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Test Booklet No.

ENGLISH

Test Booklet Code

Q3

GRIDU

This Booklet contains 32 pages, including Rough Page.

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

Important Instructions:

- 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.
- 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:
 - 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.
 - 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.
- 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.
- Use Blue/Black Ball Point Pen only for writing particulars on this page/markings responses on Answer Sheet.
- Rough work is to be done in the space provided for this purpose in the Test Booklet only.
- 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.
- The CODE for this Booklet is Q3. 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.
- 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.
- Use of white fluid for correction is NOT permissible on the Answer Sheet.
- Each candidate must show on-demand his/her Admit Card to the Invigilator.
- No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
- 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.
- Use of Electronic/Manual Calculator is prohibited.
- 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.
- No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
- The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
- Compensatory time of one hour five minutes will be provided for the examination of a candidate in the 20 minutes duration, whether such candidate (having a physical disability) is allowed to write or not. Scribe or not.

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

1 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) $10(N+1)$

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

- (1) interference pattern will disappear.
(2) there will be a central dark fringe surrounded by a few coloured fringes.
(3) there will be a central bright white fringe surrounded by a few coloured fringes.
(4) all bright fringes will be of equal width.

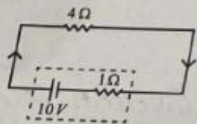
3 A logic circuit provides the output Y as per the following truth table :

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

The expression for the output Y is :

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

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



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

Q3_English]

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



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

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

- (1) 26Ω (2) 52Ω
(3) 55Ω (4) 60Ω

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



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

8 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 $4\pi \times 10^{-7} \text{ SI units}$):

- (1) 44 mT (2) 4.4 T
(3) 4.4 mT (4) 44 T

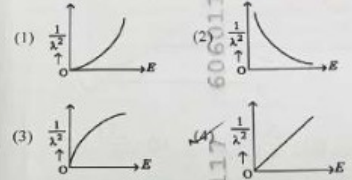
9 In an ideal transformer, the turns ratio is $\frac{N_p}{N_s} = \frac{1}{2}$.

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

[Contd...

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) :



11 Given below are two statements :

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

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

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

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

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

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

Q3_English]

- 16 The moment of inertia of a thin rod about an axis passing through its mid point and perpendicular to the rod is 2400 g cm^2 . The length of the 400 g rod is nearly :
- (1) 8.5 cm (2) 17.5 cm
(3) 20.7 cm (4) 72.0 cm

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

- 18 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

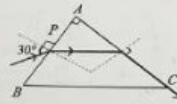
- 19 At any instant of time t , the displacement of any particle is given by $2t - 1$ (SI unit) under the influence of force of 5 N . The value of instantaneous power is (in SI unit):

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

Q3_English]

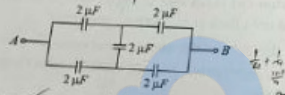
$s = at + 1$
 $f = 5 \text{ N}$
P: 4

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



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

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



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

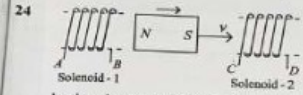
- 22 The quantities which have the same dimensions as those of solid angle are :

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

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

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

[Contd...



- 24 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

- 25 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}

- 26 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

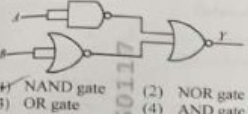
- 27 An unpolarised light beam strikes a glass surface at Brewster's angle. Then

- (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.

Q3_English]

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

35 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

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

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

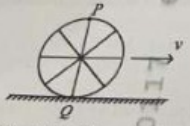
(Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ SI units}$)

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

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

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

35 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.

Q3_English]

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 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 $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$.
- (4) they originate from charges moving with uniform speed.

38 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:

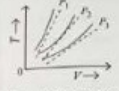
- (1) 34
 - (2) 28
 - (3) 17
 - (4) 32
- f = 140*

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

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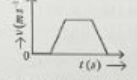
40 The following graph represents the T-V curves of an ideal gas (where T is the temperature and V the volume) at three pressures P_1, P_2 and P_3 compared with those of Charles's law represented as dotted lines.



