Section -A

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

(A) T (B) 4T (C) $\frac{T}{4}$ (D) $\sqrt{2}T$

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

(A) constant velocity

(B) constant acceleration.

(C) constant velocity but varying acceleration

(D) varying velocity and varying acceleration

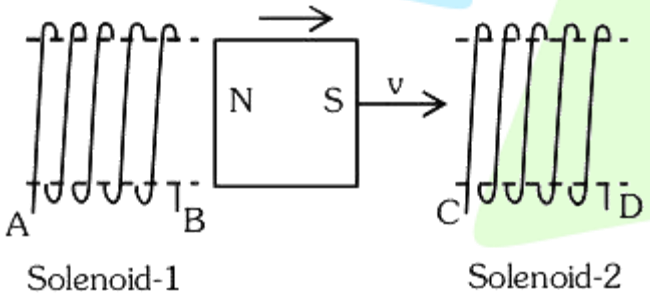
3. A logic circuit provides the output Y as per the following truth table:

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

The expression for the output Y is

(A) $A\cdot B+\bar{A}$ (B) $A\cdot\bar{B}+\bar{A}$ (C) $\bar{B}$ (D) B

4.



Solenoid-1 Solenoid-2

In the above diagrams, 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:

(A) AB and DC (B) BA and CD

(C) AB and CD (D) BA and DC

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 (t) from the centre of the dipole of dipole moment vector $\vec{P}$ of magnitude, 4×10^{-6}Cm, is $\pm9\times10^{3}$ V

(Take $\frac{1}{4\pi\epsilon_0}=9\times10^{9}$ Sl 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:

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

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

(C) A is true but R is false.

(D) A is false but B is true.

6. Match **List-I** with **List-II**

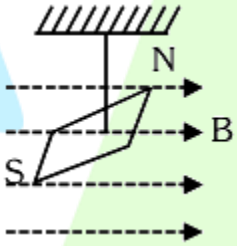
	List-I		**List-II**
A.	Diamagnetic	I.	$\chi=0$
B.	Ferromagnetic	II.	$0>\chi\geq-1$
C.	Paramagnetic	III.	$\chi>>1$
D.	Non-Magnetic &	IV.	$0<\chi<\varepsilon$ (a small positive number)

Choose the correct answer from the options given below:

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

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

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 $x\times10^{-5}$ Am^2; then the value of 'x' is:



(A) $5\pi^2$ (B) $128\ \pi^2$ (C) $50\ \pi^2$ (D) $1280\ \pi^2$

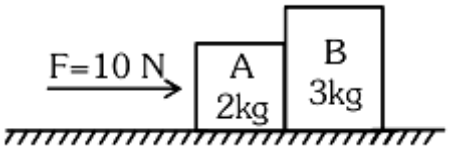
8. In a ideal transformer, the turns ratio $\frac{N_p}{N_s}=\frac{1}{2}$. The ratio V_s: V_p is equal to (the symbols carry their usual meaning) :

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

9. 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:

(A) $\frac{1}{10N}$ (B) $\frac{1}{100(N+1)}$ (C) 100 N (D) 10(N+1)

10. 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 :

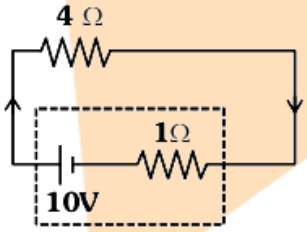


(A) zero (B) 4N (C) 6N (D) 10N

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

(A) 5cm, 2s (B) 5m, 2s (C) 5cm, 1s (D) 5m, 1 s

12. 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



(A) 4V (B) 6V (C) 8V (D) 10V

13. 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 :

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

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

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

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

14. 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 :

(A) A and B only (B) A, B, C and D only

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

15. Match List I with List ll.

	List I		List-II
	(Spectral Lineas of Hydrogen for transition for transitions from		(Wavelength (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:

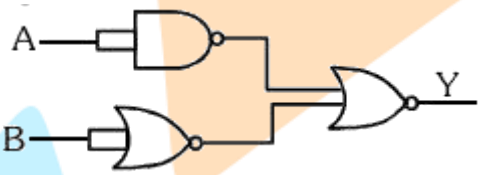
(A) A-II, B-I, C-IV, D-III (B) A-III, B-IV, C-II, D-I

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

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

(A) 44 mT (B) 4.4 T (C) 4.4 mT (4) 44 T

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



(A) NAND gate (B) NOR gate (C) OR gate (D) AND gate

18. 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:

(A) 26 Ω (B) 52 Ω (C) 55 Ω (D) 60 Ω

19. $${}^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$$

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

(A) 280,81 (B) 286,80 (C) 288,82 (D) 286.81

20. 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}Nm^{-2} is :

(A) 4 mm (B) 0.4 mm (C) 40 mm (D) 8 mm

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

(A) interference pallern will disappear.

(B) there will be a central dark fringe surrounded by a Sew coloured fringes.

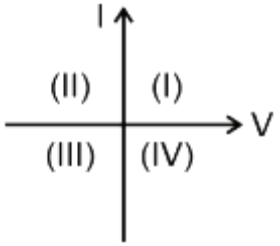
(C) there will be a central bright white fringe surrounded by a few coloured fringes.

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

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

(A) 10 (B) 5 (C) 7 (D) 6

23. 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.

