Dated :
09-03-2023

M.L. Syal's Helix Institute

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Test Series HMC-8 (Punjab Board Students)

Test-1

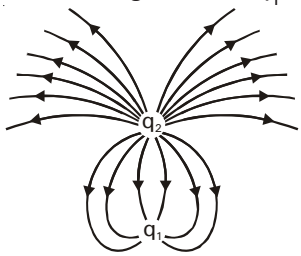
MM : 720 Time : 3 hrs. 20 min.

Physics	:	Electrostatics, Current Electricity, Magnetic Effects of Current
Chemistry	:	GOC(i/c) Nomenclature & Isomerism, Hydrocarbons,Purification, Alkyl & Aryl halides
Zoology	:	Evolution, Human Reproduction, Reproductive health
Botany	:	Ecology

PHYSICS : SECTION-A

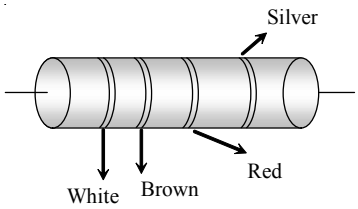
All questions are compulsory in section A

1. What is the ratio of magnitude of q_1 to that of q_2?



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

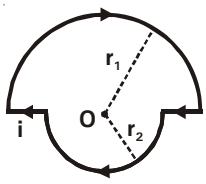
2.



In the figure a carbon resistor has bands of different colours on its body as mentioned in the figure. The value of the resistance is

(1) 2.2 k Ω (2) 3.3 k Ω
(3) 5.6 k Ω (4) 9.1 k Ω

3.



In the figure shown there are two semicircles of radii r_1 and r_2 in which a current i is flowing. The magnetic induction at the centre O will be

(1) $\frac{\mu_0 i}{4}(r_1 + r_2)$ (2) $\frac{\mu_0 i}{4}(r_1 - r_2)$

(3) $\frac{\mu_0 i}{4}\left(\frac{r_1 + r_2}{r_1 r_2}\right)$ (4) $\frac{\mu_0 i}{4}\left(\frac{r_2 - r_1}{r_1 r_2}\right)$

4. Which of following material is not widely used in wire-bound standard resistors since their resistance values would change a lot with temperature?
(1) Nichrome
(2) Copper
(3) Manganin
(4) Constantan

5. **Statement-I** : A beam of electrons and protons move parallel to each other in the same direction, then they repel each other magnetically.
Statement-II : The shape of magnet, in moving coil galvanometer to make the magnetic field radial, is convex.
(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

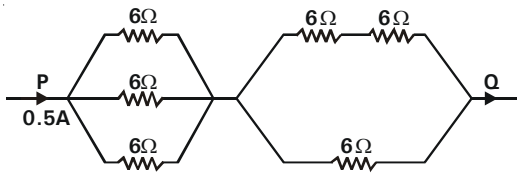
6. If a proton, deutron and α-particle on being accelerated by the same potential difference enter perpendicular to the magnetic field, then the ratio of the radii of their circular paths is
(1) $1 : \sqrt{2} : \sqrt{2}$ (2) $2 : \sqrt{2} : 1$
(3) $1 : \sqrt{2} : 1$ (4) $1 : 1 : \sqrt{2}$

7. A (25 W – 220 V) bulb and a (100 W – 200 V) bulb are joined in series to a source of 350 volt supply. Then
(1) 25 W bulb will be more bright
(2) 100 W bulb will be more bright
(3) 25 W bulb will get fused
(4) both bulbs will get fused

8. Let a long wire carries a steady current. First it is bent into a circular coil of one turn and the magnetic induction at the centre is B_1. Then the same wire is bent to form a circular coil of n turns and magnetic induction at the centre is B_2. Then
(1) $B_2 = B_1$ (2) $B_2 = n B_1$
(3) $B_2 = n^2 B_1$ (4) $B_1 = n^2 B_2$

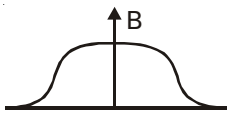
9. An electric dipole has the magnitude of its charge as q and its dipole moment is p. It is placed in a uniform electric field E. If its dipole moment is along the direction of field, force on it and its potential energy are respectively
(1) 2qE and minimum (2) qE and pE
(3) Zero and minimum (4) qE and maximum

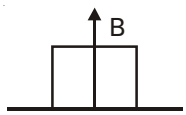
10. Resistances of 6 ohm each are connected in the manner shown in figure. With the current 0.5 ampere, the potential difference $V_P - V_Q$ is

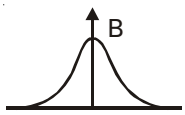


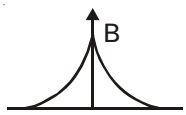
(1) 3.6 V (2) 6.0 V
(3) 3.0 V (4) 7.2 V

11. Magnetic field B along the axis of a finite straight solenoid is represented as

(1) 

(2) 

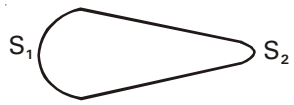
(3) 

(4) 

12. 

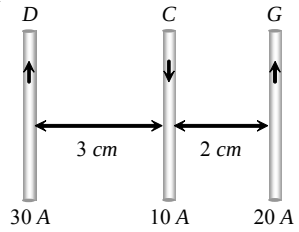
In the above arrangement of two charges A and B, on the straight line joining them, electric field will be zero at a distance of
(1) 4 m from A towards its left
(2) 4 m from B towards its left
(3) 6 m from B towards its right
(4) 6 m from B towards its left

13. A conducting body shown in figure is given some charge. If radii of curvature of two surfaces S_1 and S_2 is in ratio 10 : 1, charge density is

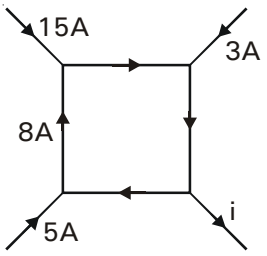


(1) more on surface S_1
(2) more on surface S_2
(3) same on both the surfaces
(4) more on surface S_1 for positive charge and on surface S_2 for negative charge

14. Three long, straight parallel wires carrying current, are arranged as shown in figure. The force experienced by a 25 cm length of wire C is



(1) 10^{-3} N (2) 2.5×10^{-3} N
(3) Zero (4) 1.5×10^{-3} N

15. 

The figure shows a network of currents. The magnitude of currents is shown here. The current i will be

(1) 3 A (2) 13 A
(3) 23 A (4) – 3 A

16. **Assertion** : Gauss's law can't be used for calculating the electric field due to three equal charges located at the corners of an equilateral triangle.

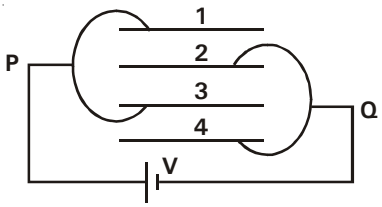
Reason : Gauss's law is not valid for this case.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

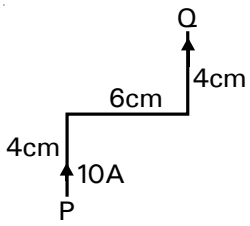
17. At what distance from a point charge the electric field is 500 V/m and potential is 3000 V?

(1) 6 m (2) 12 m
(3) 36 m (4) 144 m

18. Four plates each of area A and separation d are arranged as shown. What is the magnitude of electric field between the plate 2 and 3?