Then the correct relation is:

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

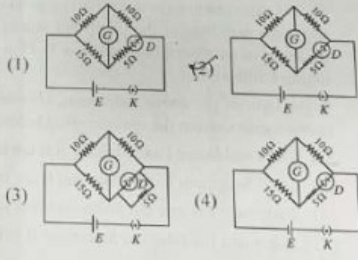
41 The velocity (v) - time (t) plot of the motion of a body is shown below :



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

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

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



Q3_English]

11 5 6 7

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

47 A metallic bar of Young's modulus, $0.5 \times 10^{11} \text{ N m}^{-2}$ and coefficient of linear thermal expansion $10^{-5} \text{ }^\circ\text{C}^{-1}$, 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) $5 \times 10^3 \text{ N}$ (2) $50 \times 10^3 \text{ N}$
 (3) $100 \times 10^3 \text{ N}$ (4) $2 \times 10^3 \text{ N}$

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° with each other. The magnetic moment of this new magnet is:
 (1) M (2) $\frac{M}{2}$
 (3) 2M (4) $\frac{M}{\sqrt{3}}$

49 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

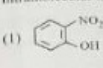
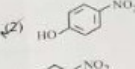
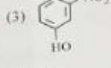
50 A force defined by $F = \alpha t^2 + \beta t$ acts on a particle at a given time t. The factor which is dimensionless, if α and β are constants, is:
 (1) $\frac{\beta t}{\alpha}$ (2) $\frac{\alpha t}{\beta}$
 (3) $\alpha \beta t$ (4) $\frac{\alpha \beta}{t}$

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


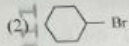
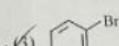
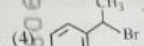
Choose the correct answer from the options given below:
 (1) A-I, B-IV, C-II, D-III
 (2) A-IV, B-III, C-II, D-I
 (3) A-III, B-IV, C-II, D-I
 (4) A-III, B-IV, C-I, D-II

52 The Henry's law constant (K_H) values of the 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) $A > B > C$

53 Given below are two statements:
Statement I: The boiling point of hydrides of Group 16 elements follow the order $\text{H}_2\text{O} > \text{H}_2\text{Te} > \text{H}_2\text{Se} > \text{H}_2\text{S}$.
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

54 Intramolecular hydrogen bonding is present in
 (1) 
 (2) 
 (3) 
 (4) HF

55 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.

56 The compound that will undergo $\text{S}_\text{N}1$ reaction with the fastest rate is
 (1) 
 (2) 
 (3) 
 (4) 

- 61 Activation energy of any chemical reaction can be calculated if one knows the value of
 (1) rate constant at standard temperature.
 (2) probability of collision.
 (3) orientation of reactant molecules during collision.
 (4) rate constant at two different temperatures.

- 62 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.

- 63 Arrange the following elements in increasing order of electronegativity:
 N, O, F, C, Si
 Choose the correct answer from the options given below:
 (1) $Si < C < N < O < F$
 (2) $Si < C < O < N < F$
 (3) $O < F < N < C < Si$
 (4) $F < O < N < C < Si$

- 64 Match List I with List II.

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

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

- 65 Match List I with List II.

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

Choose the correct answer from the options given below:

- (1) A-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

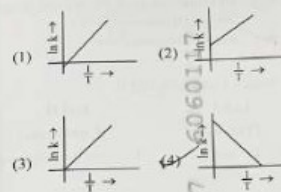
- 66 Match List I with List II.

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-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

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



- 68 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 is J is :

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

- 69 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

- 70 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) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2 NaCl$

- 71 Match List I with List II

List I (Quantum Number)	List II
A. m_l	I. $2l + 1$
B. m_s	II. $2l + 1$
C. l	III. $2l + 1$
D. n	IV. $2l + 1$

Choose the correct answer from the options given below:

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

- 72 'Spin only' magnetic moment of the following ions is $2.828 \mu_B$

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

Choose the correct answer from the options given below:

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

- 73 The high temperature superconductor is

- (1) $YBaCuO$
 (2) $LaAlO_3$
 (3) La_2CuO_4
 (4) La_2O_3

- 74 Among the following, the most stable complex is

- (1) $[Co(NH_3)_6]^{3+}$
 (2) $[Co(en)_3]^{3+}$
 (3) $[Co(NH_3)_5en]^{3+}$
 (4) $[Co(NH_3)_4en_2]^{3+}$

- 75 The IUPAC name of the following complex is

- (1) $[Co(NH_3)_4(en)]^{3+}$
 (2) $[Co(en)_2(NH_3)_2]^{3+}$
 (3) $[Co(en)_2(NH_3)_2]^{3+}$
 (4) $[Co(en)_2(NH_3)_2]^{3+}$

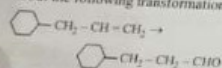
76 The reagents with which glucose does not react to give the corresponding tests/products are

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

Choose the correct options from the given below:

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

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



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

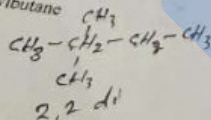
78 In which of the following equilibria, K_p and K_c are NOT equal?

