Dated : 23-04-2023

M.L. Syal's Helix Institute

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Test Series HMC-8(HP & HR), HMC-9(19-25), HMC-15(01)

MM : 720 **Test - 06** Time : 3 hrs. 20 min.

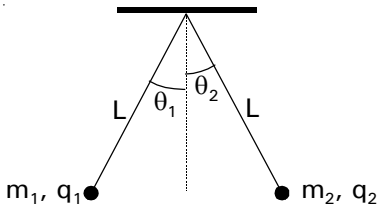
Physics	: Electrostatics, Current Electricity, Magnetic Effects of Current
Chemistry	: GOC (i/c Nomenclature, Isomerism), Hydrocarbons, Purification, Alkyl & Aryl Halides
Zoology	: Evolution, Human reproduction, Reproductive health
Botany	: Principles of inhertiance and Variation, Molecular basis of inheritance

PHYSICS : SECTION-A

All questions are compulsory in section A

1. When the current I is flowing through a conducting wire, the drift velocity is 'v'. If 2I current is flowing through the a conducting wire having double the area of cross-section, then the drift velocity will be
   (1) v/4 (2) v/2
   (3) v (4) 4v
2. 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
3. Four particles, each having a charge 'q', are placed on the vertices of a regular pentagon. The distance of each corner from the centre is 'r'. The electric field at the centre of the pentagon is
   (1) $\frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}$ (2) $\frac{1}{4\pi\varepsilon_0}\frac{q}{r}$
   (3) Zero (4) $\frac{1}{4\pi\varepsilon_0}\frac{3q}{r^2}$
4. Half part of a wire of resistance R is stretched to make it 1% longer and remaining half is stretched to make it 2% longer. What is the new approximate resistance of wire?
   (1) 1.04 R (2) 1.03 R
   (3) 1.06 R (4) R
5. Electric field is zero in the zone of

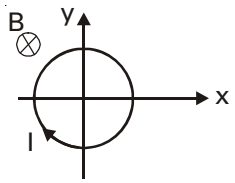
   (1) I (2) II
   (3) III (4) none of these
6. Two concentric circular coils of ten turns each are situated in the same plane. Their radii are 20 and 40 cm and they carry respectively 0.2 and 0.3 ampere current in opposite direction. The magnetic field in weber/m^2 at the centre is
   (1) $\frac{35}{4}\mu_0$ (2) $\frac{\mu_0}{80}$
   (3) $\frac{7}{80}\mu_0$ (4) $\frac{5}{4}\mu_0$
7.



   In the above figure, two tiny charged balls hang from non-conducting threads of equal length L. Which of the following condition is required for angle θ_1 to be equal to angle θ_2 ?
   (1) $m_1 = m_2$ (2) $q_1 = q_2$
   (3) both (1) & (2) (4) neither (1) nor (2)

8. **Assertion** :Terminal potential difference of a cell is always less than its emf .
Reason : Potential drop in internal resistance of the cell decreases the terminal voltage.
(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

9. 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

10. Maximum torque experienced by an electric dipole consisting of two opposite charges of $3\,\mu C$ each separated by a distance of 1 mm in uniform electric field E is 12×10^{-4} Nm. Then E is
(1) 3.6×10^5 N/C (2) 3×10^5 N/C
(3) 5×10^5 N/C (4) 4×10^5 N/C

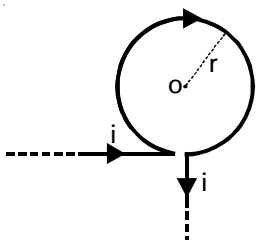
11. If a charged particle is projected in uniform magnetic field then which of the following may not be zero?
(1) Power
(2) Work done
(3) Change in momentum
(4) Change in kinetic energy

12. Two spheres of radii R_1 and R_2 are charged uniformly to the same potential. The ratio of charges on the spheres is
(1) $\sqrt{R_1} : \sqrt{R_2}$ (2) $R_1 : R_2$
(3) $R_1^2 : R_2^2$ (4) $R_1^3 : R_2^3$