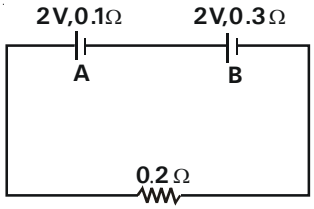
(1) $\frac{\varepsilon_0 A}{d}$ (2) $\left(\frac{\varepsilon_0 A}{d}\right)V$
(3) $\frac{V}{d}$ (4) $\frac{2V}{d}$

19. 

A current carrying wire PQ is bent in the from shown. If wire carries a current of 10 A and it is placed in a magnetic field of 5T which acts perpendicular to the paper outwards. Then it will experience a force of

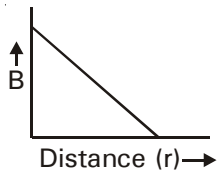
(1) Zero (2) 5 N
(3) 30 N (4) 20 N

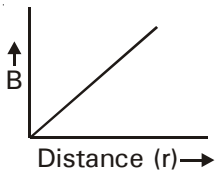
20. The potential difference across the cell

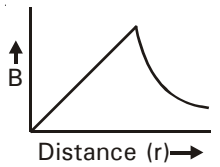


(1) B will be zero (2) A will be zero
(3) A & B will be 2V (4) none of these

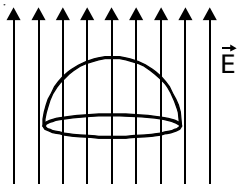
21. Which of the following graphs represents variation of magnetic field B with distance 'r' for a straight long soild cylinder carrying current?

(1) 

(2) 

(3) 

(4) 

22. 

A hemispherical plastic bowl of radius R is located in a uniform electric field as shown. What is the magnitude of the electric flux through the curved surface of the bowl?

(1) zero (2) $4\pi R^2E/3$

(3) $2\pi R^2E$ (4) πR^2E

23. A long string with a charge λ per unit length passes through a imaginary cube of edge 'a'. The maximum flux of electric field through cube will be

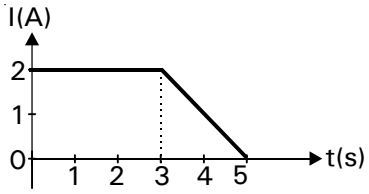
(1) $\lambda a/\varepsilon_0$ (2) $\sqrt{2}\,\lambda a/\varepsilon_0$

(3) $6\lambda a^2/\varepsilon_0$ (4) $\sqrt{3}\,\lambda a/\varepsilon_0$

24. If electric flux entering and leaving an enclosed surface respectively is ϕ_1 and ϕ_2, the electric charge inside the surface will be

(1) $(\phi_1 + \phi_2)\varepsilon_0$ (2) $(\phi_2 - \phi_1)\varepsilon_0$

(3) $\dfrac{\phi_1 + \phi_2}{\varepsilon_0}$ (4) $\dfrac{\phi_2 - \phi_1}{\varepsilon_0}$

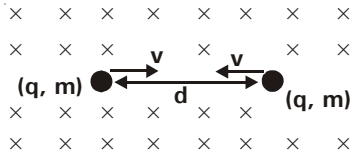
25. 

The graph shows the variation of current with time in a circuit. The average current from 0 to 5 seconds is

(1) 2 A (2) 1.8 A

(3) 1.6 A (4) 1.5 A

26. Two charged particle of charge q and mass m approaches each other with velocity v each in a uniform magnetic field B. For which minimum value of v they will not collide with each other



(1) $\dfrac{qB2d}{m}$ (2) $\dfrac{qBd}{2m}$

(3) $\dfrac{qBd}{4m}$ (4) For all value of v

27. **Statement-I** : In case of conductors, drift velocity does not vary on increasing the intensity of electric field.

Statement-II : Kirchhoff's loop rule is based on the law of conservation of energy.

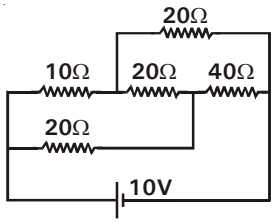
(1) Both statement-I and statement-II are correct

(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

28.



In the circuit shown, current drawn from the ideal battery is

(1) $\frac{1}{3}$ A (2) $\frac{1}{2}$ A

(3) $\frac{2}{3}$ A (4) 1 A

29. A parallel plate capacitor of capacitance C has charges q and −q on its plates. If one of the plates is moved to double the distance between them, then work done by external force is

(1) $\frac{q^2}{C}$ (2) $\frac{q^2}{2C}$

(3) $\frac{q^2}{4C}$ (4) $\frac{2q^2}{C}$

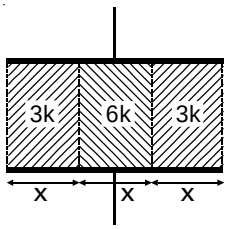
30. **Assertion** : A potentiometer wire of longer length should be used for more accurate measurements.
Reason : The potential gradient for a potentiometer of longer length with given source of emf becomes smaller.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

31. A circular loop of area 0.01m^2 carrying a current of 10A, is held perpendicular to a magnetic field of intensity 0.1T. The torque acting on the loop is

(1) zero (2) 0.01 N-m
(3) 0.001 N-m (4) 0.8 N-m

32.



A air filled parallel plate capacitor has capacitance C. It is now filled with different dielectric media as shown. The new capacitance is

(1) 4 kC (2) $\frac{2}{5}$kC

(3) 10 kC (4) $\frac{kC}{10}$

33. Ratio of potential at the centre to that at the surface of a solid sphere with uniform volume distribution of charge is

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

34. It is required to convert a galvanometer of current range 15 milli-ampere and resistance 50 Ω into a voltmeter of range 150 V. The necessary resistance in series is

(1) 995 Ω (2) 9950 Ω
(3) 1/995 Ω (4) 1/9950 Ω

35. What is the electrostatic potential energy of a system consisting of two charges 7 μC and −2 μC (and with no external field) placed at (−9 cm, 0, 0) and (9 cm, 0, 0)

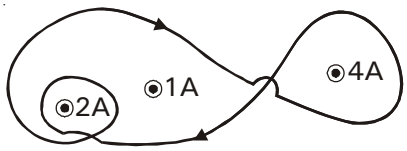
(1) 7 J (2) −0.7 J
(3) 0.7 J (4) 14 J

PHYSICS : SECTION-B

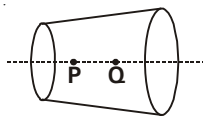
This section has 15 questions, attempt any 10 questions of them.

36. Two point charges $+3\ \mu C$ and $+8\ \mu C$ repel each other with a force of 40 N. If a charge of $-5\ \mu C$ is added to each of them, then the force between them will become
(1) -10 N (2) $+10$ N
(3) $+20$ N (4) -20 N

37. Around the loop shown, taking the direction of $\vec{dl}$ as that of the arrows, the value of $\oint \vec{B}.\vec{dl}$ will be



(1) μ_0 (2) $-\mu_0$
(3) $2\mu_0$ (4) $-2\mu_0$

38. 