(A) A is correct but B is incorrect

(B) A is incorrect but B is correct

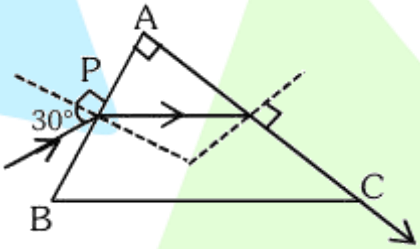
(C) Both A and B are correct

(D) Both A and B are incorrect

24. 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 :

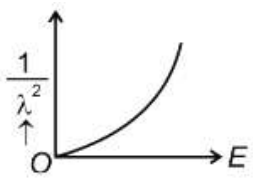
(A) 1: 2 (B) 2: 1 (C) 4: 1 (D) 1: 4

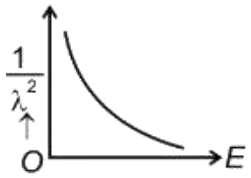
25. A light ray enters through a right angled prism at point P with the angle of incidence 30° as shown in figure. It travels through the prism parallel to its base BC and emerges along the face AC. The refractive index of the prism is:

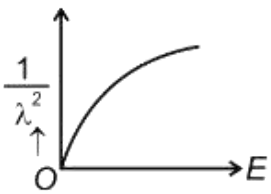


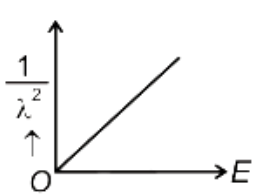
(A) $\frac{\sqrt{5}}{4}$ (B) $\frac{\sqrt{5}}{2}$ (C) $\frac{\sqrt{3}}{4}$ (D) $\frac{\sqrt{3}}{2}$

26. The graph which shows the variation of $\left(\frac{1}{\lambda^2}\right)$ and its kinetic energy. E is

(A) 

(B) 

(C) 

(D) 

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

(A) strain and angle (B) stress and angle

(C) strain and arc (D) angular speed and stress

28. An unpolarised light beam strikes a glass surface al Brewster's angle. Then :-

(A) the rellected light will be partially polarised.

(B) the refracted light will be completely polarised.

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

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

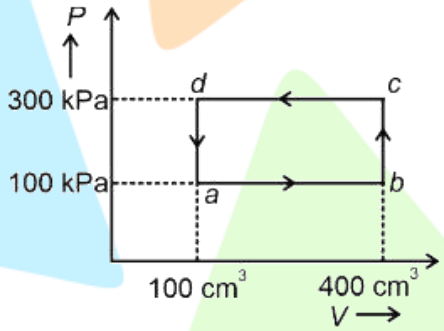
29. The moment of inertia of a thin rod about an axis passing through its mid point and perpendicular to the rod is 2400 g cm^2. The lenglh of the 400 g rod is nearly:

(A) 8.5 cm (B) 17.5 cm (C) 20.7 cm (D) 72.0 cm

30. 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 :

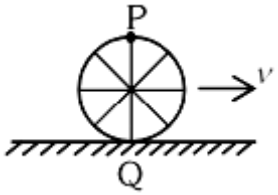
(A) 19.8 mN (B) 198 N (C) 1.98 mN (D) 99 N

31. A thermodynamic system is taken through the cycle aboda. The work done by the gas along the path bc is :



(A) Zero (B) 30 J (C) –90 J (D) –60 J

32. 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)?



(A) Point P moves slower than point Q.

(B) Point P moves faster than point Q.

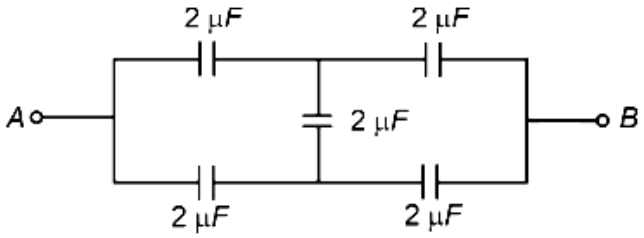
(C) Both the points P and Q move with equal speed.

(D) Point P has zero speed.

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

(A) $19.6\,ms^{-2}$ (B) $9.8\,ms^{-2}$ (C) $4.9\,ms^{-2}$ (D) $3.92\,ms^{-2}$

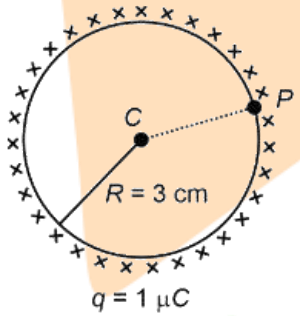
34. In the following circuit, the equivalent capacitance between terminal A and terminal B is:



(A) $2\mu F$ (B) $1\mu F$ (C) $0.5\mu F$ (D) $4\mu F$

35. 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 :

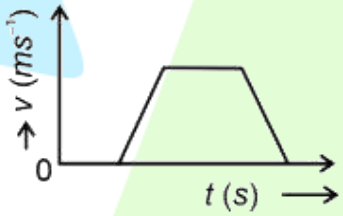
(Take $\frac{1}{4\pi\epsilon_0} = 9\times10^9$ SI units)



(A) 3×10^5 (B) 1×10^5 (C) 0.5×10^5 (D) Zero

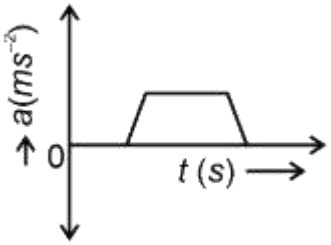
Section -B

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

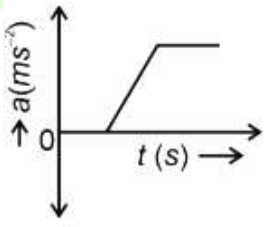


The acceleration (a) – time (t) graph that best suits this motion is :

