते हैं। यद्यपि, कीट द्वारा ग्रहण किए जाने के बाद निष्क्रिय प्राक्‌विष (प्रोटोटॉक्सिन) कीट की आंत में अम्लीय pH होने के कारण सक्रिय रुप में परिवर्तित हो जाते हैं।
उपर्युक्त कथनों के आलोक में नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:
(1) कथन I सत्य है लेकिन कथन II असत्य है।
(2) कथन I असत्य है लेकिन कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों असत्य हैं।

123 सही कथनों के सेट को पहचानिए:
A. *वैलिसनेरिया* के पुष्प रंगीन होते हैं और मकरंद निर्मित करते हैं।
B. वाटरलिली (जलकुमुदनी) के पुष्प जल द्वारा परागित नहीं होते हैं।
C. अधिकांश जल–परागित स्पीशीज़ में, परागकण गीले होने से संरक्षित (बचे) रहते हैं।
D. कुछ जलोद्‌भिदों (हाइड्रोफाइट्स) के परागकण लंबे और फीते (रिबन) जैसे होते हैं।
E. कुछ जलोद्‌भिदों (हाइड्रोफाइट्स) में, परागकणों को जल के अंदर ही निष्क्रिय रूप से ले जाया जाता है।
नीचे दिए गए विकल्पों में से सही उत्तर को चुनिए:
(1) केवल A, C, D और E
(2) केवल B, C, D और E
(3) केवल C, D और E
(4) केवल A, B, C और D

124 _____ के समय स्पिंडल फाइबर्स गुणसूत्र के काइनेटोकोर से जुड़ जाते हैं।
(1) पश्चावस्था (एनाफेज़) (2) अंत्यावस्था (टेलोफेज़)
(3) पूर्वावस्था (प्रोफेज़) (4) मध्यावस्था (मेटाफेज़)

125 सूची I का सूची II से मिलान कीजिए:

सूची I		सूची II
A. एक जीन के दो या अधिक वैकल्पिक संरूप	I.	प्रतीप संकरण (बैक क्रॉस)
B. F_1 संतति का समयुग्मजी अप्रभावी जनक के साथ संकरण	II.	सूत्रगुणता (प्लोइडी)
C. F_1 संतति का किसी भी जनक के साथ संकरण	III.	एलील
D. पादप में गुणसूत्र सेटों की संख्या	IV.	परीक्षणार्थ संकरण (टेस्ट क्रॉस)

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:
(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

126 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-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

127 Given below are two statements:

Statement I : Parenchyma is living but collenchyma is dead tissue.

Statement II : Gymnosperms lack xylem vessels but presence of xylem vessels is the characteristic of angiosperms.

In the light of the above statements, choose the correct answer from the options given below:

(1) Statement I is true but Statement II is false
(2) Statement I is false but Statement II is true
(3) Both Statement I and Statement II are true
(4) Both Statement I and Statement II are false

128 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

129 List of endangered species was released by-

(1) FOAM (2) IUCN
(3) GEAC (4) WWF

130 Lecithin, a small molecular weight organic compound found in living tissues, is an example of:

(1) Glycerides (2) Carbohydrates
(3) Amino acids (4) Phospholipids

131 Which of the following is an example of actinomorphic flower?

(1) *Pisum* (2) *Sesbania*
(3) *Datura* (4) *Cassia*

126 सूची I का सूची II से मिलान कीजिए:

सूची I		सूची II
A.	*राइजोपस*	I. मशरूम
B.	*अस्टीलेगो*	II. स्मट (कंड) कवक
C.	*पक्सीनिया*	III. डबल रोटी का फफूंद
D.	*एगारिकस*	IV. रस्ट (किट्ट) कवक

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(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

127 नीचे दो कथन दिए गए हैं:

कथन I : मृदूतक सजीव लेकिन श्लेषोतक मृत ऊतक है।

कथन II : जिम्नोस्पर्म्स (अनावृतबीजियों) में दारू वाहिकाएं नहीं होती हैं लेकिन दारू वाहिकाओं की उपस्थिति एन्जियोस्पर्म्स (आवृतबीजियों) की विशेषता है।

उपर्युक्त कथनों के आलोक में, दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(1) कथन I सत्य है लेकिन कथन II असत्य है।
(2) कथन I असत्य है लेकिन कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों असत्य हैं।

128 केल्विन चक्र में यौगिकीकृत होने वाले CO_2 के प्रत्येक अणु के लिए ATP और NADPH के कितने अणुओं की आवश्यकता होती है ?

(1) ATP के तीन अणु और NADPH के 3 अणु
(2) ATP के तीन अणु और NADPH के 2 अणु
(3) ATP के दो अणु और NADPH के 3 अणु
(4) ATP के दो अणु और NADPH के 2 अणु

129 संकटापन्न (एनडेन्जर्ड) स्पीशीज की सूची _____ के द्वारा निकाली गई थी।

(1) FOAM (2) IUCN
(3) GEAC (4) WWF

130 सजीव ऊतकों में पाया जाने वाला एक अल्प अणु भार का कार्बनिक यौगिक लेसीथिन _____ का एक उदाहरण है।

(1) ग्लिसराइड (2) कार्बोहाइड्रेट
(3) ऐमीनो अम्ल (4) फोस्फोलिपिड

131 निम्नलिखित में से कौन सा त्रिज्यासममित (एक्टीनोमोर्फिक) पुष्प का एक उदाहरण है ?

(1) *पाइसम* (2) *सेस्बेनिया*
(3) *डाटूरा* (4) *कैसिया*

132 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) B and C only (2) A and E only
(3) A and B only (4) D and E only

133 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

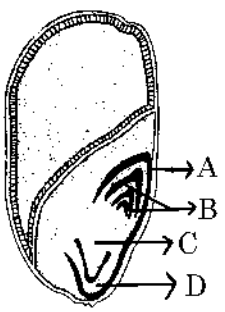
134 Which of the following are required for the dark reaction of photosynthesis?

A. Light B. Chlorophyll
C. CO_2 D. ATP
E. NADPH

Choose the correct answer from the options given below:

(1) C, D and E only
(2) D and E only
(3) A, B and C only
(4) B, C and D only

135 Identify the part of the seed from the given figure which is destined to form root when the seed germinates.



(1) C (2) D
(3) A (4) B

132 उस डीएनए खंड की क्या नियति होगी जो सिर्फ एक ऐसे वांछित जीन को धारण किए हो, जिसे किसी विजातीय जीव में स्थानांतरित किया जाना है ?

A. DNA का खंड जीव की संतति कोशिकाओं में स्वतंत्र रूप से गुणन करने में सक्षम होगा।
B. यह ग्राही के जीनोम में समेकित हो सकता है।
C. ये गुणन करके परपोषी (होस्ट) डीएनए के साथ वंशागति कर सकता है।
D. DNA का विजातीय खंड गुणसूत्र का अभिन्न भाग नहीं होता है।
E. ये प्रतिकृति करने की क्षमता प्रदर्शित करता है।

नीचे दिए गए विकल्पों में से सही उत्तर को चुनिए:

(1) केवल B और C (2) केवल A और E
(3) केवल A और B (4) केवल D और E

133 Hind II डीएनए अणुओं को सदैव एक नियत बिंदु पर काटता है जिसे अभिज्ञेय अनुक्रम (रिकगनीशन सीक्वेन्स) कहते हैं, और इसमें होते हैं:

(1) 4 bp (2) 10 bp
(3) 8 bp (4) 6 bp

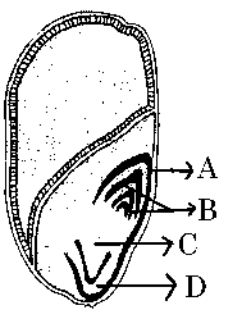
134 प्रकाशसंश्लेषण की अदीप्त अभिक्रिया के लिए निम्नलिखित में से किनकी आवश्यकता होती है ?