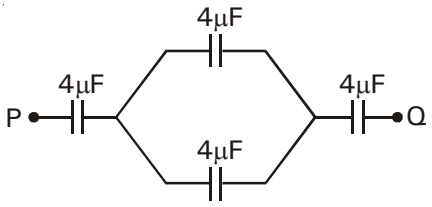
13. In meter bridge or Wheatstone bridge for measurement of resistance, the known and the unknown resistances are interchanged. The error so removed is
(1) end correction
(2) index error
(3) due to temperature effect
(4) random error

14. Two long parallel wires carrying equal current separated by 1m, exert a force of 2×10^{-7} N/m on one another. The current flowing through them is
(1) 2.0 A (2) 2×10^{-7} A
(3) 1.0 A (4) 1×10^{-7} A

15. If separation between two plates of a charged capacitor connected with the battery is increased, electric potential energy of capacitor
(1) increases
(2) decreases
(3) remains same
(4) may increase or decrease

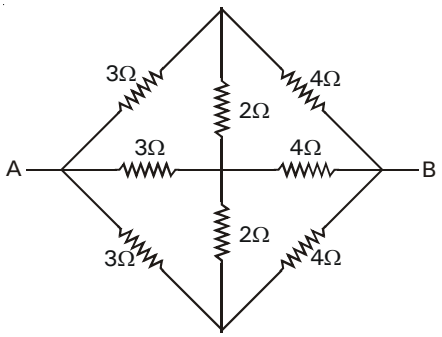
16. 

An infinitely long current carrying straight conductor is bent into the shape as shown. Then the magnetic induction at O will be
(1) $\frac{\mu_o}{4\pi}\frac{2i}{r}(\pi + 1)$ (2) $\frac{\mu_o}{4\pi}\frac{2i}{r}(\pi - 1)$
(3) zero (4) $\frac{\mu_0 i}{4\pi r}(2\pi - 1)$

17. 

Four condensers each of capacity $4\,\mu F$ are connected as shown in figure. If $V_P - V_Q = 15$ V, then the energy stored in the system is

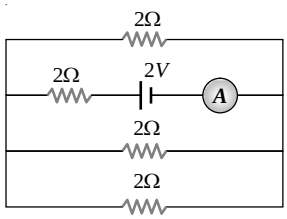
(1) 2400 erg (2) 1800 erg
(3) 3600 erg (4) 5400 erg

18. 

Equivalent resistance between A and B will be

(1) $\frac{2}{7}\,\Omega$ (2) $8\,\Omega$

(3) $\frac{4}{3}\,\Omega$ (4) $\frac{7}{3}\,\Omega$

19. 

Reading of ammeter as per figure shown is

(1) $\frac{1}{8}$ A (2) $\frac{3}{4}$ A

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

20. Electric field intensity at a point in between two parallel sheets with like charges of same surface charge densities σ is

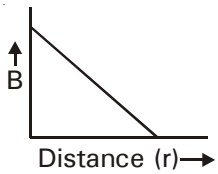
(1) $\frac{\sigma}{2_{\varepsilon_0}}$ (2) $\frac{\sigma}{\varepsilon_0}$

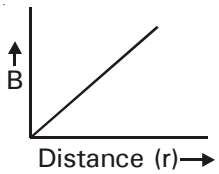
(3) zero (4) $\frac{2\sigma}{\varepsilon_0}$

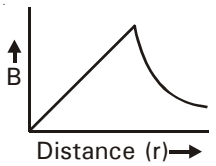
21. A carbon resistor has bands of colours green, orange, blue and gold on its body in sequence from left to right. The value of the resistance is

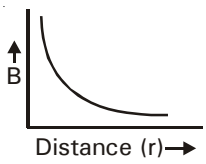
(1) $52\,M\Omega \pm 5\%$ (2) $53\,M\Omega \pm 5\%$
(3) $51\,M\Omega \pm 10\%$ (4) $40\,M\Omega \pm 5\%$

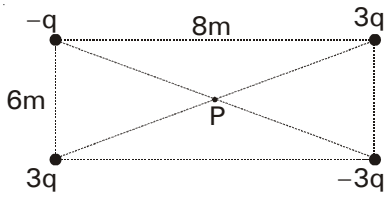
22. Which of the following graphs represents variation of magnetic field B with distance r for a straight long soild cylinder carrying current?