A wire has a non-uniform cross-section as shown above. A steady current flows through it. If the drift speeds of electrons at points P and Q are v_P and v_Q respectively, then
(1) $v_P = v_Q$ (2) $v_P < v_Q$
(3) $v_P > v_Q$ (4) $2v_P = v_Q$

39. A current is flowing in a horizontal transmission line towards north, then direction of magnetic field at a point which is just below the wire is towards
(1) east (2) west
(3) north (4) south

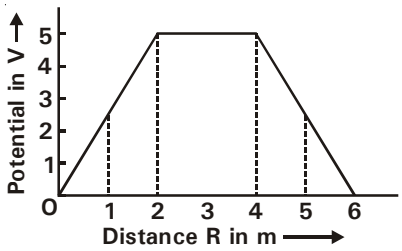
40. Ten identical cells, each of emf 1.5 V and internal resistance $0.1\ \Omega$ are connected in series and an external resistance $9\ \Omega$ is connected across this battery. The current in the circuit is
(1) 1.5 A (2) 1.2 A
(3) 1.3 A (4) 1.6 A

41. A capacitor of $1\ \mu F$ is charged to a potential of 50V. It is now connected to an uncharged capacitor of $4\ \mu F$. The common potential is
(1) 10 V (2) 50 V
(3) 25 V (4) 100 V

42. A Daniel cell is balanced on 125 cm length of a potentiometer wire. Now the cell is short-circuited by a resistance 2 ohm and the balance is obtained at 100 cm. The internal resistance of the Daniel cell is
(1) 0.5 ohm (2) 1.5 ohm
(3) 1.25 ohm (4) 4/5 ohm

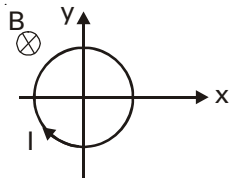
43. **Statement-I** : A capacitor stores charge in electrostatic field between plates.
Statement-II : A metal can be used as a medium for dielectric.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

44. The variation of potential with distance R from a fixed point is as shown in the figure. The electric field at R = 5m is



(1) 2.5 volt/m (2) -2.5 volt/m
(3) 2/5 volt/m (4) $-2/5$ volt/m

45. A conducting loop carrying a current I is placed in uniform magnetic field pointing into the plane of paper as shown. The loop will have a tendency to



(1) contract
(2) expand
(3) move towards + ve x-axis
(4) move towards − ve x-axis

46. Three charges 2q, −q, −q are located at the vertices of an equilateral triangle. At the centre of the triangle
(1) the field is zero but potential is non-zero
(2) the field is non-zero but potential is zero
(3) both field and potential are zero
(4) both field and potential are non-zero

47. If the resistance of a conductor is 5 Ω at 50°C and 7 Ω at 100°C then the mean temperature coefficient of resistance of the material is
(1) 0.008/°C (2) 0.006/°C
(3) 0.004/°C (4) 0.001/°C

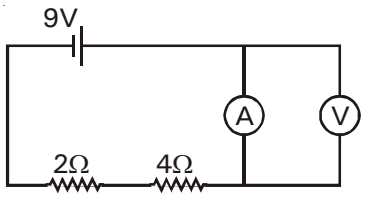
48. Match physical quantities in column-I with their dimensions in column-II

	column-I		**column-II**
a.	Electric field	p.	$[ML^3 T^{-3} A^{-1}]$
b.	Electric flux	q.	[LTA]
c.	Dipole moment	r.	$[MLT^{-3} A^{-1}]$

(1) a-r, b-p, c-q (2) a-p, b-r, c-q
(3) a-r, b-q, c-p (4) a-q, b-r, c-p

49. Which of the following is false?
(1) A magnetic field exerts a force, if the charged particle is moving across the magnetic field lines.
(2) There is no change in the kinetic energy of a charged particle moving in a magnetic field although a magnetic force may be acting on it.
(3) In a cyclotron electric field increases K.E. while magnetic field changes direction of moving charge particle.
(4) If a copper rod carries a direct current, the magnetic field associated with the current will be outside the rod and not inside the rod.

50.



In the circuit shown, A and V are ideal ammeter and voltmeter. Their respective readings will be
(1) 1.5 A, 0 V
(2) 1 A, 0.5 V
(3) 0 A, 0 V
(4) 1.5 A, 9 V

CHEMISTRY : SECTION-A

All questions are compulsory in section A

51. Propanoic acid and methyl ethanoate are which type of isomers
(1) tautomer (2) positional
(3) functional (4) metamers

52. On monochlorination of isopentane, the total number of enantiomeric pairs obtained is?
(1) 2 (2) 4
(3) 6 (4) 8

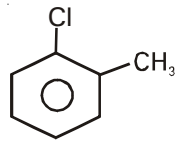
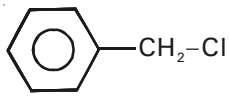
53. The structural formula for 2-Ethylprop-2-en-1-ol is
(1) $CH_2CH_3-\underset{\underset{CH_3}{|}}{C}=CH-OH$
(2) $CH_3CH_2CH=CH-CH_2OH$
(3) $CH_3-\underset{\underset{CH_3}{|}}{C}=CH-CH_2OH$
(4) $CH_2=\underset{\underset{CH_2CH_3}{|}}{CH}-CH-OH$

54. Propene when treated with HBr in presence of $(C_6H_5CO)_2O_2$ gives major product A. 'A' on heating with alcoholic potash given B.The conversion of A to B is
(1) Dehydrohalogenation reaction
(2) β –elimination reaction
(3) Electrophilic addition reaction
(4) Both (1) & (2)

55. The percentage of sulphur in an organic compound whose 0.32 g produces 0.233 g of $BaSO_4$ (At. wt. of Ba = 137, S = 32) is
(1) 1.0 (2) 10.0
(3) 23.5 (4) 32.1

56. Which of the following has highest inductive effect?
(1) CH_3- (2) CH_3-CH_2-
(3) $(CH_3)_2-CH-$ (4) $(CH_3)_3C-$

57. Type of reactions shown by benzene are mainly
(1) electrophillic substitution
(2) electrophillic addition
(3) nucleophillic addition
(4) nucleophillic substitution

58. Which of the following will undergo hydrolysis at the slowest rate?
(1) 
(2) CH_3-CH_2-Cl
(3) $CH_2=CH-CH_2-Cl$
(4) 

59. Which sodium salt on heating with soda lime give propane?
(1) $CH_3-CH_2-\underset{\underset{O}{||}}{C}-O^-Na^+$
(2) $CH_3-CH_2-CH_2-\underset{\underset{O}{||}}{C}-O^-Na^+$
(3) $(CH_3)_2CHCH_2-\underset{\underset{O}{||}}{C}-O^-Na^+$
(4) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH=CH_2$

60. The number of 1° and 2° carbon atoms in n-pentane are respectively
(1) 2, 3 (2) 3, 2
(3) 2, 4 (4) 1, 3

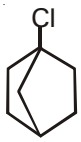
61. An alkene on reductive ozonolysis gives 2 molecules of $CH_2(CHO)_2$. The alkene is
(1) 2,4–hexadiene
(2) 1,3–cyclohexadiene
(3) 1,4– cyclohexadiene
(4) 1–methyl –1,3– cyclopentadiene

62. Kjeldahl's method can be used for the estimation of nitrogen in

(1) pyridine (2) azobenzene
(3) nitrobenzene (4) ethylamine

63. When ethyl alcohol (C_2H_5OH)reacts with thionyl chloride, in the presence of pyridine, the product obtained is

(1) $CH_3CH_2Cl + HCl$
(2) $C_2H_5Cl + HCl + SO_3$
(3) $CH_3CH_2Cl + H_2O + SO_2$
(4) $CH_3CH_2Cl + HCl + SO_2$

64. **Assertion :**  does not give precipitate when treated with $AgNO_3$ solution.