A. प्रकाश B. क्लोरोफिल (पर्णहरित)
C. CO_2 D. ATP
E. NADPH

नीचे दिए गए विकल्पों में से सही उत्तर को चुनिए:

(1) केवल C, D और E
(2) केवल D और E
(3) केवल A, B और C
(4) केवल B, C और D

135 दिए गए चित्र में बीज के उस भाग की पहचान कीजिए जो बीज के अंकुरित होने पर जड़ को बनाता है:



(1) C (2) D
(3) A (4) B

Botany : Section-B (Q. No. 136 to 150)

136 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) $\frac{100x}{3x}\,(kcal\,m^{-2})\,yr^{-1}$

(3) $\frac{x}{10}\,(kcal\,m^{-2})\,yr^{-1}$

(4) $x\,(kcal\,m^{-2})\,yr^{-1}$

137 Match List I with List II

	List I		**List II**
A.	Citric acid cycle	I.	Cytoplasm
B.	Glycolysis	II.	Mitochondrial matrix
C.	Electron transport system	III.	Intermembrane space of mitochondria
D.	Proton gradient	IV.	Inner mitochondrial membrane

Choose the correct answer from the options given below:

(1) A-III, B-IV, C-I, D-II
(2) A-IV, B-III, C-II, D-I
(3) A-I, B-II, C-III, D-IV
(4) A-II, B-I, C-IV, D-III

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

Choose the correct answer from the options given below:

(1) A-I, B-II, C-IV, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-IV, B-II, C-I, D-III
(4) A-IV, B-I, C-II, D-III

139 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) 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

136 किसी पारिस्थितिक तंत्र (ईकोसिस्टम) में यदि पृथम पोषी स्तर का नेट प्राथमिक उत्पादन (NPP) $100x\,(kcal\,m^{-2})$ प्रतिवर्ष है। तब उसी पारिस्थितिक तंत्र के तृतीय पोषी स्तर का GPP (सकल प्राथमिक उत्पादन) क्या होगा ?

(1) $10x\,(kcal\,m^{-2})$ प्रतिवर्ष

(2) $\frac{100x}{3x}\,(kcal\,m^{-2})$ प्रतिवर्ष

(3) $\frac{x}{10}\,(kcal\,m^{-2})$ प्रतिवर्ष

(4) $x\,(kcal\,m^{-2})$ प्रतिवर्ष

137 सूची I का सूची II से मिलान कीजिए:

	सूची I		**सूची II**
A.	साइट्रिक अम्ल–चक्र	I.	कोशिकाद्रव्य
B.	ग्लाइकोलिसिस	II.	माइटोकॉन्ड्रिया मैट्रिक्स
C.	इलैक्ट्रोन अभिगमन तंत्र/इलैक्ट्रोन ट्रांसपोर्ट सिस्टम	III.	माइटोकॉन्ड्रिया का अन्तराझिल्ली (इन्टरमेम्ब्रेन) अवकाश
D.	प्रोटोन प्रवणता	IV.	भीतरी माइटोकॉन्ड्रिया झिल्ली

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(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

138 सूची I का सूची II से मिलान कीजिए:

	सूची I (पुंकेसर के प्रकार)		**सूची II (उदाहरण)**
A.	एकलसंघी (मोनोएडेल्फस)	I.	सिट्रस
B.	द्विसंघी (डाइएडेल्फस)	II.	मटर
C.	बहुसंघी (पोलीएडेल्फस)	III.	लिली
D.	अधिपर्णी/परिदल लग्न	IV.	चाईना रोज/गुड़हल

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(1) A-I, B-II, C-IV, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-IV, B-II, C-I, D-III
(4) A-IV, B-I, C-II, D-III

139 नीचे दो कथन दिए गए है:

कथन I : C_3 पादपों में, कुछ O_2 रूबिस्को (RuBisCO) से बद्ध हो जाती है, अतः CO_2 यौगिकीकरण कम हो जाता है।

कथन II : C_4 पादपों में, पर्णमध्योतक कोशिकाएं बहुत कम प्रकाशश्वसन प्रदर्शित करती हैं जबकि पूलाच्छद कोशिकाएं प्रकाशश्वसन प्रदर्शित नहीं करती हैं।

उपर्युक्त कथनों के आलोक में, दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(1) कथन I सत्य है लेकिन कथन II असत्य है।
(2) कथन I असत्य है लेकिन कथन II सत्य है।
(3) कथन I और कथन II दोनों सत्य हैं।
(4) कथन I और कथन II दोनों असत्य हैं।

140 Which of the following statement is correct regarding the process of replication in *E.coli*?

(1) The DNA dependent DNA polymerase catalyses polymerization in 5' → 3' as well as 3' → 5' direction.

(2) The DNA dependent DNA polymerase catalyses polymerization in 5' → 3' direction.

(3) The DNA dependent DNA polymerase catalyses polymerization in one direction that is 3' → 5'.

(4) The DNA dependent RNA polymerase catalyses polymerization in one direction, that is 5' → 3'.

141 Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae,

A. Asexual reproduction occurs usually by biflagellate zoospores.

B. Sexual reproduction is by oogamous method only.

C. Stored food is in the form of carbohydrates which is either mannitol or laminarin.

D. The major pigments found are chlorophyll a, c and carotenoids and xanthophyll.

E. Vegetative cells have a cellulosic wall, usually covered on the outside by gelatinous coating of algin.

Choose the correct answer from the options given below:

(1) A, C, D and E only

(2) A, B, C and E only

(3) A, B, C and D only

(4) B, C, D and E only

142 Match List I with List II

	List I		**List II**
A.	GLUT-4	I.	Hormone
B.	Insulin	II.	Enzyme
C.	Trypsin	III.	Intercellular ground substance
D.	Collagen	IV.	Enables glucose transport into cells

Choose the correct answer from the options given below:

(1) A-II, B-III, C-IV, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-I, C-II, D-III

(4) A-I, B-II, C-III, D-IV

140 *ई.कोलाई* में प्रतिकृतियन (रेप्लीकेशन) की प्रक्रिया के संदर्भ में निम्नलिखित में से कौन सा कथन सही है ?

(1) डीएनए निर्भर डीएनए पोलीमरेस 5' → 3' के साथ–साथ 3' → 5' दिशा में भी बहुलकीकरण को उत्प्रेरित करता है।

(2) डीएनए निर्भर डीएनए पोलीमरेस 5' → 3' दिशा में बहुलकीकरण को उत्प्रेरित करता है।

(3) डीएनए (DNA) निर्भर डीएनए पोलीमरेस एक दिशा में यानी 3' → 5' में बहुलकीकरण को उत्प्रेरित करता है।

(4) डीएनए निर्भर आरएनए (RNA) पोलीमरेस एक दिशा में यानी 5' → 3' में बहुलकीकरण को उत्प्रेरित करता है।

141 निम्नलिखित कथनों को पढ़िए और सही कथनों के सेट को चुनिए:

फियोफाइसी के सदस्यों में,

A. अलैंगिक जनन प्रायः द्विकशाभी जूस्पोर (अलैंगिक चल बीजाणुओं) के द्वारा होता है।

B. लैंगिक जनन केवल विषमयुग्मकी (ऊओगैमस) विधि से होता है।

C. संचित खाद्य कार्बोहाइड्रेट के रूप में होता है जो मैनीटोल अथवा लैमीनेरिन है।

D. पाए जाने वाले मुख्य वर्णक पर्णहरित/क्लोरोफिल a, c और कैरोटिनॉइड तथा जैन्थोफिल हैं।

E. कायिक कोशिकाओं में सेलुलोसी भित्ति होती है, जो बाहर की ओर प्रायः एल्जिन के जिलेटिनी आवरण से आवरित होती है।

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(1) केवल A, C, D और E

(2) केवल A, B, C और E

(3) केवल A, B, C और D

(4) केवल B, C, D और E

142 सूची I का सूची II से मिलान कीजिए:

	सूची I		**सूची II**
A.	GLUT-4	I.	हार्मोन
B.	इन्सुलिन	II.	एन्जाइम
C.	ट्रिप्सिन	III.	अन्तराकोशिकीय आधारी पदार्थ
D.	कोलैजन	IV.	कोशिकाओं में ग्लूकोस के अभिगमन को संभव बनाता है

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(1) A-II, B-III, C-IV, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-I, C-II, D-III

(4) A-I, B-II, C-III, D-IV

143 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-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

144 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

145 Match List I with List II

	List I		List II
A.	Robert May	I.	Species-Area relationship
B.	Alexander von Humboldt	II.	Long term ecosystem experiment using out door plots
C.	Paul Ehrlich	III.	Global species diversity at about 7 million
D.	David Tilman	IV.	Rivet popper hypothesis

Choose the correct answer from the options given below:

(1) A-I, B-III, C-II, D-IV
(2) A-III, B-IV, C-II, D-I
(3) A-II, B-III, C-I, D-IV
(4) A-III, B-I, C-IV, D-II

143 सूची I का सूची II से मिलान कीजिए:

	सूची I		सूची II
A.	फ्रेडरिक ग्रिफिथ	I.	आनुवंशिक कूट (जेनेटिक कोड)
B.	प्रैंकोइस जैकब एवं जैक मोनोड	II.	डीएनए प्रतिकृतियन की अर्ध–संरक्षी पद्धति
C.	हर गोबिंद खोराना	III.	रूपांतरण
D.	मसेलसन एवं स्टेल	IV.	लैक–ओपेरोन

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(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

144 गन्ने की फसल में निम्नलिखित पादप वृद्धि नियंत्रकों में से किसका छिड़काव करने से तने की लंबाई बढ़ जाती है, जिसके फलस्वरूप उपज में वृद्धि होती है ?