(1) 

(2) 

(3) 

(4) 

23. 

In the above configuration of charges, the potential at point P, if $q = 2\,\mu C$, is

(1) 7200 V (2) 3600 V
(3) 1600 V (4) 4000 V

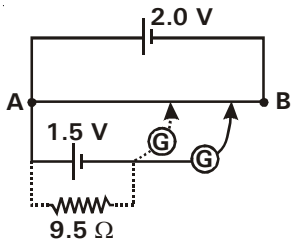
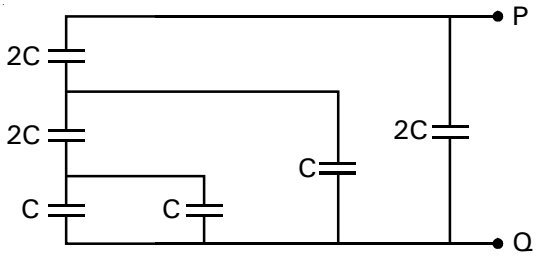
24. 

Figure shows a potentiometer used for the determination of internal resistance of a 1.5 V cell. The balance point of the cell in open circuit is 80 cm. When a resistor of 9 Ω is used in the external circuit of the cell, balance point shifts to 60 cm length of the potentiometer wire. The internal resistance of the cell is

(1) 1 Ω (2) 2 Ω
(3) 3 Ω (4) 4 Ω

25. The resultant capacitance of given circuit is



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

26. The temperature coefficient of resistance for a wire is 0.00125/°C. At 300K its resistance is 1 ohm. The temperature at which the resistance becomes 1.2 ohm is

(1) 632 K (2) 465 K
(3) 322 K (4) 512 K

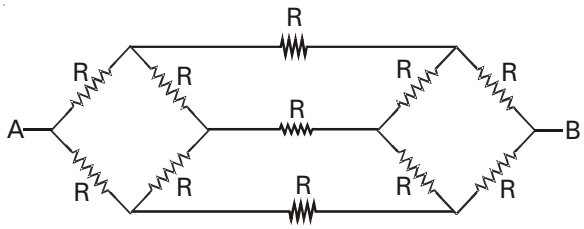
27. A proton and and a deutron enter a region of uniform magnetic field in a direction at right angles to the field. If both have same kinetic energy, the radii of circular paths described by them, r_p and r_d respectively, satisfy

(1) $r_d = \sqrt{2}\, r_p$ (2) $\sqrt{2}\, r_d = r_p$
(3) $r_d = r_p$ (4) $r_d = 2r_p$

28. 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

29. The equivalent resistance between the terminal points A and B in the network shown in figure is



(1) $\frac{7R}{5}$ (2) $\frac{5R}{6}$
(3) $\frac{7R}{12}$ (4) $\frac{5R}{12}$

30. A galvanometer gives full scale deflection with a current of 1 ampere. It is converted into an ammeter of range 10 ampere. The ratio of the resistance of ammeter to the shunt resistance used is

(1) 3 : 5 (2) 1 : 2
(3) 9 : 10 (4) 9 : 8

31. In a battery connected in an electric circuit, the positive charge inside the battery
(1) may go from the positive terminal to the negative terminal
(2) Always goes from the positive terminal to the negative terminal
(3) Always goes form the negative terminal to the positive terminal
(4) does not move