- (1) $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$
- (2) $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$
- (3) $\text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{CO}_2(\text{g}) + \text{H}_2(\text{g})$
- (4) $2\text{BrCl}(\text{g}) \rightleftharpoons \text{Br}_2(\text{g}) + \text{Cl}_2(\text{g})$

79 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

Q3_English |



80 Fehling's solution 'A' is

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

81 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

82 Given below are two statements:

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

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

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

- (1) 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.

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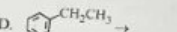
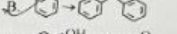
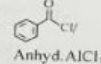
83 On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for the purification of such solid substances based on the above principle is known as

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

84 Match List I with List II.

List I (Reaction)

List II (Reagents/Condition)



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

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

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.

Q3_English |

Chemistry

86 The pair of f

- (1) Ce^{4+} a
- (2) Ce^{3+} a
- (3) Gd^{3+} a
- (4) Pm^{3+} a

87 Given below

Statement

complex

heteroleptic

Statement I

one kind of

more than o

In the light

correct ans

(1) Both S

(2) Both S

(3) Statem

(4) Statem

88 Mass in gr

9.6487 A cu

copper sulph

(Given: M

1F = 96487

(1) 3.15 g

(3) 31.5 g

89 For the giv



'P' is

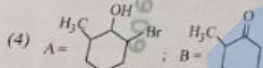
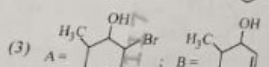
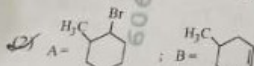
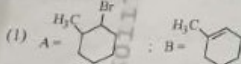
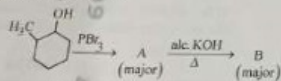


- 90 The products A and B obtained in the following reactions, respectively, are
 $3ROH + PCl_5 \rightarrow 3RCl + A$
 $ROH + PCl_5 \rightarrow RCl + HCl + B$
 (1) $POCl_3$ and H_3PO_3
 (2) $POCl_3$ and H_3PO_4
 (3) H_3PO_3 and $POCl_3$
 (4) H_3PO_3 and $POCl_3$

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

- 92 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

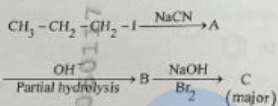
Major products A and B formed in the following reaction sequence, are



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

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

- 96 Identify the major product C formed in the following reaction sequence:



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

- 97 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

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

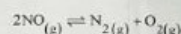
(Given $R = 2.0 \text{ cal K}^{-1} \text{ mol}^{-1}$)

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

- 99 Consider the following reaction in a sealed vessel at equilibrium with concentrations of

$N_2 = 3.0 \times 10^{-3} \text{ M}$, $O_2 = 4.2 \times 10^{-3} \text{ M}$ and

$NO = 2.8 \times 10^{-3} \text{ M}$.



If 0.1 mol L^{-1} of $NO(g)$ is taken in a closed vessel, what will be degree of dissociation (α) of $NO(g)$ at equilibrium?

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

- 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 $A = 64$; $B = 40$; $C = 32 \text{ u}$)

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

- 101 Lecithin, compound of:
 (1) Amine
 (2) Phosphate
 (3) Glycol
 (4) Carbohydrate

- 102 How many required Calvin cycle for 2 molecules of glucose?
 (1) 2
 (2) 3
 (3) 4
 (4) 5

- 103 Hind II point cut of:
 (1) 8
 (2) 9
 (3) 10
 (4) 11

- 104 In the outer

- (1) 3
 (2) 4
 (3) 5
 (4) 6

- 105 The
 (1)
 (2)
 (3)
 (4)

- 106 The cell
 (1)
 (2)
 (3)
 (4)

107 Match List I with List II

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

Choose the correct answer from the options given below:

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

108 Given below are two statements:

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

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

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

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

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

- | | |
|-------------------|---------------------|
| (1) <i>Datura</i> | (3) <i>Cassia</i> |
| (2) <i>Pisum</i> | (4) <i>Sesbania</i> |

110 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

Q3_English]

111 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

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

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

113 Match List I with List II

- | List I | List II |
|------------------------------------|-------------------|
| A. <i>Clostridium butylicum</i> | I. Ethanol |
| B. <i>Saccharomyces cerevisiae</i> | II. Streptokinase |
| C. <i>Trichoderma polysporum</i> | III. Butyric acid |
| D. <i>Streptococcus</i> 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

[Contd..