(1) साइटोकाइनिन (2) एब्सीसिक अम्ल
(3) ऑक्सिन (4) जिबरैलिन

145 सूची I का सूची II से मिलान कीजिए:

	सूची I		सूची II
A.	रॉबर्ट मे	I.	जाति क्षेत्रफल संबन्ध
B.	एलिक्लैन्डर वॉन हम्बोल्ट	II.	आउटडोर प्लॉट के उपयोग द्वारा दीर्घावधि पारिस्थितिक तंत्र परीक्षण
C.	पॉल एर्लिक	III.	वैश्विक जाति विविधता लगभग 70 लाख (7 मिलियन) है
D.	डेविड टिल्मान	IV.	रिवेट–पॉपर परिकल्पना

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:

(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

146 The DNA present in chloroplast is:
(1) Linear, single stranded
(2) Circular, single stranded
(3) Linear, double stranded
(4) Circular, double stranded

147 Match List I with List II

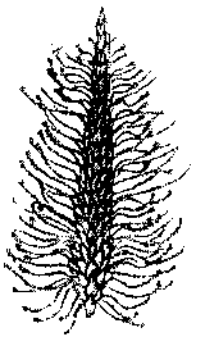
	List I		List II
A.	Rose	I.	Twisted aestivation
B.	Pea	II.	Perigynous flower
C.	Cotton	III.	Drupe
D.	Mango	IV.	Marginal placentation

Choose the correct answer from the options given below:
(1) A-IV, B-III, C-II, D-I
(2) A-II, B-III, C-IV, D-I
(3) A-II, B-IV, C-I, D-III
(4) A-I, B-II, C-III, D-IV

148 Identify the step in tricarboxylic acid cycle, which does not involve oxidation of substrate.
(1) Succinyl-CoA → Succinic acid
(2) Isocitrate → α-ketoglutaric acid
(3) Malic acid → Oxaloacetic acid
(4) Succinic acid → Malic acid

149 Which of the following are fused in somatic hybridization involving two varieties of plants?
(1) Protoplasts
(2) Pollens
(3) Callus
(4) Somatic embryos

150 Identify the correct description about the given figure:



(1) Cleistogamous flowers showing autogamy.
(2) Compact inflorescence showing complete autogamy.
(3) Wind pollinated plant inflorescence showing flowers with well exposed stamens.
(4) Water pollinated flowers showing stamens with mucilaginous covering.

146 हरितलवक (क्लोरोप्लास्ट) में उपस्थित DNA/डीएनए है:
(1) रैखिक, एकलरज्जुक
(2) वृत्तीय, एकलरज्जुक
(3) रैखिक, द्विरज्जुक
(4) वृत्तीय, द्विरज्जुक

147 सूची I का सूची II से मिलान कीजिए:

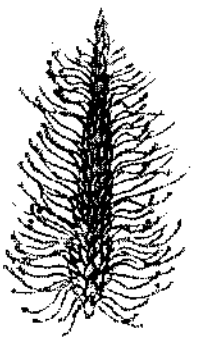
	सूची I		सूची II
A.	गुलाब	I.	व्यावर्तित पुष्पदल विन्यास
B.	मटर	II.	परिजायांगी पुष्प
C.	कपास	III.	अष्ठिल फल/ड्रूप
D.	आम	IV.	सीमांत बीजांडन्यास

नीचे दिए गए विकल्पों में से **सही** उत्तर को चुनिए:
(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

148 ट्राइकार्बोक्सिलिक अम्ल चक्र के उस चरण की पहचान कीजिए, जिसमें क्रियाधार/सबस्ट्रेट का ऑक्सीकरण नहीं होता है:
(1) सक्सीनाइल-CoA → सक्सीनिक अम्ल
(2) आइसोसाइट्रेट → α-कीटोग्लूटारिक अम्ल
(3) मैलिक अम्ल → ऑक्सैलोएसीटिक अम्ल
(4) सक्सीनिक अम्ल → मैलिक अम्ल

149 पादपों की दो किस्मों को सम्मिलित करने पर कायिक संकरण में निम्नलिखित में से किनका युग्मन होता है ?
(1) प्रोटोप्लास्ट
(2) परागकण
(3) कैलस
(4) कायिक भ्रूण

150 दिए गए चित्र के सही विवरण को पहचानिए:



(1) स्वकयुग्मन (ऑटोगेमी) को दर्शाते हुए अनुन्मील्य (क्लीस्टोगेमस) पुष्प
(2) पूर्ण स्वकयुग्मन (ऑटोगेमी) को दर्शाते हुए संहत (कॉम्पेक्ट) पुष्पक्रम
(3) सुउद्भासित पुंकेसरों को दर्शाते हुए वायु परागित पादप का पुष्पक्रम
(4) श्लेष्मीय आवरण युक्त पुंकेसरों को दर्शाते हुए जल परागित पुष्प

Zoology : Section-A (Q. No. 151 to 185)

151 Match List I with List II :

	List I		List II
A.	α-1 antitrypsin	I.	Cotton bollworm
B.	Cry IAb	II.	ADA deficiency
C.	Cry IAc	III.	Emphysema
D.	Enzyme replacement therapy	IV.	Corn borer

Choose the correct answer from the options given below :

(1) A-III, B-IV, C-I, D-II
(2) A-II, B-IV, C-I, D-III
(3) A-II, B-I, C-IV, D-III
(4) A-III, B-I, C-II, D-IV

152 Given below are two statements :

Statement I : The presence or absence of hymen is not a reliable indicator of virginity.

Statement II : The hymen is torn during the first coitus only.

In the light of the above statements, choose the correct answer from the options given below :

(1) Statement I is true but Statement II is false
(2) Statement I is false but Statement II is true
(3) Both Statement I and Statement II are true
(4) Both Statement I and Statement II are false

153 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-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

154 Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : FSH acts upon ovarian follicles in female and Leydig cells in male.

Reason R : Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

In the light of the above statements, choose the correct answer from the options given below :

(1) A is 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.

151 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		सूची II
A.	α-1 एंटीट्रिप्सिन	I.	कपास बॉलवर्म
B.	क्राई I ए बी	II.	ए डी ए की कमी
C.	क्राई I ए सी	III.	वातस्फीति
D.	एंजाइम प्रतिस्थापन चिकित्सा	IV.	मक्का छेदक

निम्न विकल्पों से सही उत्तर का चयन करो:

(1) A-III, B-IV, C-I, D-II
(2) A-II, B-IV, C-I, D-III
(3) A-II, B-I, C-IV, D-III
(4) A-III, B-I, C-II, D-IV

152 नीचे दो कथन दिए गए हैं:

कथन I : योनिच्छद की उपस्थिति या अनुपस्थिति कौमार्य का विश्वसनीय सूचक नहीं है।

कथन II : योनिच्छद केवल पहले संभोग के दौरान ही फटता है।

उपर दिए गए कथनों के प्रकाश में नीचे दिए गए विकल्पों से सही उत्तर का चयन करो:

(1) कथन I सत्य है लेकिन कथन II असत्य है।
(2) कथन I असत्य है लेकिन कथन II सत्य है।
(3) दोनों कथन I और कथन II सत्य हैं।
(4) दोनों कथन I और कथन II असत्य हैं।

153 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		सूची II
A.	*टैरोफिल्लम*	I.	हैग फिश
B.	*मिक्साइन*	II.	आरा मछली
C.	*प्रीस्टिस*	III.	एंजल मछली
D.	*एक्सोसिटस*	IV.	उड़न मछली

निम्न विकल्पों से सही उत्तर का चयन करो:

(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

154 नीचे दो कथन दिये गये हैं: एक **अभिकथन A** तथा दूसरा **कारण R** है।

अभिकथन A : एफएसएच मादा में अंडाशीय पुटकों और नर में लीडिग कोशिकाओं पर कार्य करता है।

कारण R : मादा में वृद्धि करते हुए अंडाशयी पुटक एस्ट्रोजन स्रावित करते हैं जबकि मानव नर में अंतराली कोशिकाएँ एंड्रोजेन स्रावित करती हैं।