32. Four equal charges Q are placed at four corners of a square of each side 'a'. Work done in re-moving a charge $-Q$ from its centre to infinity is

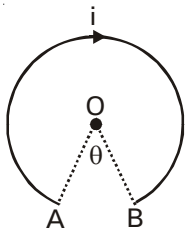
(1) 0 (2) $\frac{\sqrt{2}Q^2}{4\pi\varepsilon_0 a}$

(3) $\frac{\sqrt{2}\,Q^2}{\pi\varepsilon_0 a}$ (4) $\frac{Q^2}{2\pi\varepsilon_0 a}$

33. An electron is travelling horizontally towards east. A magnetic field in vertically downward direction exerts a force on the electron along
(1) East (2) West
(3) North (4) South

34. If a direct current is passed in a spring, it
(1) gets compressed (2) gets expanded
(3) oscillates (4) remains unchanged

35. A current carrying wire AB of length $2\pi R$ is turned along a circle, as shown in figure. The magnetic field at the centre O is



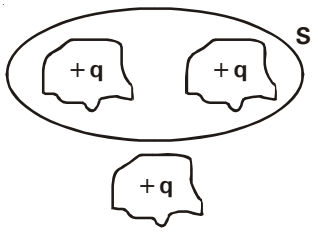
(1) $\frac{\mu_0 i}{2R}\left(\frac{2\pi-\theta}{2\pi}\right)^2$ (2) $\frac{\mu_0 i}{2R}\left(\frac{2\pi-\theta}{2\pi}\right)$

(3) $\frac{\mu_0 i}{2R}(2\pi-\theta)$ (4) $\frac{\mu_0 i}{2R}(2\pi-\theta)^2$

PHYSICS : SECTION-B

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

36. Shown below is a distribution of charges. The flux of electric field due to these charges through the surface S is



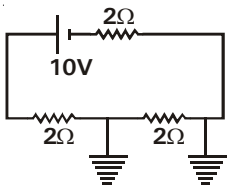
(1) $3q/\varepsilon_0$ (2) $2q/\varepsilon_0$
(3) q/ε_0 (4) Zero

37. Two bulbs B_1 (40W, 220V) and B_2 (100W, 220V) are connected in series to an e.m.f. of 220V. Which of these glows brighter?
(1) 40 W (2) 100 W
(3) Both glow equally (4) 40 W bulb fuses

38. The emf of a battery is 2 V and its internal resistance is $0.5\,\Omega$. The maximum power which it can deliver to any external circuit will be
(1) 8 W
(2) 4 W
(3) 2 W
(4) None of the above

39. A parallel plate condenser is connected with the terminals of a battery. The distance between the plates is 6 mm. If a glass plate 4.5 mm thick with dielectric constant 9 is introduced between them, then the capacity will become
(1) 2 times (2) The same
(3) 3 times (4) 4 times

40.



What is current supplied by cell in above figure?

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

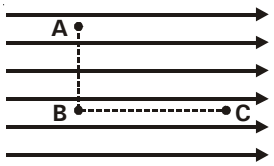
(3) 5 A (4) $\frac{5}{2}$A

41. A copper wire of length 2 m and radius 1 mm is joined in series with an iron wire of length 3 m and radius 1.5 mm and a current is passed through the wires. The ratio of the current density in the copper and iron wires is

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

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

42. Figure shows three points A, B and C in a region of uniform electric field $\vec{E}$. The line AB is perpendicular and BC is parallel to the field lines. If V_A, V_B and V_C represent electric potentials at points A, B and C respectively, which of the following holds good?