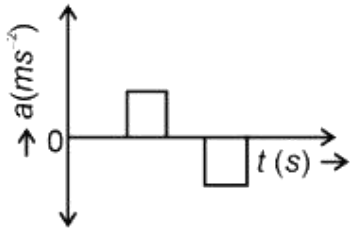
(A)



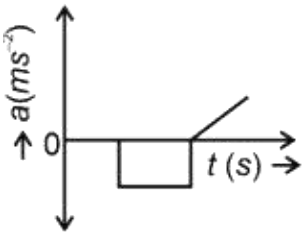
(B)



(C)



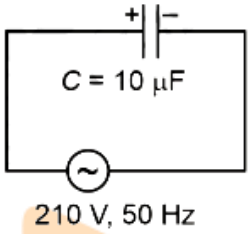
(D)



37. 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:

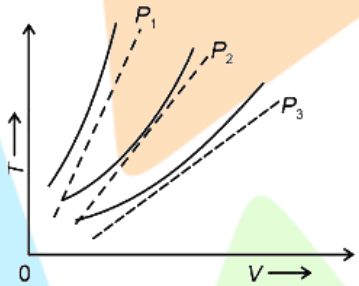
(A) $\sqrt{3}$ (B) $\sqrt{2}$ (C) $2\sqrt{3}$ (D) 4

38. A 10μF capacitor is connected to a 210 V, 50H source as shown in figure. The peak current in the circuit is nearly ($\pi = 3.14$) :



(A) 0.58A (B) 0.93A (C) 1.20A (D) 0.35

39. The following graph represents the T-V curves of an ideal gas (where T is the temperature and V is 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:

(A) $P_3 > P_2 > P_1$ (B) $P_1 > P_3 > P_2$

(C) $P_2 > P_1 > P_3$ (D) $P_1 > P_2 > P_3$

40. 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:

41. 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 2 R from the surface of the earth is:

(A) $\frac{5CmM}{6R}$ (B) $\frac{2GmM}{3R}$ (C) $\frac{GmM}{2R}$ (D) $\frac{GmM}{3R}$

42. 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:

(A) there is no current.

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

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

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

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

(A) they are transverse in nature.

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

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

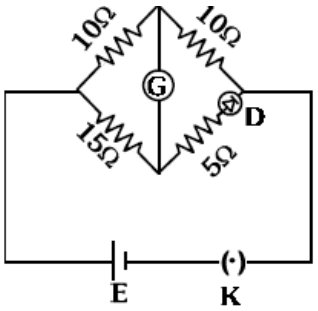
(D) they original from charges moving with uniform speed.

44. A metallic bar of Young's modulus, $0.5\times10^{11}Nm^{-2}$ and coefficient of linear thermal expansion 10^5 C^{-1}, length 1 m and area of cross-section 10^{-3} m^2 is heated from 0°C to 100°C without expansion or bending. The compressive force developed in it is:

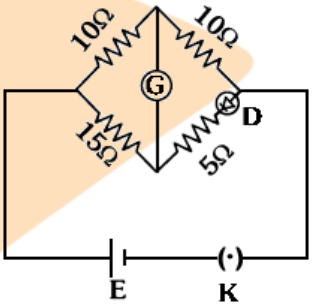
(1) 5×10^3 N (2) 50×10^3 N (3) 100×10^3 N (4) 2×10^3 N

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

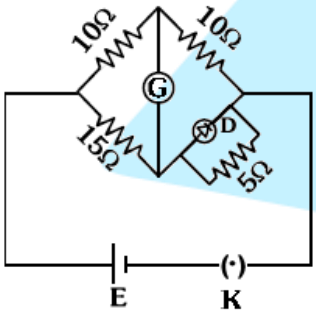
(A)



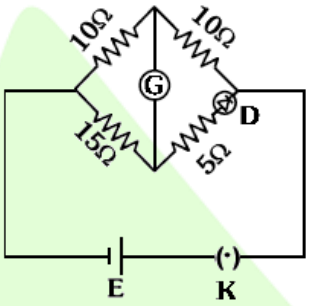
(B)



(C)



(D)



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

A. hold the steel there if it is magnetic.

B. hold the steel there if it is non-magnetic.

C. move the steel away from the pole with uniform velocity if it is conducting.

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

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

(A) B and D only

(B) A and C only

(C) A, C and D only

(D) C only

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:

(A) A, B and E only (B) A, C and E only

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

48. 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

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 :

(A) 34 (B) 28 (C) 17 (D) 32

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:

(A) $\frac{\beta t}{\alpha}$ (B) $\frac{\alpha t}{\beta}$ (C) αβt (D) $\frac{\alpha\beta}{t}$

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

(a) Ti^{3+} (b) Cr^{2+} (c) Mn^{2+}

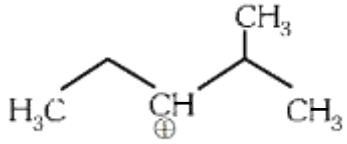
(d) Fe^{2+} (e) Sc^{3+}

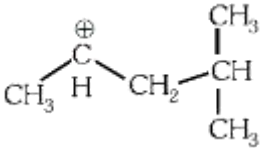
Choose the most appropriate answer from the options given below:

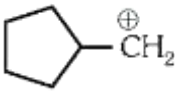
(1) B and D only (2) A and E only

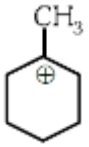
(3) B and C only (4) A and D only

52. The most stable carbocation among the following is :

(A) 

(B) 

(C) 

(D) 

53. 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 ex 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:

(A) Both statement-I and Statement-II are true.