Reason : The nucleophilic substitution reaction does not take place at bridge head carbon atoms.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

65. Which is most acidic ?

(1) $ClCH_2COOH$ (2) O_2N-CH_2COOH
(3) CH_3COOH (4) C_2H_5COOH

66. Match the terms mentioned in column I with their respective terms in column II.

Column I	**Column II**
i. Carbocation	a. ethyne
ii. *sp* hybridisation	b. species that can supply a pair of electrons
iii. Nucleophile	c. species that can receive a pair of electron
iv. Electrophile	d. sp^2 hybridised carbon with empty p-orbital

(1) i-a, ii-d, iii-b, iv-c (2) i-d, ii-a, iii-b, iv-c
(3) i-b, ii-d, iii-a, iv-c (4) i-d, ii-a, iii-c, iv-b

67. The order of reactivities of the following alkyl halides with Mg to form Grignard's reagent is

(1) R–Cl > R–Br > R–I
(2) R–Br > R–Cl > R–I
(3) R–Cl > R–I > R–Br
(4) R–I > R–Br > R–Cl

68. Which of the following represents Wurtz-fittig reaction

(1) $2C_6H_5I + 2Na \rightarrow C_6H_5C_6H_5 + 2NaI$
(2) $C_6H_5I + 2Na + CH_3I \rightarrow C_6H_5CH_3 + 2NaI$
(3) $2CH_3CH_2I + 2Na \rightarrow CH_3CH_2CH_2CH_3 + 2NaI$
(4) $CH_3Br + AgF \rightarrow CH_3F + AgBr$

69. Which step is chain propagation step in the following mechanism?

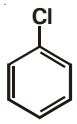
(1) $Cl_2 \xrightarrow{h\nu} \dot{Cl} + \dot{Cl}$
(2) $\dot{Cl} + CH_4 \longrightarrow \dot{C}H_3 + HCl$
(3) $\dot{Cl} + \dot{Cl} \longrightarrow Cl_2$
(4) $\dot{C}H_3 + \dot{Cl} \longrightarrow CH_3Cl$

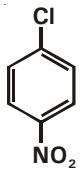
70. $CH_3-CH = CH_2 \xrightarrow{Br_2 / NaCl}$

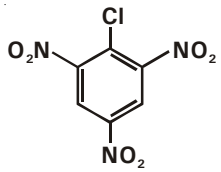
Product of the above reaction is

(1) Only 1,2-dibromopropane
(2) Only 1–bromo-2- chloropropane
(3) Only 2–bromo– 1–chloropropane
(4) Mixture of 1,2–dibromopropane and 1–bromo –2– chloropropane

71. Arrange the compounds in increasing order of rate of reaction towards nucleophilic substitution

(a) 

(b) 

(c) 

(1) (c) < (b) < (a) (2) (b) < (c) < (a)
(3) (a) < (c) < (b) (4) (a) < (b) < (c)

72. Which of the following statements is correct for electromeric effect?

(1) It is a temporary effect

(2) It is the property shown by π bond

(3) It take place in presence of a reagent, i.e., electrophile or nucleophile

(4) All are correct

73. **Statement-I** : Ethyne on passing through red hot iron tube at 873 K undergoes cyclic polymerisation.
Statement-II : Three molecules of ethyne polymerise to form benzene.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

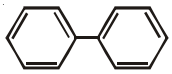
(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

74. Which of the following is /are aromatic?

a. 

b. 

c. 

(1) both a & b (2) both b & c

(3) both a & c (4) a, b & c

75. Which of the following is the most stable carbocation?

(1) $CH_3-\overset{\oplus}{C}H-OH$ (2) $CH_3-\overset{O}{\overset{\|}{C}}-\overset{\oplus}{C}H_2$

(3) $CH_3-\overset{\oplus}{C}H-NH_2$ (4) $CH_3\overset{\oplus}{C}H-CN$

76. Which of the following is incorrect for the reaction $RX + NaI \rightarrow RI + NaX$

(1) Reactions occurs in presence of dry acetone

(2) X is generally Cl or Br

(3) NaCl or NaBr formed is soluble in dry acetone.

(4) The reaction is called Finkelstein halide exchange reaction

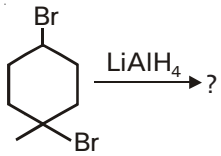
77. A flask contains a mixture of isohexane (boiling point = 63°C)- and 3–methyl pentane (boiling point = 60°C). What is the best way to separate the two liquids?

(1) Simple distillation

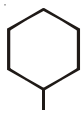
(2) Fractional distillation

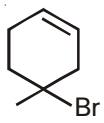
(3) Chromatography

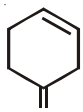
(4) Solvent extraction

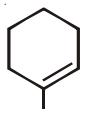
78. 

The product formed in reaction is

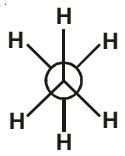
(1) 

(2) 

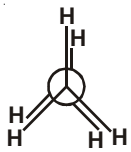
(3) 

(4) 

79. Which type of conformation is shown by I and II?



(I)



(II)

(1) I is eclipsed, II is staggered.

(2) II is eclipsed, I is staggered.

(3) Both are eclipsed.

(4) Both are staggered.

80. Keto-enol tautomerism is observed in

(1) C_6H_5CHO

(2) $C_6H_5COC_6H_5$

(3) $C_6H_5COCH_2COCH_3$

(4) $CH_2=CHCHO$

81. Principle involved in paper chromatography is

(1) Adsorption (2) Partition

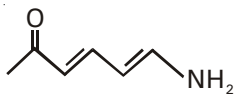
(3) Solubility (4) Volatility

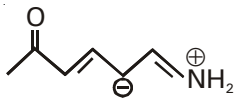
82. $CH_2=CH-CH_3+NBS \xrightarrow{h\nu} A$. A will be

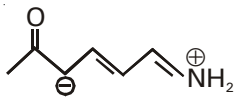
(1) $CH_2-CH_2-CH_3$ with Br (2) $CH_2-CH-CH_3$ with Br and Br

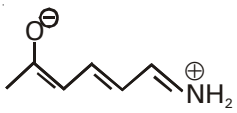
(3) $CH_2=CH-CH_2Br$ (4) All of these

83. Among the following the most stable resonating structure is

(1) 

(2) 

(3) 

(4) 

84. $A \xrightarrow[\text{Reaction}]{\text{Wurtz}}$ 2,3–Dimethyl butane. A is

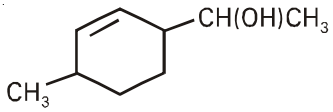
(1) hexane

(2) isopropyl bromide

(3) neohexane

(4) 2,3– dimethyl hexane

85. The number of chiral centres in the following molecules is



(1) 1 (2) 2

(3) 4 (4) 3

CHEMISTRY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

86. The reaction

$CH_2=CH_2+H_2 \xrightarrow[523-573K]{Ni} CH_3-CH_3$ is called

(1) Wurtz's reaction

(2) Kolbe's electrolysis

(3) Sabatier and Senderen's reaction

(4) Frankland reaction

87. In S_N1 reaction, first step involves formation of

(1) free radical (2) carbanion

(3) carbocation (4) final product

88. Which of the following set has only nucleophiles?

(1) NH_3 , $H_3O^{\oplus}$, $OH^{\ominus}$

(2) NH_3, H_2O, $Cl^{\ominus}$

(3) $NH_4^{\oplus}$,CH_3CHO, RCN

(4) $CH_3^{\oplus}$, $CH_3^{\ominus}$, PCl_3

89. Which of the following is not an example of conjugated system?

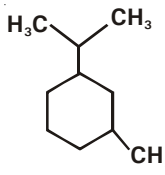
(1) 1, 3-butadiene (2) 

(3)  (4) $CH_2=CH-\overset{+}{C}H_2$

90. How many alkanes of molecular weight 100 are chiral ?

(1) 1 (2) 2

(3) 3 (4) 5

91. The IUPAC name of  is

(1) 1-methyl-3-(1-methylethyl)cyclohexane

(2) 2-(3-methylcyclohexyl) propane

(3) 3-methyl-1-(1-methylethyl) cyclohexane

(4) 1, 3-isopropylmethylcyclohexane

92. Elimination reaction of 2–bromopentane to form pent–2–ene is

A. β –elimination reaction

B. Follows Zaitsev's rule

C. Dehydrohalogenation

D. Dehydration

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

(3) A, B, D (4) A,B, C & D

93. Which of the following pair is correctly matched?

	Reaction	**Major Product**
I.	$R-X+AgCN$	$R-NC$
II.	$R-X+KCN$	$R-CN$
III.	$R-X+KNO_2$	$R-NO_2$
IV.	$R-X+AgNO_2$	$R-O-N=O$

(1) I alone (2) I and II

(3) III and IV (4) I, II, III and IV

94. **Statement-I :** Alkyne is less reactive for nucleophilic addition than alkene.