(1) $V_A = V_B = V_C$ (2) $V_A = V_B > V_C$

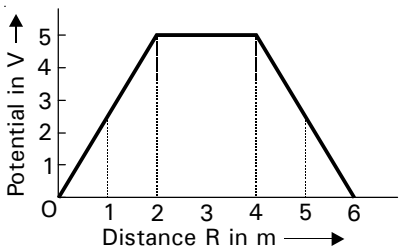
(3) $V_A = V_B < V_C$ (4) $V_A > V_B = V_C$

43. A straight wire of length 0.5 metre and carrying a current of 1.2 ampere is placed in a uniform magnetic field of induction 2 Tesla. The magnetic field is perpendicular to the length of the wire. The force on the wire is

(1) 2.4 N (2) 2.4 N

(3) 3.0 N (4) 1.2 N

44.



The variation of potential with distance R from a fixed point is as shown in the figure. The electric field at R = 1.5m is

(1) 2.5 volt/m (2) −2.5 volt/m

(3) 2/5 volt/m (4) −2/5 volt/m

45. **Statement-I** : If a current carrying circular loop of one turn is turned into a coil having 'n' turns, then magnetic field at the centre of the coil becomes 'n' times the previous field.

Statement-II : In a cyclotron electric field increases K.E. while magnetic field changes direction of moving charged particle.

(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

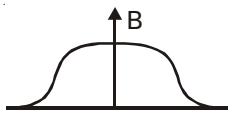
(4) Statement-I is incorrect but statement-II is correct

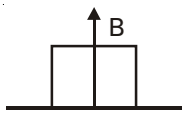
46. A charged capacitor of capacity C is charged to a potential V and is now connected across an identical uncharged capacitor. Loss of energy will be

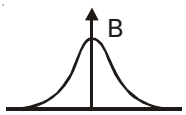
(1) $\frac{1}{2}CV^2$ (2) $\frac{3}{4}CV^2$

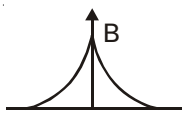
(3) $\frac{1}{4}CV^2$ (4) Zero

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

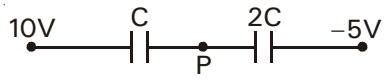
(1) 

(2) 

(3) 

(4) 

48. A circular loop of area $0.01\,m^2$ 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

49. 

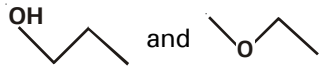
The above arrangement is part of a network. The potential at point P is
(1) 7.5 volts (2) 5 volts
(3) 2.5 volts (4) 0 volt

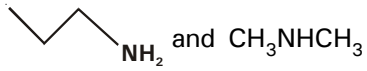
50. A torch battery consisting of two cells of 1.45 volts and an internal resistance 0.15 Ω each sends currents through the filament of a lamp having resistance 1.5 Ω .Value of current will be
(1) 0.92 A (2) 1.61 A
(3) 1.15 A (4) 2.61 A

CHEMISTRY : SECTION-A

All questions are compulsory in section A

51. The reaction of chlorobenzene with KNH_2 proceeds via
(1) Benzyne intermediate
(2) Carbocation intermediate
(3) Carbon free radical
(4) None of these

52. Functional isomerism may not exist between
(1) 

(2) 

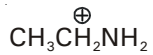
(3) $C_6H_5CH_2OH$ and $C_6H_5OCH_3$
(4) $CH_3NHCH_2CH_3$ and 

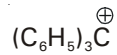
53. Which one(s) of the following is/are factor for lesser reactivity of haloarenes ?
(1) resonance effect
(2) instability of carbocation
(3) higher bond strength of C–X bond
(4) All of these

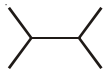
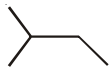
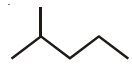
54. For detection of sulphur in an organic compound, Lassaigne's extract is acidified with dilute acetic acid and lead acetate is then added to it. The black ppt. is obtained which is due to formation of
(1) PbS (2) Na_2S
(3) $PbSO_4$ (4) PbS_2O_3

55. Mesomeric effect does not operate in
(1) 

(2) 

(3) 

(4) 