(B) Both statement-I and Statement-II are false.

(C) Statement-I is the true but Statement-II is false.

(D) Statement-I is false but Statement-II is true.

54. 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:

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

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

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

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

55. The highest number of helium atoms is in:

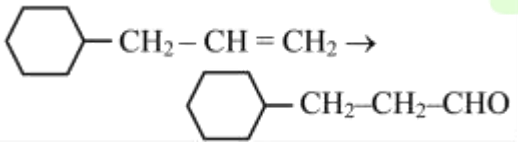
(A) 4 mol of helium

(B) 4 u of helium

(C) 4 g of helium

(D) 2.271098 L of helium at STP

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



(A) (i) $\frac{Il_2O}{I^+}$ (ii) CrO_3

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

(C) (i) BH_3 (ii) $\frac{H_2O_2}{\overset{\ominus}{O}H}$ (iii) Alk. $KMnO_4$ (iv) $H_3O^{\oplus}$

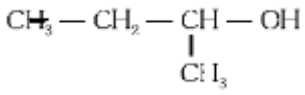
(D) (i) H_2O/H^+(ii) PCC

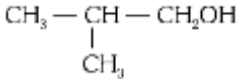
57. Match List I with List II.

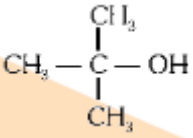
List-I (Process)		List-II (Conditions)	
A.	Isothermal process	I.	No heat exchange
B.	Isochoric process	II.	Carried out at constant temperature
C.	Isobaric process	III.	Carried out at constant volume
D.	Adiabatic process	IV.	Carried out at constant pressure

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

(A) $CH_3 - CH_2 - CH_2 - CH_2OH$

(B) 

(C) 

(D) 

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

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

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

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

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

60. 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:

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

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

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

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

61. 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:

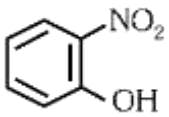
(A) Both Statement I and Statement II are true.

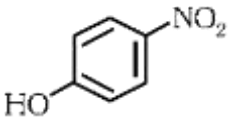
(B) Both Statement I and Statement II are false.

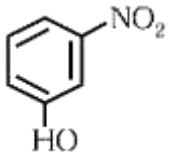
(C) Statement I is correct but Statement II is false.

(D) Statement I is incorrect but Statement II is true.

62. Intramolecular hydrogen bonding is present in:

(A) 

(B) 

(C) 

(D) HF

63. 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:

(A) Crystallization (B) Sublimation

(C) Distillation (D) Chromatography

64. In which of the following processes entropy increases?

a. A liquid evaporates to vapour

b. Temperature of a crystalline solid lowered from 130 K to 0 K .

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

d. $Cl_{2(g)} \rightarrow 2Cl_{(g)}$

Choose the correct answer from the options given below:

(A) a and c (B) a, b and d (C) a, c and d (D) c and d

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

(A) O (B) Se (C) Te (D) Po

66. 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) 3 F
(B) 1 mol of MnO_4^- to Mn^{2+}	(II) 2 F
(C) 1.5 mole of Ca from molten $CaCl_2$	(III) 1 F
(D) 1 mol of FeO to Fe_2O_3	(IV) 5 F

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

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

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

N, O, F, C, Si

Choose the correct answer from the options given below:

(A) Si < C < N < O < F (B) Si < C < O < N < F

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

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

(A) n-hexane
(B) 2-methylpentane
(C) 2, 3-dimethylbutane
(D) 2, 2-dimethylbutane

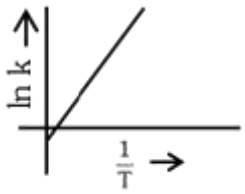
69. Fehling's solution ' *A* ' is

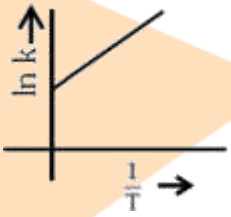
(A) aqueous copper sulphate
(B) alkaline copper sulphate
(C) alkaline solution of sodium potassium tartrate (Rochelle's salt)
(D) aqueous sodium citrate

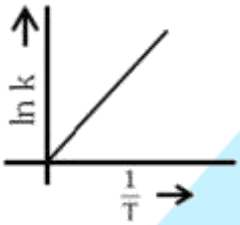
70. Activation energy of any chemical reaction can be calculated if one knows the value of

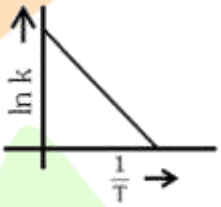
(A) rate constant at standard temperature.
(B) probability of collision.
(C) orientation of reactant molecules during collision.
(D) rate constant at two different temperatures.

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

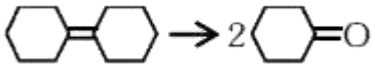
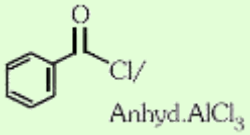
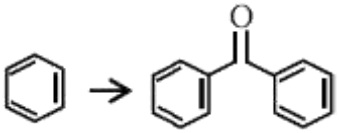
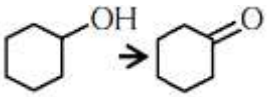
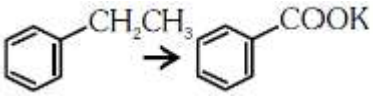
(A) 

(B) 

(C) 

(D) 

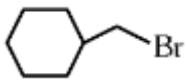
72. Match List I with List II.