उपर दिए गए कथनों के प्रकाश में नीचे दिए गए विकल्पों से सही उत्तर का चयन करो:

(1) A सत्य है लेकिन R असत्य है।
(2) A असत्य है लेकिन R सत्य है।
(3) दोनों A और R सत्य हैं और R, A का सही स्पष्टीकरण है।
(4) दोनों A और R सत्य हैं लेकिन R, A का सही स्पष्टीकरण नहीं है।

155 Which of the following is not a component of Fallopian tube?
(1) Infundibulum (2) Ampulla
(3) Uterine fundus (4) Isthmus

156 Which of the following is not a natural/traditional contraceptive method?
(1) Lactational amenorrhea
(2) Vaults
(3) Coitus interruptus
(4) Periodic abstinence

157 Match List I with List II :

List I		List II
A. Typhoid	I.	Fungus
B. Leishmaniasis	II.	Nematode
C. Ringworm	III.	Protozoa
D. Filariasis	IV.	Bacteria

Choose the correct answer from the options given below :
(1) A-III, B-I, C-IV, D-II
(2) A-II, B-IV, C-III, D-I
(3) A-I, B-III, C-II, D-IV
(4) A-IV, B-III, C-I, D-II

158 Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R :
Assertion A : Breast-feeding during initial period of infant growth is recommended by doctors for bringing a healthy baby.
Reason R : Colostrum contains several antibodies absolutely essential to develop resistance for the new born baby.
In the light of the above statements, choose the most appropriate answer from the options given below :
(1) A is 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.

159 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

160 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.

155 निम्न में कौन फेलोपियन नली का अवयव नहीं है ?
(1) कीपक (2) तुंबिका
(3) गर्भाशयी फंडस (4) संकीर्णपथ

156 निम्न में कौन सी प्राकृतिक/परंपरागत गर्भनिरोधक विधि नहीं है ?
(1) स्तनपान अनार्तव
(2) वाल्ट
(3) कोइटस इन्ट्रप्टस
(4) आवधिक संयम

157 सूची I को सूची II के साथ सुमेलित करो–

सूची I		सूची II
A. टायफॉइड	I.	कवक
B. लीशमैनियता	II.	सूत्रकृमि
C. रिंगवर्म	III.	प्रोटोजोआ
D. फाइलेरिएसिस	IV.	जीवाणु

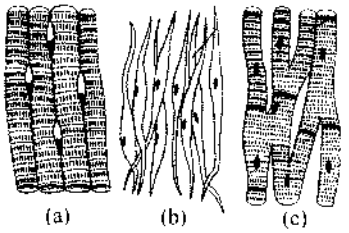
निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-III, B-I, C-IV, D-II
(2) A-II, B-IV, C-III, D-I
(3) A-I, B-III, C-II, D-IV
(4) A-IV, B-III, C-I, D-II

158 नीचे दो कथन दिये गये हैं: इनमें एक **अभिकथन A** और दूसरा **कारण R** है।
अभिकथन A : शिशु के स्वस्थ विकास के लिए उसकी वृद्धि के आरंभिक काल में कुछ समय तक डॉक्टर शिशु को स्तनपान कराने की सलाह देते हैं।
कारण R : कोलोस्ट्रम में कई प्रकार के प्रतिरक्षी होते हैं जो नवजात शिशु में प्रतिरोधी क्षमता उत्पन्न करने के लिए परम आवश्यक होते हैं।
उपर दिए गए कथनों के प्रकाश में नीचे दिए गए विकल्पों से सबसे सही उत्तर का चयन करो:
(1) A सही है लेकिन R गलत है।
(2) A गलत है लेकिन R सही है।
(3) दोनों A और R सही हैं और R, A का सही स्पष्टीकरण है।
(4) दोनों A और R सही हैं लेकिन R, A का सही स्पष्टीकरण नहीं है।

159 निम्न में कौन सा घटक हार्डी वेनवर्ग साम्यता को प्रभावित नहीं करेगा ?
(1) जीन प्रवास
(2) स्थिर जीन पूल
(3) आनुवंशिक पुनर्योग
(4) आनुवंशिक विचलन

160 निम्न कथनों में कौन सा गलत है ?
(1) बायोरिएक्टर छोटी मात्रा में जीवाणु संवर्धन के उत्पादन के लिए उपयोग में लाए जाते हैं।
(2) बायोरिएक्टर में एक प्रक्षोभक सिस्टम, ऑक्सीजन प्रदाय तंत्र एवं झाग नियंत्रण तंत्र होता है।
(3) एक बायोरिएक्टर वांछित उत्पाद पाने के लिए अनुकूलतम स्थितियां प्रदान करता है।
(4) विलोडक प्रकार के बायोरिएक्टर सर्वाधिक उपयोग में आते हैं।

161 Three types of muscles are given as a, b and c. Identify the correct matching pair along with their location in human body :



Name of muscle/location

(1) (a) 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.

162 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*

Choose the correct answer from the options given below :

(1) A-II, B-I, C-III, D-IV
(2) A-III, B-IV, C-I, D-II
(3) A-IV, B-III, C-I, D-II
(4) A-I, B-III, C-II, D-IV

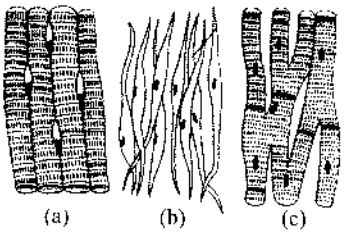
163 Match List I with List II :

	List I		**List II**
A.	Pons	I.	Provides additional space for Neurons, regulates posture and balance.
B.	Hypothalamus	II.	Controls respiration and gastric secretions.
C.	Medulla	III.	Connects different regions of the brain.
D.	Cerebellum	IV.	Neuro secretory cells

Choose the correct answer from the options given below :

(1) A-I, B-III, C-II, D-IV
(2) A-II, B-I, C-III, D-IV
(3) A-II, B-III, C-I, D-IV
(4) A-III, B-IV, C-II, D-I

161 a, b एवं c के रूप में तीन प्रकार की पेशी दी गई हैं। सुमेलित युग्म और उनकी मानव शरीर में उनकी स्थिति को पहचानिए:



पेशी का नाम / स्थिति

(1) (a) कंकालीय – द्विशिरस्का
(b) अनैच्छिक – आंत्र
(c) चिकनी – हृदय

(2) (a) अनैच्छिक – नाक का सिरा
(b) कंकालीय – अस्थि
(c) हृद – हृदय

(3) (a) चिकनी – पादांगुलि
(b) कंकालीय – टाँग
(c) हृद – हृदय

(4) (a) कंकालीय – त्रिशिरस्का
(b) चिकनी – आमाश्य
(c) हृद – हृदय

162 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		**सूची II**
A.	कोकेन	I.	शल्यक्रिया में प्रभावी शामक
B.	हिरोइन	II.	*कैनेबिस सैटाइवा*
C.	मॉर्फिन	III.	*ऐरिथ्रोजाइलम*
D.	मैरिजुआना	IV.	*पैपेवर सोम्नीफेरम*

निम्न विकल्पों से सही उत्तर का चयन करो:

(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

163 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		**सूची II**
A.	पॉंस	I.	तंत्रिकोशिकाओं को अतिरिक्त स्थान प्रदान करता है, स्थिति और संतुलन नियंत्रण करता है
B.	हाइपोथेलेमस	II.	श्वसन और जठर स्रावों को नियंत्रित करता है
C.	मेड्यूला	III.	मस्तिष्क के विभिन्न भागों को आपस में जोड़ता है
D.	अनुमस्तिष्क	IV.	तंत्रिकास्रावी कोशिकाएं

निम्न विकल्पों से सही उत्तर का चयन करो:

(1) A-I, B-III, C-II, D-IV
(2) A-II, B-I, C-III, D-IV
(3) A-II, B-III, C-I, D-IV
(4) A-III, B-IV, C-II, D-I

164 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

165 The "Ti plasmid" of *Agrobacterium tumefaciens* stands for
(1) Tumor inducing plasmid
(2) Temperature independent plasmid
(3) Tumour inhibiting plasmid
(4) Tumor independent plasmid

166 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 from the options given below :
(1) A-II, B-IV, C-I, D-III
(2) A-IV, B-III, C-II, D-I
(3) A-IV, B-II, C-III, D-I
(4) A-I, B-II, C-IV, D-III

167 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-IV, B-I, C-II, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-III, B-I, C-II, D-IV
(4) A-I, B-III, C-IV, D-II