56. Which of the following alkane is synthesised from single alkyl halide by Wurtz reaction?
(1)  (2) 
(3)  (4) 

57. Which of the following statements is not correct for a nucleophile?
(1) Nucleophiles attack low electron density sites
(2) Nucleophiles are not electron seeking
(3) Nucleophile is a Lewis acid
(4) Ammonia is a nucleophile

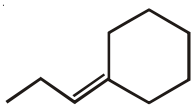
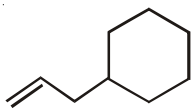
58. $CaC_2 \xrightarrow{H_2O} x \xrightarrow[\text{iron tube}]{\text{Red hot}} y \xrightarrow{CH_3-CH=CH_2/H^+} z$

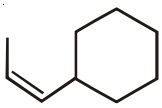
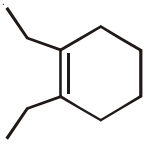
Major product z is

(1) Cumene (2) n-Propyl benzene

(3) mesitylene (4) polyacetylene

59. Which of the following alkene is most stable ?

(1)  (2) 

(3)  (4) 

60. In the presence of sunlight benzene reacts with Cl_2 to give product X. the number of hydrogen in one molecule of product X is

(1) zero (2) 4

(3) 6 (4) 12

61. $CH_3CH=CH_2 \xrightarrow{Cl_2(h\nu)} X \xrightarrow[\text{acetone}]{NaI} Y$

The compound Y in the above sequence is

(1) 1, 2-Dichloro-3-iodopropane

(2) 1-Chloro-2-iodopropane

(3) 3-Iodopropene

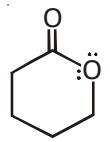
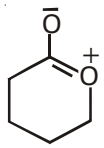
(4) 1, 2-Diodopropane

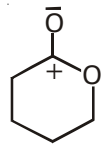
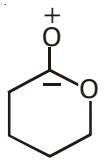
62. An organic compound containing C, N, H and S is heated with CuO. The gases liberated are passed through lime water. The lime water turns milky due to formation of

(1) CO_2 (2) NO_2

(3) SO_2 (4) Both (1) and (3)

63. Which of the folloiwng resonating structures has complete octet of all the atoms?

a.  b. 

c.  d. 

(1) b and c (2) a and b

(3) a and d (4) c and d

64. **Statement-I** : The boiling point of tertiary butyl iodide is less than boiling point of n-butyl iodide.

Statement-II : Tert.butyl group has higher surface area than n-butyl group.

(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

65. If the % nitrogen in an organic compound is 12.5%, then how much of the organic compound should be taken so to produce 50 mL of N_2 at 300 K and 715 mm pressure

(aqueous tension = 15 mm at 300 K)

(1) 0.149 g (2) 0.419 g

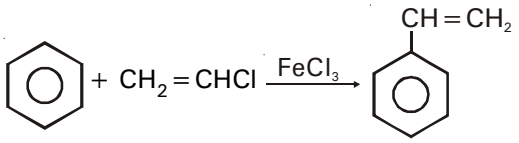
(3) 0.914 g (4) 0.941 g

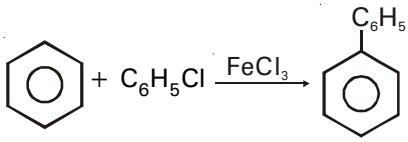
66. Which of the following can involve rearrangement of carbocation in the addition reaction of alkene ?

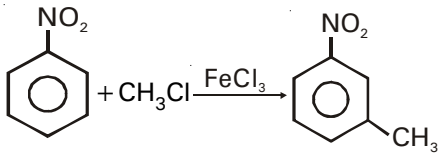
(1) Br_2/CCl_4 (2) HBr

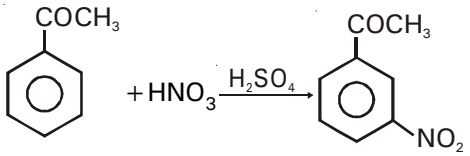
(3) HBr/R_2O_2 (4) Br_2/H_2O

67. In which of the following reactions, the mentioned product is the major product

(1) 