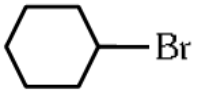
List I (Reaction)	**List II (Reagents/Condition)**
(A) 	(I) 
(B) 	(II) CrO_3
(C) 	(III) $KMnO_4/KOH,\Delta$
(D) 	(IV) (i) O_3 (ii) Zn-H_2O

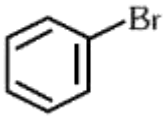
Choose the correct answer from the options given below:

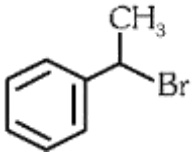
(A) A-IV, B-I, C-III, D-II
(B) A-III, B-I, C-II, D-IV
(C) A-IV, B-I, C-II, D-III
(D) A-I, B-IV, C-II, D-III

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

(A) 

(B) 

(C) 

(D) 

74. Which reaction is NOT a redox reaction?

(A) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$(B) $2KClO_3 + I_2 \rightarrow 2KIO_3 + Cl_2$

(C) $H_2 + Cl_2 \rightarrow 2\,HCl$(D) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$

75. Given below are two statements :

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

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

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

(A) Both statement I and Statement II are correct

(B) Both Statement I and Statement II are incorrect

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

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

76. Given below are two statements:

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

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

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

(A) Both statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

77. Match List I wilh 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-bond
B.	ethene	**II.**	Two π–bonds
C.	Carbon molecule, C_2	**III.**	One σ–bond
D.	ethyne	**IV.**	One π–bonds and one π–bond

Chose the correct answer from the option given below

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

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

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

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

78. 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:

(A) B > A > C (B) B > C > A

(C) $A > C > B$ (D) $A > B > C$

79. The energy of an electron in the ground state (n = 1) for Ile^{+}ion is – xJ. Then that for an electron in n = 2 state for Be^{3+} ion in J is:

(A) –x (B) $-\frac{x}{9}$ (C) –4x (D) $-\frac{4}{9}x$

80. The Σ° 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

(A) d^5 to d^4 configuration (B) d^5 to d^2 configuration

(C) d^4 to d^5 configuration (D) d^3 to d^5 configuration

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

A. Tollens' reagent B. Schiff's reagent

C. HCN D. NH_2OH

E. $NaHSO_3$

Choose the correct options from the given below:

(A) B and C (B) A and D

(C) B and E (D) E and D

82. 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:

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

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

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

Li, Be, B, C, N

Chose the correct answer from the options given below:

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

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

84. 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

(A) 750 mg (B) 250 mg (C) Zero mg (D) 200 mg

85. For the reaction $2\ A \rightleftharpoons\ B + C, K_c = 4 \times 10^{-3}$. 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?

(A) Reaction is at equilibrium.

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

(C) Reaction has a tendency to go in backward direction

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

Section – B

86. 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:

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

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

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

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

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

(A) $POCl_3$ and H_3PO_3 (B) $POCl_3$ and I_3PO_4

(C) H_3PO_4 and $POCl_3$ (D) H_3PO_3 and $POCl_3$

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

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

(A) 3.15 g (B) 0.315 g (C) 31.5 g (D) 0.0315 g

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

(A) 37°C (B) 310°C (C) 25.73°C (D) 12.05°C

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

$CH_3 - CH_2 - CH_2 - I \xrightarrow{NaOH} A$

$\xrightarrow{NaOH} A \xrightarrow[\text{Parlal hydrolysis}]{OH} B \xrightarrow[Br_2]{NaOH} \underset{\text{(Major)}}{C}$

(A) propylamine
(B) Butlyamine
(C) butanamide
(D) α – promobutanoic acid

91. Identify the correct answer.

(A) Three resonance structures can be drawn for ozone
(B) BF_3 has non-zero dipole moment
(C) Dipole moment of NF_3 is greater than that of NH_3
(D) Three canonical forms can be drawn for CO_3^{2-} ion.

92. Given below are two statements:

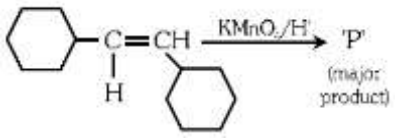
Statement I : $[Co(NH_3)_6]^{3+}$ is a homoleptic complex whereas $[Co(NH_3)_4Cl_2]^{+}$is a heteroleptic complex.

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

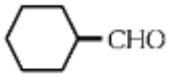
In the light of the above statements, choose the correct answer from the options given below.

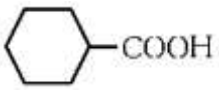
(A) Both Statement I and Statement II are true.
(B) Both Statement I and Statement II are false.
(C) Statement I is true but Statement II is false.
(D) Statement I is false but Statement II is true.

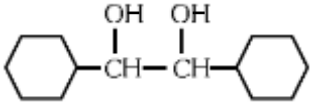
93. For the given reaction

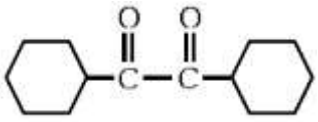


'P' is

(A) 

(B) 

(C) 

(D) 

94. The pair of lanthanoid ions which are diamagnetic is

(A) Ce^{4+} and Yb^{2+}
(B) Ce^{3+} and Eu^{2+}
(C) Gd^{3+} and Eu^{3+}
(D) Pm^{3+} and Sm^{3+}

95. 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?