Statement-II : The vinylic intermediate produced during the addition of nucleophile in alkyne is more stable than the intermediate given by alkene.

(1) Both statement-I and statement-II are correct

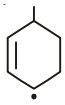
(2) Both statement-I and statement-II are incorrect

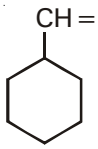
(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

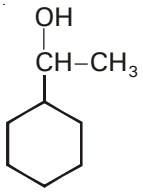
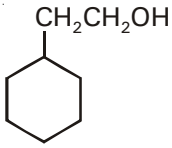
95. The most stable free radical is

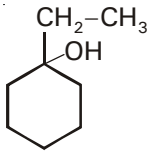
(1)  (2) 

(3)  (4) 

96.  $\xrightarrow{H_2O/H^+}$ A (major product)

In the above reaction, the product A is

(1)  (2) 

(3)  (4) Both (1) & (2)

97. **Assertion :** Aqueous hydrohalogen acids are used to prepare alkyl halides from alkenes.

Reason : Hydrogen iodide readily reacts with alkenes to form alkyl halides.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

98. Cyclic compounds show geometrical isomerism because of

(1) free rotation about C–C bond

(2) 1, 3-migration of H-atom

(3) hindered rotation about C–C bond due to rigid ring structure

(4) all are correct

99. The blue colour developed during the Lassaigne's test for nitrogen is due to
(1) $Fe_3[Fe(CN)_6]_4$ (2) $Fe_4[Fe(CN)_6]_3$
(3) $K_4[Fe(CN)_6]$ (4) $Fe(CNS)_3$

100. The maximum number of structural isomers with molecular formula C_4H_8 are
(1) 2 (2) 4
(3) 3 (4) 5

ZOOLOGY : SECTION-A

All questions are compulsory in section A

101. Which set of the following accentuate variations are ?
(1) Habitat fragmentation and genetic drift
(2) Natural selection and small variations
(3) Mutations and use and disuse of organ
(4) any of these

102. Two peaks are observed in the distribution curve of which type of natural selection?
(1) Directional (2) Diversifying
(3) Stabilising (4) Progressive

103. Embryological support for evolution was given by
(1) Ernst Haeckel
(2) Hugo de Vries
(3) Darwin
(4) Lamarck

104. Which of the following is not a correct match?
(1) Octopus eye & mammalian eye – Analogy
(2) Similarity in proteins – Homology
(3) Flipper of Penguins & Dolphins – Convergence
(4) Vertebrate heart – Analogy

105. **Statement- I** : Oviducts, uterus, ovaries & vagina constitute the female accessory ducts.
Statement- II : The edges of infundibulum possess finger like structures called fimbrae.
(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

106. The type of selection observed in peppered moth during industrial melanism is
(1) stabilising (2) directional
(3) disruptive (4) normalising

107. Find the correct match
(1) Thecodont – Common ancestors of Lizards, Dinosaur & Birds
(2) *Psilophyton* – Common ancestors of Bryophytes, Algae, Fungi
(3) Reptiles – First true land vertebrate
(4) Duck billed platypus – Missing link between reptiles & Mammals

108. Unpaired female accessory ducts are
(1) Vagina and fallopian tube
(2) Oviduct and uterus
(3) Uterus and vagina
(4) Fallopian tube and epididymus

109. Evolution is a stochastic phenomenon which depends on
(1) chance events in nature
(2) chance mutation in organism
(3) variations
(4) all of these

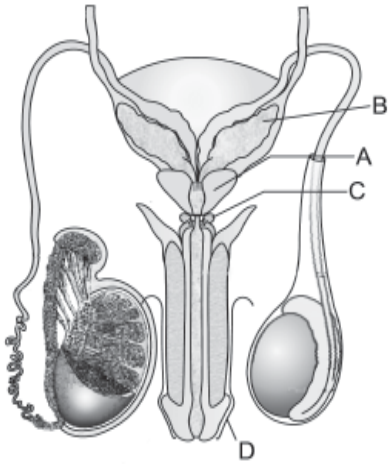
110. Match the entities given in column-I with those of column-II

Column-I	**Column-II**
a. Perimetrium	i. undergoes strong uterine contractions during child birth
b. Myometrium	ii. thin membranous
c. Endometrium	iii. glandular

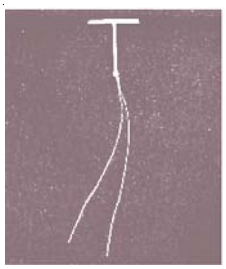
(1) a-i, b-ii, c-iii (2) a-ii, b-iii, c-i
(3) a-ii, b-i, c-iii (4) a-iii, b-i, c-ii

111. Which of the following are correct statements ?
a. the rate of appearance of new forms is linked to life span of the organisms
b. there must be a genetic basis for any trait to be selected naturally in order to evolve
c. new alleles added to a population by genetic recombination always enhance the effect of selection
d. sampling errors often reduce the genetic variability of the population
(1) a, b, d (2) a, b, c
(3) b, c, d (4) a, c, d

112. Following is a diagrammatic view of male reproductive system. Identify the structure which releases a secretion that helps in lubrication of penis?



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

113. 

What is incorrect w.r.t. above figure?
(1) It is inserted by medical professionals in the uterus through vagina
(2) It releases Cu^{2+} ions which suppress sperm motility
(3) It prevents implantation
(4) None of these

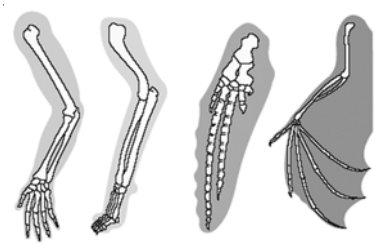
114. Which of the following is the correct match?