(2) 

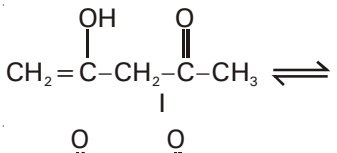
(3) 

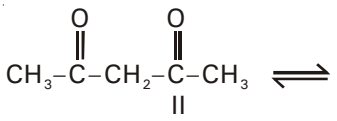
(4) 

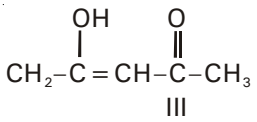
68. Carius method is not reliable for the estimation of
(1) Cl (2) Br
(3) H (4) S

69. The seperation of $(\pm)$ lactic acid is called
(1) resolution (2) racemisation
(3) retention (4) inversion

70. The order of stability of the following tautomeric compounds is







(1) I > II > III (2) III > II > I
(3) II > I > III (4) II > III > I

71. Which of the following has minimum acidic character?
(1) flouro acetic acid (2) chloro acetic acid
(3) bromo acetic acid (4) iodo acetic acid

72. Match the column I with column II ,to identify the products of oxidation of alkanes and mark the appropriate choice

	Column-I		**Column-II**
a.	$(CH_3)_3CH + 2O_2 \xrightarrow[[O]]{KMnO_4}$	i.	$HCOOH + H_2O$
b.	$2CH_4 + O_2 \xrightarrow[100\ atm]{Cu/523K}$	ii.	$(CH_3)_3COH$
c.	$CH_4 + O_2 \xrightarrow[\Delta]{Mo_2O_3}$	iii.	$2CH_3OH$
d.	$CH_4 + \frac{3}{2}O_2 \xrightarrow{(CH_3COO)_2Mn}$	iv.	$HCHO + H_2O$

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

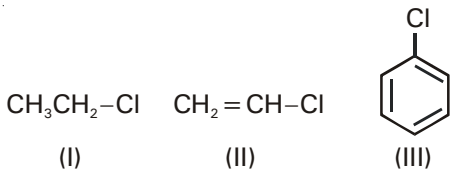
73. When chloroform is exposed to air and sunlight, it gives
(1) Carbon tetrachloride
(2) Carbonyl chloride
(3) Mustard gas
(4) Lewsite

74. $-CCl_3$ group when attached to benzene ring acts as deactivating group due to
(1) resonance effect
(2) inductive effect
(3) electromeric effect
(4) reverse hyperconguation

75. Which of the following compound is not chiral?
(1) $DCH_2CH_2CH_2Br$ (2) $CH_3CH(D)CH_2Br$
(3) $CH_3-CH(Cl)CH_2D$ (4) $CH_2CH_2CH(D)Cl$

76. The alkene that gives same product with HBr in the absence as well as in the presence of peroxide is
(1) 1-butene (2) propene
(3) 2-methyl propene (4) 2-butene

77. The correct order of C–Cl bond length in given molecules is



(I) (II) (III)

(1) I = II > III (2) I > II > III
(3) III > II > I (4) II > I > III

78. 2-methylbut-2-ene on reaction with hot acidic $KMnO_4$ gives
(1) CH_3COCH_3 and CH_3COOH
(2) CH_3CHO and CH_3COOH
(3) CH_3CH_2OH and CH_3COOH
(4) $CH_3CH_2CH_3$ and CH_3CHO

79. How many isomeric prodcuts (excluding stereo isomers) are possible in monochlorination of compound

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

80. Delocalization of electrons involving sigma bond is known as
(1) mesomeric effect
(2) tautomeric effect
(3) electromeric effect
(4) hyper conjugative effect

81. Which of the following statements is incorrect?
(1) In S_N2 reaction, the hybrid state of C changes from sp^3 to sp^2 and then returns back to sp^3 in the product
(2) In the transition state of S_N2, the attacking Nu^-, carbon atom bearing the leaving group and the leaving group are not collinear.
(3) The molecule CH_3-O-CH_2Cl can undergo both S_N1 and S_N2 reaction
(4) $R-\overset{\overset{O}{\|}}{C}-OAg$ reacts with Br_2/CCl_4 to form alkyl bromide whereas with I_2, an ester is formed.