(A) 0.00889 (B) 0.0889

(C) 0.8889 (D) 0.717

96. A compound X contains 32% of A, 20% of B and remaining percentage of C. Then, the empirical formula of X is :

(Given atomic masses of $A = 64; B = 40; C = 32u$)

(A) A_2BC_2 (B) ABC_3 (C) AB_2C_2 (D) ABC_4

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

(A) 0 calorie (B) -413.14 calories (C) 413.14 calories (D) 100 calories

98. 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?

(A) dilute hydrochloric acid

(B) concentrated sulphuric acid

(C) dilute nitric acid

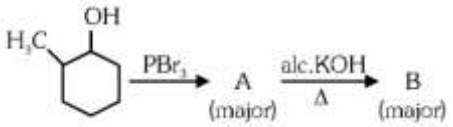
(D) dilute sulphuric acid

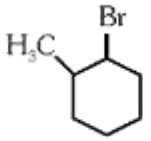
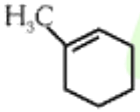
99. The rate of a reaction quadruples when temperature changes from 27°C to 57°C. Calculate the energy of activation.

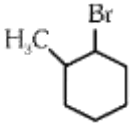
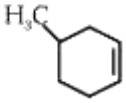
Given $R = 8.314\ J\ K^{-1}\ mol^{-1}, \log 4 = 0.6021$

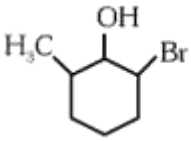
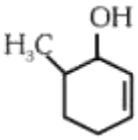
(A) $\frac{38.04 kJ}{mol}$ (B) $\frac{380.4 ks}{mol}$ (C) $\frac{3.80 kJ}{mol}$ (D) 3804 kJ/mol

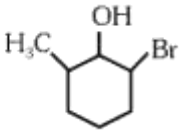
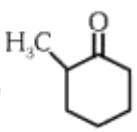
100. Major products A and B formed in the following reaction sequence, are



(A) A =  ; B = 

(B) A =  ; B = 

(C) A =  ; B = 

(D) A =  ; B = 

101. Lecithin, a small molecular weight organic compound found in living tissues, is an example of:
(A) Amino acids (B) Phospholipids
(C) Glycerides (D) Carbohydrates

102. 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:
(A) A, B and C only (B) B, C and D only
(C) C, D and E only (D) D and E only

103. Spindle fibers attach to kinetochores of chromosomes during
(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

104. Bulliform cells are responsible for
(A) Inward curling of leaves in monocots.
(B) Protecting the plant from salt stress.
(C) Increased photosynthesis in monocots.
(D) Providing large spaces for storage of sugars.

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

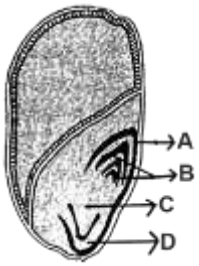
(A) C (B) D (C) A (D) B

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:
(A) A and B only (B) D and E only
(C) B and C only (D) A and E only

107. 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:
(A) Both Statement I and Statement II are true
(B) Both Statement I and Statement II are false
(C) Statement I is true but Statement II is false
(D) Statement I is false but Statement II is true

108. List of endangered species was released by
(A) GEAC (B) WWF (C) FOAM (D) IUCN

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



(A) A (B) B (C) C (D) D

110. 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:
(A) A-III, B-I, C-II, D-IV (B) A-II, B-IV, C-III, D-I
(C) A-III, B-I, C-IV, D-II (D) A-IV, B-I, C-III, D-II

111. 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)

(A) (a) Epigynous; (b) Hypogynous (B) (a) Hypogynous; (b) Epigynous
(C) (a) Perigynous; (b) Epigynous (D) (a) Perigynous; (b) Perigynous

112. Auxin is used by gardeners to prepare weed-free lawns. But no damage is caused to grass as auxin
(A) promotes apical dominance.
(B) promotes abscission of mature leaves only.
(C) does not affect mature monocotyledonous plants.
(D) can help in cell division in grasses, to produce growth.

113. A pink flowered Snapdragon plant was crossed with a red flowered Snapdragon plant. What type of phenotype/s is/are expected in the progeny?
(A) Only red flowered plants
(B) Red flowered as well as pink flowered plants
(C) Only pink flowered plants
(D) Red, Pink as well as white flowered plants

114. Which one of the following is not a criterion for classification of fungi?
(A) Morphology of mycelium (B) Mode of nutrition
(C) Mode of spore formation (D) Fruiting body

115. The lactose present in the growth medium of bacteria is transported to the cell by the action of
(A) Beta-galactosidase (B) Acetylase (C) Permease (D) Polymerase

116. 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?
(A) BB (B) bb (C) Bb (D) BB/Bb

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:
(A) Both Statement I and Statement II are true
(B) Both Statement I and Statement II are false
(C) Statement I is true but Statement II is false
(D) Statement I is false but Statement II is true

118. How many molecules of ATP and NADPH are required for every molecule of CO_2 fixed in the Calvin cycle?
(A) 2 molecules of ATP and 3 molecules of NADPH
(B) 2 molecules of ATP and 2 molecules of NADPH
(C) 3 molecules of ATP and 3 molecules of NADPH
(D) 3 molecules of ATP and 2 molecules of NADPH

119. 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;
(A) Repressor, Operator gene, Structural gene (B)Structural gene, Transposons, Operator gene
(C) Inducer, Repressor, Structural gene (D) Promotor, Structural gene, Terminator

120. 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.
(A) A, C, D and E only (B) A and B only
(C) A, B and E only (D) A, B and D only

121. The equation of Verhulst-Pearl logistic growth is $\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$.
From this equation, K indicates:
(A) Intrinsic rate of natural increase (B) Biotic potential
(C) Carrying capacity (D) Population density

122. Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:
(A) Cofactor inhibition (B) Feedback inhibition
(C) Competitive inhibition (D) Enzyme activation

123. 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:

(A) A, B and C only

(B) A, C, D and E only

(C) B, C and D only

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

124. 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:

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

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

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

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

125. Identify the set of **correct** statements:

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

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

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

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

E. In some hydrophytes, the pollen grains are carried passively inside water. Choose the correct answer from the options given below.