168 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

164 निम्न में कौन स्वप्रतिरक्षा विकार हैं ?
A. माइस्थेनिया ग्रेविस
B. रूमेटैओयड संधि शोथ
C. गाउट
D. पेशीय दुष्पोषण
E. सिस्टेमिक ल्यूपस एरिथेमैटोसस (एस एल ई)
निम्न विकल्पों से सबसे सही उत्तर का चयन करो:
(1) केवल B, C और E (2) केवल C, D और E
(3) केवल A, B और D (4) केवल A, B और E

165 *एग्रोबैक्टीरियम ट्युमेफैसियन* के Ti प्लाज्मिड का अर्थ है
(1) ट्यूमर प्रेरक प्लाज्मिड
(2) तापक्रम स्वतंत्र प्लाज्मिड
(3) ट्यूमर निरोधी प्लाज्मिड
(4) ट्यूमर स्वतंत्र प्लाज्मिड

166 सूची I को सूची II के साथ सुमेलित करो–

सूची I (पूर्वावस्था I की उप अवस्था)		**सूची II (विशिष्ट लक्षण)**
A. पारगतिक्रम	I.	सिनेप्टोनिमल सम्मिश्र का निर्माण
B. स्थूलपट्ट	II.	काएज्मेटा का उपांतीभवन पूर्ण होना
C. युग्मपट्ट	III.	गुणसूत्र पतले धागे जैसे दिखते हैं
D. तनुपट्ट	IV.	पुनर्योजन ग्रंथिकाएँ दिखाई देती हैं

निम्न विकल्पों से सही उत्तर का चयन करो:
(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

167 सूची I को सूची II के साथ सुमेलित करो–

सूची I		**सूची II**
A. औषधिरहित आईयूडी	I.	मल्टीलोड 375
B. ताँबा मोचक आईयूडी	II.	प्रोजेस्टोजन
C. हार्मोन मोचक आईयूडी	III.	लिप्पेस लूप
D. अंतर्रोप	IV.	एलएनजी-20

निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-IV, B-I, C-II, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-III, B-I, C-II, D-IV
(4) A-I, B-III, C-IV, D-II

168 निम्न कथनों पर विचार करो:
A. एनेलिड सत्य गुहीय होते हैं
B. पोरीफेरा कूट गुहीय होते हैं
C. ऐस्केलमिंथीज अगुहीय होते हैं
D. प्लेटीहैल्मिंथीज कूट गुहीय होते हैं
निम्न विकल्पों में से सही उत्तर का चयन करो:
(1) केवल C (2) केवल D
(3) केवल B (4) केवल A

169 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

170 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-II, B-III, C-I, D-IV
(2) A-III, B-I, C-IV, D-II
(3) A-IV, B-II, C-III, D-I
(4) A-I, B-III, C-II, D-IV

171 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-II, B-IV, C-I, D-III
(2) A-IV, B-I, C-III, D-II
(3) A-IV, B-II, C-III, D-I
(4) A-III, B-II, C-I, D-IV

172 Match List I with List II :

	List I		**List II**
A.	Down's syndrome	I.	11^{th} chromosome
B.	α-Thalassemia	II.	'X' chromosome
C.	β-Thalassemia	III.	21^{st} chromosome
D.	Klinefelter's syndrome	IV.	16^{th} chromosome

Choose the correct answer from the options given below :
(1) A-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

169 कूपिका में निम्न में से कौन से घटक ऑक्सी–हीमोग्लोबिन बनाने के लिए अनुकूल है ?
(1) कम pCO_2 एवं उच्च H^+ सांद्रता
(2) कम pCO_2 एवं उच्च तापक्रम
(3) उच्च pO_2 एवं उच्च pCO_2
(4) उच्च pO_2 अपेक्षाकृत कम H^+ सांद्रता

170 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		**सूची II**
A.	रेशीय संधियाँ	I.	निकटवर्ती कशेरुक, सीमित गति
B.	उपास्थि युक्त संधियाँ	II.	ह्युमरस एवं अंस मेखला, घूर्णी गति
C.	कब्जा संधियाँ	III.	कपाल, कोई गति नहीं होती
D.	कन्दुक खल्लिका संधियाँ	IV.	घुटना, चलने में सहायता करता है

निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-II, B-III, C-I, D-IV
(2) A-III, B-I, C-IV, D-II
(3) A-IV, B-II, C-III, D-I
(4) A-I, B-III, C-II, D-IV

171 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		**सूची II**
A.	लाइपेज	I.	पेप्टाइड बंध
B.	न्यूक्लिएज	II.	एस्टर बंध
C.	प्रोटिएज	III.	ग्लाईकोसाइडिक बंध
D.	एमाइलेज	IV.	फास्फोडाइएस्टर बंध

निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-II, B-IV, C-I, D-III
(2) A-IV, B-I, C-III, D-II
(3) A-IV, B-II, C-III, D-I
(4) A-III, B-II, C-I, D-IV

172 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		**सूची II**
A.	डाउन सिंड्रोम	I.	11वां गुणसूत्र
B.	α-थैलेसीमिया	II.	'X' गुणसूत्र
C.	β-थैलेसीमिया	III.	21वां गुणसूत्र
D.	क्लाइनफेल्टर सिंड्रोम	IV.	16वां गुणसूत्र

निम्न विकल्पों से सही उत्तर का चयन करो:
(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

173 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

174 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

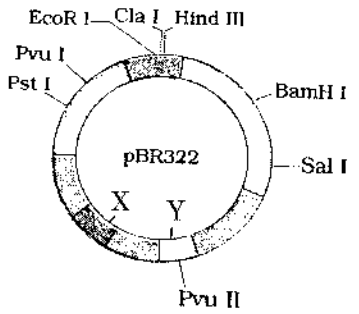
Choose the correct answer from the options given below :

(1) A-II, B-IV, C-I, D-III
(2) A-IV, B-III, C-II, D-I
(3) A-IV, B-II, C-III, D-I
(4) A-II, B-I, C-IV, D-III

175 The flippers of the Penguins and Dolphins are the example of the

(1) Convergent evolution
(2) Divergent evolution
(3) Adaptive radiation
(4) Natural selection

176 The following diagram showing restriction sites in *E.coli* cloning vector pBR322. Find the role of '*X*' and '*Y*' genes :



(1) The gene 'X' is for protein involved in replication of Plasmid and '*Y*' for resistance to antibiotics.
(2) Gene '*X*' is responsible for recognition sites and '*Y*' is responsible for antibiotic resistance.
(3) The gene '*X*' is responsible for resistance to antibiotics and '*Y*' for protein involved in the replication of Plasmid.
(4) The gene '*X*' is responsible for controlling the copy number of the linked DNA and '*Y*' for protein involved in the replication of Plasmid.

173 नीचे मानव विकास की कुछ अवस्थाएं दी गई हैं। इनको (भूत से नवीन) के सही क्रम में व्यवस्थित करो।

A. *होमो हैबिलस*
B. *होमो सैपियंस*
C. *होमो नियंडरथैलएंसिस*
D. *होमो इरैक्टस*

निम्न विकल्पों से मानव विकास के सही क्रम का चयन करो:

(1) C-B-D-A (2) A-D-C-B
(3) D-A-C-B (4) B-A-D-C

174 सूची I को सूची II के साथ सुमेलित करो–

सूची I		सूची II	
A.	*प्लूरोब्रेकिआ*	I.	मोलस्का
B.	रेतीजिह्वा	II.	टीनोफोरा
C.	स्टोमोकॉर्ड	III.	ओस्टिक्थीज
D.	वायु कोष	IV.	हेमीकॉर्डेटा

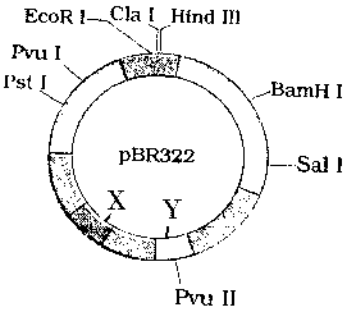
निम्न विकल्पों से सही उत्तर का चयन करो:

(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

175 पेंग्विन और डॉल्फिन के फ्लिपर्स उदाहरण है

(1) अभिसारी विकास का
(2) अपसारी विकास का
(3) अनुकूली विकिरण का
(4) प्राकृतिक वरण का

176 नीचे दिए गए आरेख में *ई.कोलाई* क्लोनिंग संवाहक pBR322 के प्रतिबंधन स्थल दर्शाये गए हैं। '*X*' एवं '*Y*' जीन की भूमिका का पता लगाओ:



(1) जीन 'X' उन प्रोटीन जो प्लाज्मिड की प्रतिकृति में सम्मिलित हैं और '*Y*' प्रतिजैविक के प्रति प्रतिरोध।
(2) जीन '*X*' पहचान अनुक्रम के लिए उत्तरदायी है एवं '*Y*' प्रतिजैविक के प्रति प्रतिरोध के लिए उत्तरदायी है।
(3) जीन '*X*' प्रतिजैविक के प्रति प्रतिरोध के लिए उत्तरदायी है और '*Y*' उन प्रोटीन जो प्लाज्मिड के प्रतिकृति में सम्मिलित होते हैं।
(4) जीन '*X*' बंधित डीएनए की कॉपी संख्या के नियंत्रण के लिए उत्तरदायी है और '*Y*' उन प्रोटीन जो प्लाज्मिड की प्रतिकृति में सम्मिलित हैं।

177 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

178 Match List I with List II :

List I		List II
A. Common cold	I.	*Plasmodium*
B. Haemozoin	II.	Typhoid
C. Widal test	III.	Rhinoviruses
D. Allergy	IV.	Dust mites

Choose the correct answer from the options given below :

(1) A-III, B-I, C-II, D-IV
(2) A-IV, B-II, C-III, D-I
(3) A-II, B-IV, C-III, D-I
(4) A-I, B-III, C-II, D-IV

179 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) 5^{th} segment (4) 10^{th} segment

180 Match List I with List II :

List I		List II
A. Axoneme	I.	Centriole
B. Cartwheel pattern	II.	Cilia and flagella
C. Crista	III.	Chromosome
D. Satellite	IV.	Mitochondria

Choose the correct answer from the options given below :

(1) A-II, B-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

181 Which of the following is not a steroid hormone?

(1) Progesterone (2) Glucagon
(3) Cortisol (4) Testosterone

177 नीचे कोशिका विभाजन की अवस्थाएँ दी गई हैं

A. गैप 2 प्रावस्था
B. कोशिकाद्रव्य विभाजन
C. संश्लेषण प्रावस्था
D. केन्द्रक विभाजन
E. गैप 1 प्रावस्था

निम्न विकल्पों में से अवस्थाओं के सही क्रम का चयन करो:

(1) B-D-E-A-C (2) E-C-A-D-B
(3) C-E-D-A-B (4) E-B-D-A-C

178 सूची I को सूची II के साथ सुमेलित करो–

सूची I		सूची II
A. सामान्य जुकाम	I.	*प्लैज्मोडियम*
B. हीमोजोइन	II.	टायफॉइड
C. विडाल परीक्षण	III.	राइनोवाइरस
D. ऐलर्जी	IV.	धूल चिचडी

निम्न विकल्पों से सही उत्तर का चयन करो:

(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

179 तिलचट्टे के दोनों लिंगो में एक जोड़ी संधियुक्त तंतुमय संरचनाएँ जिन्हे गुदीय लूम कहते हैं, उपस्थित होती हैं:

(1) 8वें और 9वें खंड पर (2) 11वें खंड पर
(3) 5वें खंड पर (4) 10वें खंड पर

180 सूची I को सूची II के साथ सुमेलित करो

सूची I		सूची II
A. अक्षसूत्र	I.	तारक केन्द्र
B. बैलगाड़ी के पहिए सम पैटर्न	II.	पक्ष्माभ एवं कशाभिका
C. क्रिस्टा	III.	गुणसूत्र
D. सेटेलाइट	IV.	सूत्रकणिका

निम्न विकल्पों से सही उत्तर का चयन करो:

(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

181 निम्न में कौन स्टीरॉइड हार्मोन नहीं है ?

(1) प्राजेस्टरॉन (2) ग्लूकागॉन
(3) कोर्टीसोल (4) टेस्टोस्टेरान

182 Given below are two statements :

Statement I : In the nephron, the descending limb of loop of Henle is impermeable to water and permeable to electrolytes.

Statement II : The proximal convoluted tubule is lined by simple columnar brush border epithelium and increases the surface area for reabsorption.

In the light of the above statements, choose the correct answer from the options given below :

(1) Statement I is 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

183 Which one is the correct product of DNA dependent RNA polymerase to the given template?

3'TACATGGCAAATATCCATTCA5'

(1) 5'AUGUACCGUUUAUAGGGAAGU3'
(2) 5'ATGTACCGTTTATAGGTAAGT3'
(3) 5'AUGUACCGUUUAUAGGUAAGU3'
(4) 5'AUGUAAAGUUUAUAGGUAAGU3'

184 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-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

185 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

182 नीचे दो कथन दिए गए हैं:

कथन I : वृक्काणु में हेनले पाश की अवरोही भुजा जल के लिए अपारगम्य है और विद्युत–अपघट्य के लिए पारगम्य है।

कथन II : समीपस्थ संवलित नलिका सरल स्तंभाकार ब्रुश बार्डर उपकला से बनी होती है और पुनरावशोषण के लिए सतह क्षेत्र को बढाती है।

उपर दिए गए कथनों के प्रकाश में निम्न विकल्पों से सही उत्तर का चयन करो:

(1) कथन I सत्य है लेकिन कथन II असत्य है।
(2) कथन I असत्य है लेकिन कथन II सत्य है।
(3) दोनों कथन I और कथन II सत्य हैं।
(4) दोनों कथन I और कथन II असत्य हैं।

183 दिए हुए टेम्पलेट के लिए डीएनए निर्भर आरएनए पॉलीमरेज का उत्पाद क्या होगा ?

3'TACATGGCAAATATCCATTCA5'

(1) 5'AUGUACCGUUUAUAGGGAAGU3'
(2) 5'ATGTACCGTTTATAGGTAAGT3'
(3) 5'AUGUACCGUUUAUAGGUAAGU3'
(4) 5'AUGUAAAGUUUAUAGGUAAGU3'

184 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		**सूची II**
A.	निःश्वसन क्षमता	I.	निःश्वसन सुरक्षित आयतन + ज्वारीय आयतन + अंतःश्वसन सुरक्षित आयतन
B.	क्रियाशील अवशिष्ट क्षमता	II.	ज्वारीय आयतन + निःश्वसन सुरक्षित आयतन
C.	जैव क्षमता	III.	ज्वारीय आयतन + अंतःश्वसन सुरक्षित आयतन
D.	अंतःश्वसन क्षमता	IV.	निःश्वसन सुरक्षित आयतन + अवशिष्ट आयतन

निम्न विकल्पों से सही उत्तर का चयन करो:

(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

185 हृदय में क्रिया विभव के संवहन के मार्ग की निम्न अवस्थाएं हैं:

A. एवी बंडल B. पुरकिंजे तंतु
C. एवी पर्व D. बंडल शाखाएँ
E. एसए पर्व

निम्न विकल्पों में से मार्ग के सही विकल्प का चयन करो–

(1) B-D-E-C-A (2) E-A-D-B-C
(3) E-C-A-D-B (4) A-E-C-B-D

Zoology : Section-B (Q. No. 186 to 200)

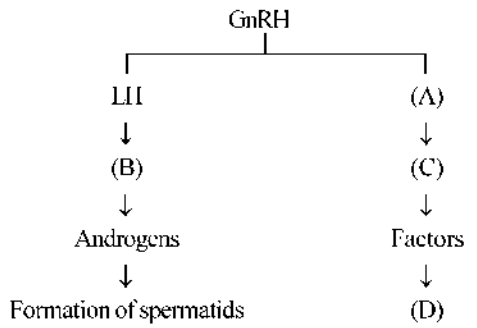
186 Match List I with List II :

	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-III, B-IV, C-I, D-II
(2) A-II, B-I, C-IV, D-III
(3) A-II, B-I, C-III, D-IV
(4) A-IV, B-III, C-I, D-II

187 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.