	Category	Examples	Exception
(1)	Composition of seminal plasma	Prostaglandins, fructose, calcium	Fructose
(2)	Cells lining the seminiferous tubules	Immunologically competent cells, spermatogonia	Spermatogonia
(3)	Characteristics of semen	Thin, alkaline and milky	Thin
(4)	Components of the intratesticular genital duct system	Ductuli efferents, epididymis, tubuli reacti	Tubuli recti

115. Development of different functional structure from a common ancestor shows
(1) parallel evolution
(2) adaptive convergence
(3) adaptive radiation
(4) reversion

116. Which of the following is false statement?
(1) Excess use of herbicides and pesticides has resulted in selection of resistant varieties in a much larger time scale.
(2) Natural selection is based on certain observations which are factual.
(3) Mendel had talked of inheritable 'factors' influencing phenotype.
(4) According to Malthus, resources grow arithmatically and population size increases geometrically

117. What can we infer about the structures shown in figure?



(1) These structures are anatomically similar
(2) The structures perform similar functions though their origin may or may not be similar
(3) They exhibit convergent evolution
(4) Both (1) & (3)

118. How many statements are false ?
a. Each testis has about 250 compartments called testicular lobules
b. Each lobule contains 4-5 highly coiled seminiferous tubules
c. Leydig cells in testis secrete proteinaceous testicular hormones
d. Each seminiferous tubules is lined by two types of cells called male germ cells & Leydig cells
(1) Three (2) Four
(3) Two (4) One

119. How many of the following are exclusively extra abdominal?
Seminiferous tubules, vasa efferentia, spermatic cords, urethra, rete testis, vasa deferentia
(1) two (2) three
(3) four (4) five

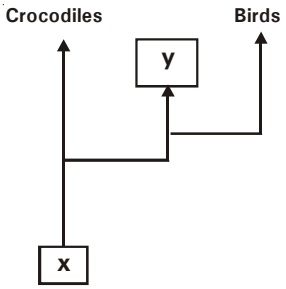
120. Which of the following is incorrect regarding mammalian evolution?
(1) When reptiles came down, mammals dominated earth
(2) North American mammals resembling horse, hippopotamus, bear, rabbit etc. were overridden by South American fauna
(3) First mammals were shrew like and their fossils were small sized
(4) Some mammals could adapt to live completely in water

121. Which will never be seen in the proliferative phase of menstrual cycle?
(1) Primary follicle
(2) Regeneration of endometrium of uterus
(3) Formation of corpus luteum
(4) Peak level of LH & FSH

122. Which of the following statement is correct?
(1) Hymen is a membrane which fully covers the vaginal opening
(2) Individual organisms may die without fail, but species continue to live through millions of years unless threatened by natural or anthropogenic extinction
(3) Penis possess two types of special erectile tissue
(4) Both (2) and (3)

123. Which of the following statements are correct?
a. Exo-biology is study of history of life on earth
b. When we look at moon on a clear night sky we are looking long back in time
c. Stellar distances are measured in light years
d. universe is very old–almost 20 billion years old
(1) both a & b (2) both b & c
(3) both c & d (4) both a & d

124. Identify x and y from vertebrate evolution



(1) therapsids and mammals
(2) therapsids and dinosaurs
(3) sauropsids and therapsids
(4) thecodonts and dinosaurs

125. Which of the following characters are related with ideal contraceptive?
a. User friendly
b. Easily available in market
c. Irreversible
d. Mandatory medical supervision
e. No or least side effects
(1) a, b, c & e (2) a, b & e
(3) a, b, d & e (4) a, b, c, d & e

126. Human evolution is
(1) adaptive convergence as well as phyletic speciation
(2) phyletic evolution and adaptive convergence
(3) phyletic evolution and progressive evolution
(4) phyletic evolution and retrogressive evolution

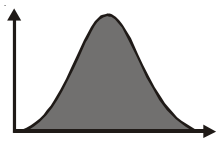
127. Choose the incorrect statement
(1) The glandular tissue of breast is divided into 15-20 mammary lobes
(2) The milk produced during initial few days of lactation is rich in Ig A.
(3) Prolactin secreted from posterior lobe of pituitary regulates formation of milk in mammary glands
(4) Mammary glands are characteristic of all mammals

128. **Assertion** : Ovaries are the primary female sex organs
Reason : Ovaries produce female gamete & several steroidal hormones.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

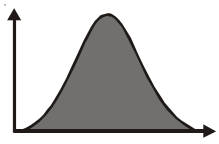
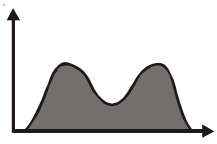
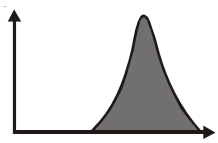
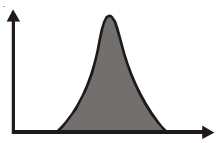
129. **Directional, minor, discontinuous, inheritable, random, directionless, spontaneous, continuous**
How many of the above describe saltations of de Vries?
(1) four (2) five
(3) three (4) six

130. Human male reproductive system is associated with
(1) 3 paired male accessory glands
(2) 3 single male accessory glands
(3) 3 single & 2 paired male accessory glands
(4) 2 paired & 1 single male accessory glands

131. Which of the following barrier method protect users from contracting STIs and AIDS?
(1) Condoms (2) Cervical caps
(3) Vaults (4) All of these

132. 

In a storm, sparrows with abnormally long or short wings were killed. Those which survived possessed normal wings and normal body proportion. Which among the following options depict correct selection with respect to above graph?

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

133. What is correct about semen?
(1) It contains substances to increase the acidity of uterus
(2) Shows a pH of 7.3 – 7.5
(3) Glucose act as respiratory substrate for sperm
(4) All of these

134. How many of the following are living organisms evolved from sauropsids?
Tuatara, Pelycosaurs, *Panthera tigris, Pavo,* Dinosaurs, Flying phalanger, *Rana tigrina*, Lizard, *Hippocampus*
(1) Two (2) Three
(3) One (4) Five

135. The onset of sexual maturity and reproductive age is called
(1) puberty (2) menopause
(3) menarche (4) menstruation

ZOOLOGY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

136. **Assertion** : Saheli is non steroidal contraceptive pill.
Reason : Saheli blocks the receptors of estrogen on uterus
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

137. Which of the following organisms show adaptive convergence?
(1) Tasmanian wolf and tasmanian tiger cat
(2) Wolf and Mole
(3) Numbat and placental anteater
(4) Bandicoot and Koala

138. The layer of uterus which undergoes cyclic changes during menstrual cycle is
(1) perimetrium (2) myometrium
(3) endometrium (4) all of these

139. Choose the correct statement about skulls a, b, c

a. 

b. 

c. 

(1) skull 'b' is of an adult chimpanzee
(2) skull 'c' is of baby chimpanzee
(3) skull 'a' is of an adult human being
(4) all the above

140. How is spermiation different from spermatogenesis?
(1) In spermiation, the spermatids are released finally from seminiferous tubules.
(2) Spermiation occurs within Interstitial spaces, while spermatogenesis occurs inside seminiferous tubules
(3) Spermiation is release of diploid spermatozoa, while spermatogenesis formation of sperms from haploid germ cells.
(4) Spermiation leads to final release of spermatozoa, while spermatogenesis is formation of spermatozoa from immature germs cells

141. Match the column

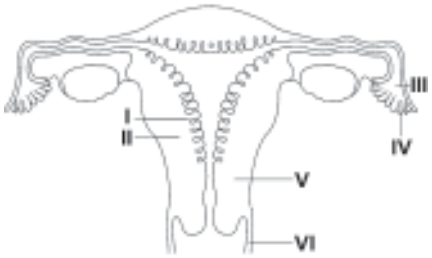
	Column-I		**Column-II**
a.	Mons pubis	i.	Extra-abdominal pouch
b.	Scrotum	ii.	Loose fold of skin
c.	Clitoris	iii.	Cushion of fatty tissue
d.	Foreskin	iv.	Tiny-finger like structure

(1) a–i, b–ii, c–iii, d–iv (2) a–iii, b–i, c–ii, d–iv
(3) a–iii, b–i, c–iv, d–ii (4) a–iv, b–iii, c–i, d–ii

142. Select the incorrect match of event and its time span of occurrence

	Event	**Time span of occurrence**
(1)	Invertebrates formed and became active	500 myA
(2)	Reptiles dominated earth	50 my A
(3)	Dinosaurs disappeared from earth	65 myA
(4)	Jaw less fishes	350 myA

143. An IUD is
(1) LNG-20 (2) multiload 375
(3) vasectomy (4) both (1) and (2)

144. 