114 The equation of Verhulst-Pearl logistic growth is

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

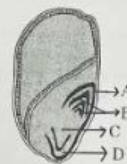
From this equation, *K* indicates:

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

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

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

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



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

117 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

Q3_English]

118 These are reproductive loss:

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

Choose the correct answer:

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

119 Which one of the following is not a mode of reproduction?

- (1) Morphogenesis
- (2) Mode of nutrition
- (3) Mode of reproduction
- (4) Fruiting

120 Identify the part of the flower which is the ovary from the given figure.



- (1) Epicotyl
- (2) Hypocotyl
- (3) Scutellum
- (4) Radicle

121 List of endangered species:

- (1) Ganges Dolphin
- (2) Indian Rhinoceros
- (3) Asiatic Elephant
- (4) One-horned Rhinoceros

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

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

Choose the correct answer from the options given below:

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

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

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

Choose the correct answer from the options given below:

- A, B and C only
- A, C, D and E only
- B, C and D only
- A, B, C, D and E

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

- Cofactor inhibition
- Feedback inhibition
- Competitive inhibition
- Enzyme activation

Q3_English |

18

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

- Differentiation
- Redifferentiation
- Dedifferentiation
- Maturation

126. Spindle fibers attach to kinetochores of chromosomes during

- Prophase
- Metaphase
- Anaphase
- Telophase

127. Tropical regions show greatest level of species richness because

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

Choose the correct answer from the options given below:

- A, C, D and E only
- A and B only
- A, B and E only
- A, B and D only

128. Given below are two statements:

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

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

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

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

| Contd..

129. Match List I with List II

List I

- Nucleolus
- Centriole
- Leucoplasts
- Golgi apparatus

List II

- Site of formation of glycolipid
- Organization like the cartwheel
- Site for active ribosomal RNA synthesis
- For storing nutrients

Choose the correct answer from the options given below:

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

130. Bulliform cells are responsible for

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

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

- Only red flowered plants
- Red flowered as well as pink flowered plants
- Only pink flowered plants
- Red, Pink as well as white flowered plants

132. 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;

- Repressor, Operator gene, Structural gene
- Structural gene, Transposons, Operator gene
- Inducer, Repressor, Structural gene
- Promotor, Structural gene, Terminator

Q3_English |

19

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

136 The DNA present in chloroplast is:

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

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

138 Match List I with List II

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

Choose the correct answer from the options given below:

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

139 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.

140 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.

141 Match List I with List II

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

Choose the correct answer from the options given below:

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

142 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

147 Match List I with List II

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

Choose the correct answer from the options given below:

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

148 Match List I with List II

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

Choose the correct answer from the options given below:

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

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

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

150 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

Zoology : Section-A (Q. No. 151 to 185)

151 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
- 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

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

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

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

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

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

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

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

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

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

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

156 Which of the following is not a steroid hormone?

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

157 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

158 Following are the stages of cell division:

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

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

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

159 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

163 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

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

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

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

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

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

165 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

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

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

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

168 Match List I with List II :

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

Choose the correct answer from the options given below :

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

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

- 3' TACATGGCAATATCCATTCAS'
- (1) 5' AUGUACCGUUAUAGGUAAGU3'
- (2) 5' AUGUAAAGUUAUAGGUAAGU3'
- (3) 5' AUGUACCGUUAUAGGGAAGU3'
- (4) 5' ATGTACCGTTTATAGGTAAGT3'

170 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

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-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

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

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

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

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

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

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

- (1) High pO_2 and High pCO_2
- (2) High pO_2 and Lesser H^+ concentration
- (3) Low pCO_2 and High H^+ concentration
- (4) Low pCO_2 and High temperature

177 Match List I with List II :

List I	List II
A. Common cold	I. <i>Plasmodium</i>
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

Q3_English]

178 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

179 Match List I with List II :

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

Choose the correct answer from the options given below :

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

180 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.

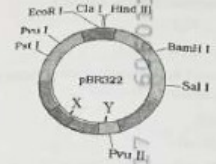
Statement II : The proximal convoluted tubule is lined by simple columnar brush border epithelium and increases the surface area for reabsorption.

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

[Contd..

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. 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

Q3_English]

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 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

Q3_English |

188 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

189 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.

190 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.

[Contd...

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

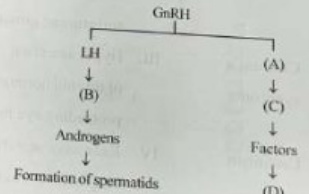
192 Regarding catalytic cycle of an enzyme action, select the correct sequential steps :

- 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 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.

Q3_English |

196 Match List I with List II :

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

Choose the correct answer from the options given below :

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

197 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^{Bj} / I^{Aj} / ii
- B. I^{Bj} / I^{Aj} / ii
- C. I^{Aj} / I^{Aj} / I^{Bj}
- D. I^{Aj} / I^{Bj} / I^{Aj}
- E. ii^{Bj} / ii^{Aj} / I^{Aj} I^{Bj}

Choose the most appropriate answer from the options given below :

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

198 Match List I with List II :

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

Choose the correct answer from the options given below :

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

199 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.

200 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

SPACE FOR ROUGH WORK