188 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, D, C, B (4) A, E, B, D, C

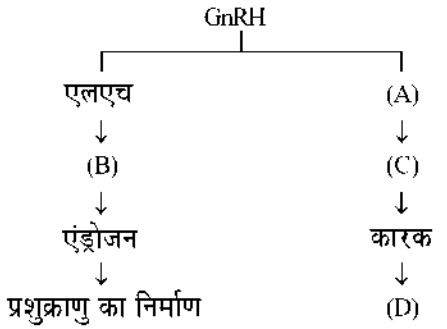
186 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		**सूची II**
A.	एककोशिकीय ग्रंथिल उपकला	I.	लार ग्रंथियाँ
B.	संयुक्त उपकला	II.	अग्नाशय
C.	बहुकोशिकीय ग्रंथिल उपकला	III.	आहार नाल की कलश कोशिकाएँ
D.	अंतःस्त्रावी ग्रंथिल उपकला	IV.	मुख गुहा की नम सतह

निम्न विकल्पों से सही उत्तर का चयन करो:

(1) A-III, B-IV, C-I, D-II
(2) A-II, B-I, C-IV, D-III
(3) A-II, B-I, C-III, D-IV
(4) A-IV, B-III, C-I, D-II

187 शुक्रजनन के संदर्भ में (A), (B), (C), (D) के सही विकल्प को पहचानो।



(1) एफएसएच, सर्टोली कोशिकाएँ, लीडिग कोशिकाएँ, शुक्रजनन
(2) आईसीएसएच, लीडिग कोशिकाएँ, सर्टोली कोशिकाएँ, शुक्रजनन
(3) एफएसएच, लीडिग कोशिकाएँ, सर्टोली कोशिकाएँ, शुक्राणुजनन
(4) आईसीएसएच, अंतराली कोशिकाएँ, लीडिग कोशिकाएँ, शुक्राणुजनन

188 एक एंजाइम क्रियाविधि के उत्प्रेरकी चक्र के संदर्भ में सही अनुक्रमीय चरणों का चयन करो:

A. क्रियाधार एंजाइम सम्मिश्र का निर्माण।
B. मुक्त एंजाइम का अन्य क्रियाधार से बंधने के लिए तैयार होना।
C. उत्पादों का मोचन।
D. क्रियाधार के रासायनिक बंध टूट जाते हैं।
E. क्रियाधार का सक्रिय स्थल पर बंधना।

निम्न विकल्पों से सही उत्तर का चयन करो:

(1) B, A, C, D, E (2) E, D, C, B, A
(3) E, A, D, C, B (4) A, E, B, D, C

189 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-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

190 Given below are two statements :
Statement I : Mitochondria and chloroplasts are both double membrane bound organelles.
Statement II : Inner membrane of mitochondria is relatively less permeable, as compared to chloroplast.
In the light of the above statements, choose the most appropriate answer from the options given below :
(1) Statement I is 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.

191 Match List I with List II :

	List I		List II
A.	RNA polymerase III	I.	snRNPs
B.	Termination of transcription	II.	Promotor
C.	Splicing of Exons	III.	Rho factor
D.	TATA box	IV.	SnRNAs, tRNA

Choose the correct answer from the options given below :
(1) A-III, B-IV, C-I, D-II
(2) A-IV, B-III, C-I, D-II
(3) A-II, B-IV, C-I, D-III
(4) A-III, B-II, C-IV, D-I

192 Given below are two statements :
Statement I : The cerebral hemispheres are connected by nerve tract known as corpus callosum.
Statement II : The brain stem consists of the medulla oblongata, pons and cerebrum.
In the light of the above statements, choose the most appropriate answer from the options given below :
(1) Statement I is correct but Statement II is incorrect.
(2) Statement I is incorrect but Statement II is correct.
(3) Both Statement I and Statement II are correct.
(4) Both Statement I and Statement II are incorrect.

189 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		सूची II
A.	P तरंग	I.	हृदय पेशियाँ विद्युतीय शांत होती हैं
B.	QRS सम्मिश्र	II.	निलयों का विध्रुवण
C.	T तरंग	III.	आलिंदों का विध्रुवण
D.	T-P गैप	IV.	निलयों का पुनःध्रुवण

निम्न विकल्पों से सही उत्तर का चयन करो:
(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

190 नीचे दो कथन दिए गए हैं:
कथन I : सूत्रकणिका और क्लोरोप्लास्ट दोनों दोहरी झिल्ली बंधित अंगक हैं।
कथन II : सूत्रकणिका की अंतःझिल्ली क्लोरोप्लास्ट की तुलना में अपेक्षाकृत कम पारगम्य होती है।
उपर दिए गए कथनों के प्रकाश में निम्न विकल्पों से सबसे सही उत्तर का चयन करो:
(1) कथन I सही है लेकिन कथन II गलत है।
(2) कथन I गलत है लेकिन कथन II सही है।
(3) दोनों कथन I और कथन II सही हैं।
(4) दोनों कथन I और कथन II गलत हैं।

191 सूची I को सूची II के साथ सुमेलित करो–

	सूची I		सूची II
A.	आरएनए पॉलीमरेज III	I.	snRNPs
B.	अनुलेखन का समापन	II.	उन्नायक
C.	व्यक्तेक का समबंधन	III.	रो कारक
D.	TATA बॉक्स	IV.	SnRNAs, tRNA

निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-III, B-IV, C-I, D-II
(2) A-IV, B-III, C-I, D-II
(3) A-II, B-IV, C-I, D-III
(4) A-III, B-II, C-IV, D-I

192 नीचे दो कथन दिए गए हैं:
कथन I : प्रमस्तिष्क गोलार्द्ध तंत्रिका पट्टी द्वारा जुड़े होते हैं जिसे कॉर्पस कैलोसम कहते हैं।
कथन II : मस्तिष्क स्तंभ में मेड्यूला ओबलोंगेटा, पोंस और सेरीब्रम आते हैं।
ऊपर दिए गए कथनों के प्रकाश में निम्न विकल्पों से सबसे सही उत्तर का चयन करो:
(1) कथन I सही है लेकिन कथन II गलत है।
(2) कथन I गलत है लेकिन कथन II सही है।
(3) दोनों कथन I और कथन II सही हैं।
(4) दोनों कथन I और कथन II गलत हैं।

193 Given below are two statements :
Statement I : Bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.
Statement II : Both bone marrow and thymus provide micro environments for the development and maturation of T-lymphocytes.
In the light of the above statements, choose the most appropriate answer from the options given below :
(1) Statement I is correct but Statement II is incorrect.
(2) Statement I is incorrect but Statement II is correct.
(3) Both Statement I and Statement II are correct.
(4) Both Statement I and Statement II are incorrect.

194 Match List I with List II related to digestive system of cockroach.

	List I		List II
A.	The structures used for storing of food.	I.	Gizzard
B.	Ring of 6-8 blind tubules at junction of foregut and midgut.	II.	Gastric Caeca
C.	Ring of 100-150 yellow coloured 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-III, C-II, D-I
(2) A-III, B-II, C-IV, D-I
(3) A-IV, B-II, C-III, D-I
(4) A-I, B-II, C-III, D-IV

195 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.

196 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.

193 नीचे दो कथन दिए गए हैं:
कथन I : अस्थि मज्जा मुख्य लसीकाभ अंग है जहाँ लसीकाणु सहित सभी रक्त कोशिकाएँ उत्पादित होती हैं।
कथन II : दोनों अस्थि मज्जा एवं थाइमस टी–लसीकाणु के विकास एवं परिपक्वन के लिए सूक्ष्म वातावरण प्रदान करती हैं।
उपर दिए गए कथनों के प्रकाश में निम्न विकल्पों से सर्वाधिक सही उत्तर का चयन करो:
(1) कथन I सही है लेकिन कथन II गलत है।
(2) कथन I गलत है लेकिन कथन II सही है।
(3) दोनों कथन I और कथन II सही हैं।
(4) दोनों कथन I और कथन II गलत हैं।

194 तिलचट्टे के पाचन तंत्र से संबंधित सूची I को सूची II के साथ सुमेलित करो–

	सूची I		सूची II
A.	भोजन संग्रहित करने के लिए उपयोग आने वाली संरचनाएँ / भाग	I.	पेषणी
B.	अग्रांत्र व मध्यांत्र के संधिस्थल पर 6-8 अंध नलिकाओं का वलय	II.	जठर अंधनाल
C.	मध्यांत्र व पश्चांत्र के संधिस्थल पर 100-150 पीले रंग के पतले तंतुओं का वलय	III.	मैलपीगी नलिकाएँ
D.	भोजन को पीसने के लिए उपयोगी संरचनाएं	IV.	अन्नपुट

निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-IV, B-III, C-II, D-I
(2) A-III, B-II, C-IV, D-I
(3) A-IV, B-II, C-III, D-I
(4) A-I, B-II, C-III, D-IV