(A) C, D and E only

(B) A, B, C and D only

(C) A, C, D and E only

(D) B, C, D and E only

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:

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

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

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

(A) 8 bp (B) 6 bp (C) 4 bp (D) 10 bp

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

(A) Datura (B) Cassia (C) Pisum (D) Sesbania

129. 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

(A) *in-situ* conservation (B) Biodiversity conservation

(C) Semi-conservative method (D) Sustainable development

130. 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:

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

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

(A) Differentiation (B) Redifferentiation

(C) Dedifferentiation (D) Maturation

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

(A) Totipotency (B) Micropropagation

(C) Differentiation (D) Somatic hybridization

133. Match List I with List II

List I	**List II**
A. Two or more alternative forms of a gene	I. Back cross
B. Cross of F_1 progeny with homozygous	II.Ploidy recessive parent
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:

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

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

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

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

134. The cofactor of the enzyme carboxypeptidase is:

(A) Zinc (B)Niacin (C) Flavin (D)Haem

135. 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:

(A) A, C and D only

(B) A, B, C and D only

(C) A, B and E only

(D) A, B and D only

SECTION-B

136. 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:

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

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

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

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

137. 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.

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

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

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

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

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

(A) Malic acid → Oxaloacetic acid

(B) Succinic acid → Malic acid

(C) Succinyl-CoA → Succinic acid

(D) Isocitrate → α-ketoglutaric acid

139. 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:

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

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

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

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

140. 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:

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

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

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

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

141. 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 C4 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:

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

142. Identify the correct description about the given figure:

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

(B) Water pollinated flowers showing stamens with mucilaginous covering.

(C) Cleistogamous flowers showing autogamy.

(D) Compact inflorescence showing complete autogamy

143. 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 :

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

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

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

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

144. 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:

(A) A, B, C and D only

(B) B, C, D and E only

(C) A, C, D and E only

(D) A, B, C and E only

145. 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?

(A) $\frac{x}{10}\left(\text{kcal}\,m^{-2}\right)yr^{-1}$

(B) $x\left(\text{kcal}\,m^{-2}\right)yr^{-1}$

(C) $10x\left(\text{kcal}\,m^{-2}\right)yr^{-1}$

(D) $\frac{100x}{3x}\left(\text{kcal}\,m^{-2}\right)yr^{-1}$

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

(A) The DNA dependent DNA polymerase catalyses polymerization in one direction that is 3′ → 5′

(B) The DNA dependent RNA polymerase catalyses polymerization in one direction, that is 5′ →3′

(C) The DNA dependent DNA polymerase catalyses polymerization in 5′ → 3′ as well as 3′ → 5′ direction

(D) The DNA dependent DNA polymerase catalyses polymerization in 5′ → 3′ direction

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

(A) Callus

(B) Somatic embryos

(C) Protoplasts

(D) Pollens

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

(A) Auxin

(B) Gibberellin

(C) Cytokinin

(D) Abscisic acid

149. 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:

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

150. The DNA present in chloroplast is:

(A) Linear, double stranded
(B) Circular, double stranded
(C) Linear, single stranded
(D) Circular, single stranded

151. 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 :

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

152. 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:

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

153. 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 :

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

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

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

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

154. 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:

(A) A, B & D only (B) A, B & E only

(C) B, C & E only (D) C, D & E only

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

(A) Uterine fundus (B) Isthmus

(C) Infundibulum (D) Ampulla

156. The flipers of the Penguins and Dolphins are the example of the

(A) Adaptive radiation (B) Natural selection

(C) Convergent evolution (D) Divergent evolution

157. Match List I with List II:

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

Choose the correct answer from the options given below:

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

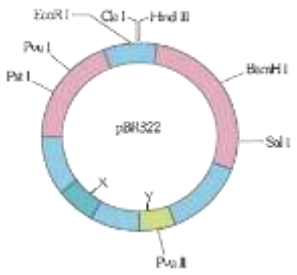
(B) A-III, B-I, C-II, D-IV

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

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

158. The following diagram showing restriction sites in E. co if cloning vectorypBR322.

Find the role of 'X' and 'Y' genes.



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

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

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

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

159. 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:

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

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

(C) A is correct but R is not correct

(D) A is not correct but R is correct

160. The "Ti plasmid" of *Agrobacterium tumefaciens* stands for

(A) Tumour inhibiting plasmid

(B) Tumor independent plasmid

(C) Tumor inducing plasmid

(D) Temperature independent plasmid

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 :

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

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

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

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

162. 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:

(A) D-A-C-B (B) B-A-D-C

(C) C-B-D-A (D) A-D-C-B

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

(A) Cortisol

(B) Testosterone

(C) Progesterone

(D) Glucagon

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

(A) 5^{th} segment

(B) 10^{th} segment

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

(D) 11^{th} segment

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

(A) Genetic recombination (B) Genetic drift

(C) Gene migration (D) Constant gene pool

166. 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 :

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

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

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

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

167. 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 :

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

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

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

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

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

3'TACATGGCAAATATCCATTCA5'

(A) 5'AUGUACCGUUUAUAGGUAAGU3'