Given is the sectional view of female reproductive system. From the following options identify which are correctly matched?
(1) I - Endometrium, V - Cervical canal
III - Infundibulum, VI - Vagina
(2) II - Myometrium, IV - Fimbriae
III - Infundibulum, V - Cervix
(3) II - Endometrium, III - Infundibulum
VI - Cervical canal, I - Perimetrium
(4) III - Infundibulum, IV - Ostia
V - Cervix, VI - Cervical canal

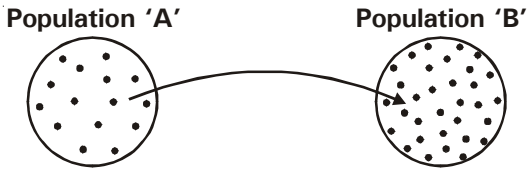
145. 

Which of the following is/are correct w.r.t. given figure?

(1) These are implants having progestogen and estrogen
(2) They prevent ovulation and implantation
(3) Their effective periods are much longer than oral contraceptives
(4) all of these

146. The feature applicable to Darwin Finches present on Galapagos islands is
(1) evolved from original seed eating finches
(2) different from each other w.r.t. type of beak
(3) small black birds representing adaptive divergence
(4) All of these

147. The category of molecules produced by the Miller-Urey experiments was
(1) Organic monomers
(2) Micromolecules
(3) Organic polymers
(4) Both (1) and (2)

148. 

Organisms from population 'A' moves to population 'B' and interbreeding between the two population occur. This would result in
(1) Change in the gene pool of 'B' but not in the gene pool of 'A'
(2) Addition of new alleles to population 'B' and loss of alleles from population 'A'
(3) Unrestricted gene flow into population 'B', if it occurs several times
(4) both (2) & (3)

149. **Statement- I** : Natural selection and Branching descent are two key concepts for Darwinism.

Statement- II : Homology is accounted by idea of Branching descent.
(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

150. Find the correct statement
(1) First human like being the first hominid is *Homo erectus*
(2) First fossil man who buried their dead ones was *Australopithecus*
(3) Cranial capacity of *Homo erectus* is nearly equal to modern man
(4) *Dryopithecus* was more like ape while *Ramapithecus* was more like man

BOTANY : SECTION-A

All questions are compulsory in section A

151. The base of each pyramid represents
(1) producer level (2) top level consumer
(3) herbivore level (4) carnivore level

152. The thickness of the ozone is measured in terms of
(1) decibel (dB) (2) Dobson units (DU)
(3) mililitres (4) centimetre

153. Pick the false statement
(1) PAR is 1-5% of incident solar radiation
(2) Rapid deforestation has significantly increased the rate of release of CO_2 into air
(3) Success of mammals is largely due to their ability of maintain a constant body temperature
(4) *Ophrys* employs a sexual deceit to get pollination done

154. The historic convention on biological diversity held in Rio de Janeiro in
(1) 1992 (2) 2002
(3) 1998 (4) 2010

155. Select the correct match w.r.t recent extinctions
(1) *Dodo*- Russia
(2) *Thylacine*- Australia
(3) *Quagga*- Mauritius
(4) Steller's sea cow- Africa

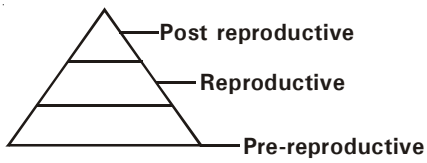
156. Polyblend, a fine powder of recycled modified plastic developed by A. Khan and his company, mixed with bitumen is used to lay roads as it
(1) reduces bitumen's water repellant property
(2) increases road life by a factor of three
(3) enchances bitumen's water repellant property
(4) both (2) and (3)

157. **Statement- I** : In an aquatic ecosystem, GFC is the major conduit for energy flow.

Statement- II : A given species may occupy more than one trophic level at the same time in the same ecosystem.
(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

158. Municipal waste water has
(1) 99.9% sewage impurities
(2) 0.1% sewage impurities
(3) 1% non-biodegradable impurites
(4) 7% of biodegradable impurities

159. How many countries pledged their commitment to achieve by 2010, a significant reduction in the current rate of biodiversity loss at global, regional and local levels in the World Summit held in 2002?
(1) 190 (2) 90
(3) 19 (4) 195

160. 

This age pyramid represents
(1) Expanding population
(2) Positive growth rate
(3) Stable population
(4) Both (1) and (2)

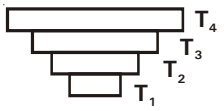
161. Match the column I and II and select the correct option

	Column-I		Column-II
a.	Epiphyte	i.	Bio-control
b.	Mycorrhizae	ii.	Commensalism
c.	Cuckoo	iii.	Mutualism
d.	*Cactoblastis*	iv.	Brood parasitism

(1) a–i, b–ii, c–iii, d–iv (2) a–ii, b–iii, c–iv, d–i
(3) a–iv, b–i, c–iii, d–ii (4) a–iv, b–iii, c–i, d–ii

162. Distributional range of what type of organisms will be affected more because of increase in average global temperature?
(1) Stenothermal (2) Mesophytic
(3) Eurythermal (4) Stenohaline

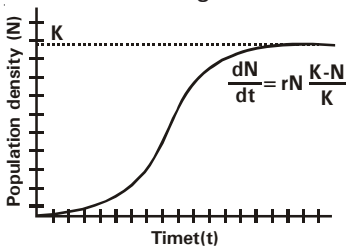
163. **Assertion** : Biodiversity of the prokaryotes cannot be estimated.
Reason : Conventional taxonomic methods are not suitable for identification and characterisation of microbes
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

164. Given below is the inverted pyramid


Which of the following is correct for this pyramid?
(1) Aquatic ecosystem – pyramid of biomass
(2) Grassland ecosystem – pyramid of energy
(3) Aquatic ecosystem – pyramid of number
(4) Forest ecosystem – pyramid of biomass.

165. The Montreal Protocol is related to
(1) persistent organic pollutants
(2) global warming and climate change
(3) substances that deplete the ozone layer
(4) biosafety of genetically modified organisms

166. Select the odd one w.r.t *ex-situ* conservation
(1) botanical garden
(2) wildlife safari parks
(3) zoological parks
(4) sacred grooves

167. Which is incorrect w.r.t. growth curve given below?


(1) It is found in stable type of population
(2) An equilibrium is reached when size of population approaches carrying capacity of area
(3) Environmental resistance does not operate to slow down exponential phase
(4) A phase of deceleration occurs before equilibrium is reached

168. Which of the following statements are true?
a. 4×10^{13} kg of carbon is fixed annually through photosynthesis on the Earth
b. carbon constitutes 49% of dry weight of organisms
c. atmosphere contains 71% of carbon
d. Earth crust is the reservoir of carbon
(1) a only (2) a, b, d
(3) a and d (4) a and b

169. If two species competing for same resources avoid competition by choosing different times for feeding or different foraging pattern, it is
(1) resource partitioning
(2) competitive release
(3) competitive exclusion
(4) Amensalism

170. "Rivet popper hypothesis" to explain the role of species richness for ecosystem health was given by
(1) Paul Ehrlich
(2) Alexander Von Humboldt
(3) Edward Wilson
(4) Robert May