195 नीचे दो कथन दिए गए है:
कथन I : गॉसे के स्पर्धी अपवर्जन सिद्धांत के अनुसार विभिन्न संसाधनों के लिए स्पर्धी दो निकटतम सबंधित स्पीशीज अनंतकाल तक साथ साथ नहीं रह सकती।
कथन II : गॉसे के सिद्धांत के अनुसार, स्पर्धा के समय निकृष्ट निकाल दिए जाते हैं। यह सत्य हो सकता है जब संसाधन सीमित होते हैं।
उपर दिए गए कथनों के प्रकाश में नीचे दिए गए विकल्पों से सही उत्तर का चयन करो:
(1) कथन I सत्य है लेकिन कथन II असत्य है।
(2) कथन I असत्य है लेकिन कथन II सत्य है।
(3) दोनों कथन I और कथन II सत्य हैं।
(4) दोनों कथन I और कथन II असत्य हैं।

196 सान्निध्य मध्यांश वृक्काणुओं से संबंधित निम्न कथनों से सही का चयन करो।
(1) सान्निध्य मध्यांश वृक्काणु का हेनले पाश मध्यांश में गहराई तक जाता है।
(2) सान्निध्य मध्यांश वृक्काणु वल्कुटीय वृक्काणु से अधिक होते हैं।
(3) सान्निध्य मध्यांश वृक्काणु वर्तीनी के स्तंभ में स्थित होते हैं।
(4) सान्निध्य मध्यांश वृक्काणु का वृक्क पिंडाणु रीनल मध्यांश के बाहरी हिस्से में होता है।

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 Match List I with List II :

List I		List II
A. Mesozoic Era	I.	Lower invertebrates
B. Proterozoic Era	II.	Fish & Amphibia
C. Cenozoic Era	III.	Birds & Reptiles
D. Paleozoic Era	IV.	Mammals

Choose the correct answer from the options given below :
(1) A-I, B-II, C-IV, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-II, B-I, C-III, D-IV
(4) A-III, B-I, C-II, D-IV

199 Match List I with List II :

List I		List II
A. Exophthalmic goiter	I.	Excess secretion of cortisol, moon face & hyperglycemia
B. Acromegaly	II.	Hypo-secretion of thyroid hormone and stunted growth.
C. Cushing's syndrome	III.	Hyper secretion of thyroid hormone & protruding eye balls.
D. Cretinism	IV.	Excessive secretion of growth hormone.

Choose the correct answer from the options given below :
(1) A-III, B-IV, C-II, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-I, B-III, C-II, D-IV
(4) A-IV, B-II, C-I, D-III

200 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) C & B only (2) D & E only
(3) A only (4) B only

197 नीचे अरज्जुकी के विषय में कथन हैं:
A. ग्रसनी क्लोम छिद्र से छिद्रित होती है
B. पृष्ठ रज्जु अनुपस्थित होता है
C. केन्द्रीय तंत्रिका तंत्र पृष्ठीय होता है
D. हृदय यदि उपस्थित होता है तो पृष्ठीय होता है
E. गुदा पश्च पुच्छ अनुपस्थित होती है
निम्न विकल्पों से सबसे सही उत्तर का चयन करो:
(1) केवल B, D और E (2) केवल B, C और D
(3) केवल A और C (4) केवल A, B और D

198 सूची I को सूची II के साथ सुमेलित करो–

सूची I		सूची II
A. मीजोजोइक महाकल्प	I.	निम्न अकशेरूक
B. प्रोटेरौजोइक महाकल्प	II.	मत्स्य व एंफीबिया
C. सीनोजोइक महाकल्प	III.	पक्षी व सरीसृप
D. पैलियोजोइक महाकल्प	IV.	स्तनधारी

निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-I, B-II, C-IV, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-II, B-I, C-III, D-IV
(4) A-III, B-I, C-II, D-IV

199 सूची I को सूची II के साथ सुमेलित करो–

सूची I		सूची II
A. एक्सोथैलेमिक गलगंड	I.	कोर्टीसोल का अत्याधिक स्रवण, चंद्राकार चेहरा एवं अतिग्लूकोज रक्तता
B. अतिकायता	II.	थाइरॉइड हार्मोन का अल्प स्रवण एवं अवरुद्ध वृद्धि
C. कुशिंग सिंड्रोम	III.	थाइरॉइड हार्मोन का अति स्त्रवण एवं उभरे हुए नेत्र गोलक
D. क्रेटीनता	IV.	वृद्धि हार्मोन का अत्याधिक स्रवण

निम्न विकल्पों से सही उत्तर का चयन करो:
(1) A-III, B-IV, C-II, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-I, B-III, C-II, D-IV
(4) A-IV, B-II, C-I, D-III

200 ABO रुधिर वर्ग प्रणाली के अनुसार पिता का रुधिर वर्ग B^+, माता का A^+ और बच्चे का O^+ है। इनके क्रमशः जीनोटाइप हो सकते हैं
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. $iI^B / iI^A / I^AI^B$
निम्न विकल्पों से सबसे सही उत्तर का चयन करो:
(1) केवल C और B (2) केवल D और E
(3) केवल A (4) केवल B

SPACE FOR ROUGH WORK / कच्चे काम के लिये जगह

निम्नलिखित निर्देश ध्यान से पढ़ें :	*Read carefully the following instructions :*
6. परीक्षा सम्पन्न होने पर, परीक्षार्थी कक्ष/हॉल छोड़ने से पूर्व **उत्तर पत्र (मूल प्रतिलिपि एवं कार्यालय प्रतिलिपि) कक्ष निरीक्षक को अवश्य सौंप दें।** परीक्षार्थी अपने साथ प्रश्न पुस्तिका ले जा सकते हैं।	6. 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.
7. **इस पुस्तिका का संकेत है T6। यह सुनिश्चित कर लें कि इस पुस्तिका का संकेत, उत्तर पत्र के मूल प्रतिलिपि पर छापे गये संकेत से मिलता है।** अगर यह भिन्न हो तो परीक्षार्थी दूसरी परीक्षा पुस्तिका और उत्तर पत्र लेने के लिए निरीक्षक को तुरंत अवगत कराएं।	7. **The CODE for this Booklet is T6. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet.** In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
8. परीक्षार्थी सुनिश्चित करें कि इस उत्तर पत्र को मोड़ा न जाए एवं उस पर कोई अन्य निशान न लगाएं। परीक्षार्थी अपना अनुक्रमांक प्रश्न पुस्तिका/उत्तर पत्र में निर्धारित स्थान के अतिरिक्त अन्यत्र ना लिखें।	8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
9. उत्तर पत्र पर किसी प्रकार के संशोधन हेतु व्हाइट फ़्लूइड के प्रयोग की अनुमति **नहीं** है।	9. Use of white fluid for correction is **NOT** permissible on the Answer Sheet.
10. पूछे जाने पर प्रत्येक परीक्षार्थी, निरीक्षक को अपना प्रवेश-पत्र दिखाएं।	10. Each candidate must show on-demand his/her Admit Card to the Invigilator.
11. केंद्र अधीक्षक या निरीक्षक की विशेष अनुमति के बिना कोई परीक्षार्थी अपना स्थान न छोड़ें।	11. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
12. कार्यरत निरीक्षक को अपना उत्तर पत्र दिए बिना एवं उपस्थिति-पत्रक पर दुबारा हस्ताक्षर (समय के साथ) किए बिना कोई परीक्षार्थी परीक्षा हॉल नहीं छोड़ेंगे। **यदि किसी परीक्षार्थी ने दूसरी बार उपस्थिति-पत्रक पर हस्ताक्षर नहीं किए तो यह माना जाएगा कि उसने उत्तर पत्र नहीं लौटाया है और यह अनुचित साधन का मामला माना जाएगा।**	12. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet **twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**
13. इलेक्ट्रानिक/हस्तचालित परिकलक का उपयोग वर्जित है।	13. Use of Electronic/Manual Calculator is prohibited.
14. परीक्षा-कक्ष/हॉल में आचरण के लिए परीक्षार्थी, परीक्षा के नियमों एवं विनियमों द्वारा नियमित हैं। अनुचित साधन के सभी मामलों का फैसला इस परीक्षा के नियमों एवं विनियमों के अनुसार होगा।	14. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
15. **किसी हालात में परीक्षा पुस्तिका और उत्तर पत्र का कोई भाग अलग न करें।**	15. **No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
16. परीक्षा पुस्तिका / उत्तर पत्र में दिए गए परीक्षा पुस्तिका संकेत को परीक्षार्थी सही तरीके से उपस्थिति-पत्रक में लिखें।	16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
17. तीन घंटे बीस मिनट की अवधि की परीक्षा के लिए एक घंटा पाँच मिनट का प्रतिपूरक समय प्रदान किया जाएगा, चाहे ऐसा अभ्यर्थी (जो लिखने के लिए शारीरिक रूप से असक्षम हो), स्क्राईब का उपयोग करता है या नहीं ।	17. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of Scribe or not.