(B) 5'AUGUAAAGUUUAUAGGUAAGU3'

(C) 5'AUGUACCGUUUAUAGGGAAGU3'

(D) 5'ATGTACCGTTTATAGGTAAGT3'

169. 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 :

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

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

(C) A is true but R is false

(D) A is false but R is true

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

(A) Coitus interruptus

(B) Periodic abstinence

(C) Lactational amenorrhea

(D) Vaults

171. 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 option given below:

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

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

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

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

172. Consider the following statements :

A. Annelids are true coelomates

B. Poriferans are pseudocoelomates

C. Aschelminthes are acoelomates

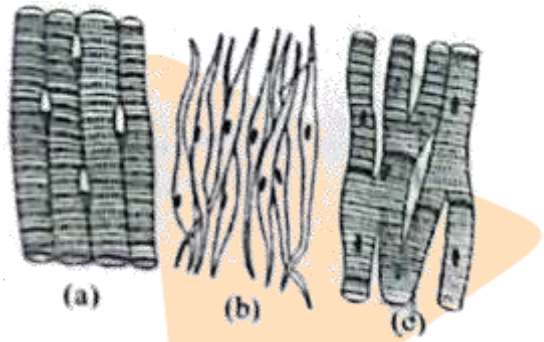
D. Platyhelminthes are pseudocoelomates

Choose the correct answer from the options given below :

(A) B only (B) A only

(C) C only (D) D only

173. 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

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

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

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

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

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

A. AV bundle B. Purkinje fibres

C. AV node D. Bundle branches E. SA node

Choose the correct sequence of pathway from the options given below

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

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

175. 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 :

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

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

176. 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 :

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

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

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

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

177. 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

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

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

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

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

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

(A) High pO_2 and High pCO_2

(B) High pO_2 and Lesser H^+ concentration

(C) Low pCO_2 and High H^+ concentration

(D) Low pCO_2 and High temperature

179. 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 :

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

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

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

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

180. 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:

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

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

181. Which of the following statements is incorrect?

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

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

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

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

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 option given below :

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

183. 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 a statements, choose the correct answer from the options given below :

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

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 :

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

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

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 :

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

Section B

186. Given below are two statements:

Statement I: Mitochondria and chloroplasts both double membranes bound organelles.

Statement II: Inner membrane of mitochondria is relatively less permeable, as compared chloroplast. In the light of the above statements, choose the mis appropriate answer from the options given below:

(A) Both Statement I and Statement II are correct.
(B) Both Statement I and Statement II are incorrect.
(C) Statement I is correct but Statement II is incorrect.
(D) Statement I is incorrect but Statement II is correct

187. Match List I with List II:

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

Choose the correct answer from the options given below :

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

188. 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 :

(A) Both Statement I and Statement II are true.
(B) Both Statement I and Statement II are false.
(C) Statement I is true but Statement II is false.
(D) Statement I is false but Statement II is true.

189. Match List I with List II:

	List I		**List II**
A.	Unicellular glandular epithelium	I.	Salivary glands
B.	Compound epithelium	II.	Pancreas
C.	Multicellular glandular epithelium	III.	Goblet cells of alimentary canal
D.	Endocrine glandular epithelium	IV.	Moist surface of buccal cavity

Choose the correct answer from the options given below:

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

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

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

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

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

	List I		**List II**
A.	The structures used for storing of food	I.	Gizzard
B.	Ring of 6-8 blind tubules at junction of foregut and midgut.	II.	Gastric Caeca
C.	Ring of 100-150 yellow coloured thin filaments at junction of midgut and hindgut.	III.	Malpighian tubules
D.	The structures used for grinding the food.	IV.	Crop

Choose the correct answer from the options given below:

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

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

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

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

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

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

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

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

(D) Juxta medullary nephrons outnumber the cortical nephrons.

192. 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 :

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

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

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

(D) 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:

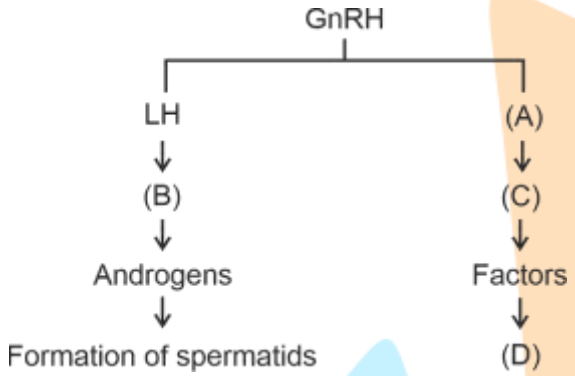
(A) Both Statement I and Statement II are correct.

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

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

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

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



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

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

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

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

195. 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

As per ABO blood grouping system, the blood group of father is B+, mother is A^+ and child is O^+. Theirrespective genotype can be

A. IBi/IAi/ii

B. IBIB/IAIA/ii

C. IAIB/iIA/IBi

D. IAi/IBi/IAi

E. iIB/iIA/IAIB

Choose the most appropriate answer from the options given below :

(A) A only

(B) B only

(C) C & B only

(D) D & E only

196. 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 above statements, choose the most appropriate answer from the options given below

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

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

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

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

197. 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 :

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

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

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

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

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 :

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

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

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

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

199. Match List I with List II :

	List I		**List II**
A.	Exophthalmic goiter	I.	Excess secretion of cortisol, moon face & hypergylcemia.
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 :

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

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

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

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

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:

(A) A & C only

(B) A, B & D only

(C) B, D & E only

(D) B, C & D only