171. All are true for biodiversity except
(1) term is popularised by sociobiologist Edward Wilson
(2) eastern ghats have a greater amphibian species diversity than western ghats
(3) India has more than 50,000 genetically different strains of rice
(4) India has a greater ecosystem diversity than a Scandinavian country like Norway

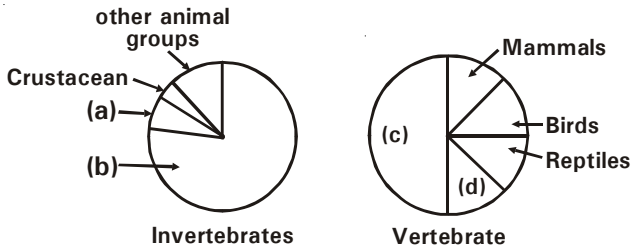
172. Catalytic converters
(1) have inexpensive metals
(2) are fitted into automobiles
(3) convert CO_2 into CO
(4) should be used with leaded petrol

173. Which of the following statements about decomposition is false?
(1) It is largely an oxygen requiring process
(2) The rate of decomposition is not regulated by climatic factors
(3) It is breakdown of organic matter into inorganic substances like CO_2, H_2O and nutrients
(4) Low temperature and anaerobiosis inhibit decomposition resulting in build up of organic material

174. Which of the following statement is incorrect?
(1) Species inventories are more complete in tropical countries
(2) Robert May places the global species diversity at about 7 million
(3) Insects are the most species- rich taxonomic group
(4) India has only 2.4 percent of the world's land area

175. At high altitudes, where atmospheric pressure is low, the body doesn't get enough oxygen and we experience altitude sickness. But we do get acclimatised by
a. increasing RBC production
b. by increasing breathing rate
c. by decreasing the binding capacity of haemoglobin
(1) only a (2) b & c
(3) a, b & c (4) a & c

176. Choose the correct option of unlabelled areas (a, b, c and d) in the following pie charts which show global animal diversity.



(1) a–insects, d–fishes
(2) b–insects, c–fishes
(3) c–amphibians, d–angiosperms
(4) a–molluscs, c–insects

177. Species diversity increases with
(1) increase in latitude and decrease in altitude
(2) decrease in latitude and increase in altitude
(3) decrease in both latitude and altitude
(4) increase in both latitude and altitude

178. Which of the following is not concerned about conservation of wildlife?
(1) Amrita Devi Bishnoi wildlife protection award
(2) Chipko movement
(3) Slash and burn agriculture/Jhum cultivation
(4) Joint forest management

179. El Nino effect is related to
(1) Global warming
(2) Ozone depletion
(3) Eutrophication
(4) Biological magnification

180. How many statements are correct w.r.t DDT?
a. concentration is increased at successive trophic levels
b. highest concentration occurs in seagull in aquatic food chain
c. it disturbs calcium metabolism in birds
d. high concentrations causes thinning of eggshell and their premature breaking
(1) two (2) four
(3) three (4) one only

181. The most important cause driving animals and plants to extinction is
(1) Over exploitation
(2) Alien species invasions
(3) Habitat loss and Fragmentation
(4) Co-extinction

182. Which of the following equation correctly represents species-area relationship?
(1) $\log C = \log S + Z \log A$
(2) $\log A = \log C + Z \log S$
(3) $\log A = \log S + Z \log C$
(4) $\log S = \log C + Z \log A$

183. Which of the following statement is not correct?
(1) government of India has passed the environment (protection) Act in 1986
(2) smokestacks of thermal power plants and smelters release particulate matter only
(3) in India, the Air Act came into force in 1981
(4) Air Act was amended in 1987 to include noise as an air pollutant

184. Three mile island and Chernobyl incidents are linked to
(1) improper disposal of nuclear waste
(2) accidental leakage or meltdown of atomic reactors
(3) toxic substances present in e-waste
(4) nutrient enrichment of lake

185. If we analyse the species-area relationships among very large areas like the entire continents, then slope of line becomes much steeper in the range of
(1) 0.1 to 0.6 (2) 0.1 to 0.2
(3) 0.6 to 1.2 (4) 0.1 to 1.15

BOTANY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

186. Pick the false statement w.r.t succession on land
(1) Lichens are the pioneers on rock
(2) With time the land is converted into water body
(3) Ultimately a stable forest community is formed
(4) The climax community is mesic

187. Alien species introduced in India are
(1) Carrot grass and *Lilium*
(2) *Cyanodon* and *Parthenium*
(3) *Lantana* and *Eicchornia*
(4) *Clarias* and Nile *Perch*

188. Pick the correctly matched mean annual value for the given biome
(1) Grassland – Rainfall-300cm
(2) Tundra – Temperature 30°C
(3) Tropical forest – Rainfall –50cm
(4) Desert – Rainfall –25cm

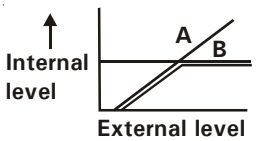
189. **Assertion** : Small animals tend to lose body heat very fast when it is cold outside.
Reason : Small animals have a larger surface area relative to their volume.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

190. Which of the following is not included in ecosystem services?
(1) Maintenance of biodiversity
(2) Recharging of ground water
(3) Decrease in atmospheric humidity
(4) Pollination of crops

191. India with much of its land area in the tropical latitudes, has _____ species of birds.
(1) more than 1200 (2) 1400
(3) 105 (4) 56

192. The major factor in causing global warming is
(1) increase in oxygen concentration in atmosphere
(2) decrease in carbon dioxide concentration in atmosphere
(3) increase in carbon dioxide concentration in atmosphere
(4) decrease in atmospheric nitrogen

193. Choose the correct option w.r.t the given diagrammatic representation of organismic response to change in abiotic factors.



(1) A–mammal, B–fishes
(2) A–birds, B–Ambibians
(3) A–invertebrates, B–mammals
(4) A–reptiles, B–fishes

194. Which one of the following area is considered as hot spot in India?
(1) Western Ghat and Sri Lanka
(2) Eastern Ghat
(3) Himalayas and Eastern Ghat
(4) All sacred grove

195. **Statement- I** : Nitrate and phosphate discharge in a water body causes eutrophication.
Statement- II : Eutrophication increases the inorganic content in water body and hence growth of algal blooms.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

196. Choose the correct statements w.r.t. E–wastes
a. Buried in landfills or incinerated
b. Over half of e-wastes are exported to China, India, Pakistan
c. It involves manual participation for recycling in developing countries
d. Eventually recycling is the only solution for treatment of e-wastes
(1) a, b (2) b, c and d
(3) a, b, c and d (4) c, d

197. According to the IUCN(2004), the total number of plant and animal species is
(1) slightly more than 1.5 billion
(2) slightly less than 1.5 million
(3) slightly more than 1.5 million
(4) 7 million

198. Which of the following process will not lead to accumulation of solid waste?
(1) Open dumping of municipal waste
(2) Export of defunct ships from developed to developing countries
(3) Incineration of hospital waste
(4) Use of plastics and polythene bags

199. The birth rate of a given species is 0.5 offsprings per individual per week. If the current population has 20 members, how many members will be added by birth in one week?
(1) 40 (2) 60
(3) 10 (4) 30

200. Pick the group of organisms belonging to same trophic level
(1) zooplanktons, wolf, lions
(2) man, lion, cow
(3) grasshoppers, grasses ,cow
(4) phytoplanktons, grass, trees