82. When alkyl halide is heated with dry Ag_2O, it produces?
(1) Ester (2) Ether
(3) Ketone (4) Alcohol

83. The most electron rich ring (benzene) is in
(1) Chlorobenzene (2) Methoxybenzene
(3) Phenol (4) Methylbenzene

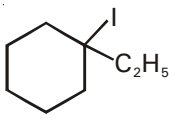
84. 1-phenyl 2-chloropropane on treating with alcoholic KOH gives mainly
(1) 1-phenyl propene (2) 3-phenyl propene
(3) 1-phenyl propanol-2 (4) 1-phenyl propanol-1

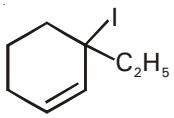
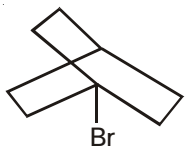
85. **Assertion** : $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$ and $CH_3-\overset{\overset{OH}{|}}{C}=CH_2$ are resonating structure.
Reason : They are formed by delocalisation of π bond.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion 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

CHEMISTRY : SECTION-B

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

86. Which of the following compounds generally do not react by unimolecular nucleophilic substitution mechanism?

(1) $(C_2H_5)_3CBr$ (2) 

(3)  (4) 

87. Cyclobutene $\xrightarrow[(ii)\ Zn/H_2O]{(i)\ O_3}$ A.

A will be

(1) $\begin{matrix} CH_2 \\ \| \\ CH_2 \end{matrix}$ (2) $\begin{matrix} CH_2CHO \\ | \\ CH_2CHO \end{matrix}$

(3) $CH_3 - CHO$ (4) $\begin{matrix} CH_2COOH \\ | \\ CH_2COOH \end{matrix}$

88. Identify the correct statement

(1) Napthalene and camphor can be separated by sublimation

(2) Hexane and toluene can be separated by simple distillation

(3) Mixture of Napthalene and benzophenone can can't be separated by column chromatography

(4) All of these

89. **Assertion** : Rate of hydration of alkenes with H_2O/H^+ and D_2O/H^+ will be different.

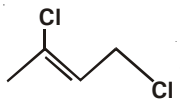
Reason : O–D bond is stronger than O—H .

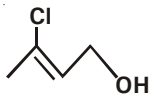
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

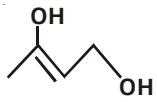
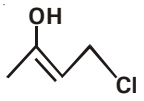
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

90.  $\xrightarrow{\text{aqueous NaOH}}$ A. A is

(1)  (2) 

(3)  (4) 

91. Identify the reagent from the following list which can easily distinguish between 1-butyne & 2-butyne

(1) bromine, CCl_4

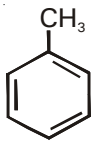
(2) H_2, Lindlar catalyst

(3) dilute H_2SO_4, $HgSO_4$

(4) ammonical Cu_2Cl_2

92. In which of the following molecules $-CH_3$ shows hyperconjugation ?

(1) $CH \equiv C - CH_2CH_3$ (2) CH_3-CH_3

(3)  (4) $CH_3 - MgX$

93. The restricted rotation about carbon-carbon double bond in But-2-ene is due to

(1) overlap of two p-orbitals

(2) overlap of one p & one sp^2 hybridized orbitals

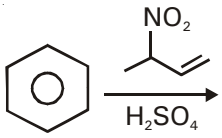
(3) overlap of two sp^2-hybridized orbitals

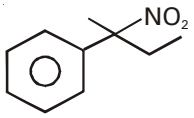
(4) overlap of one s & one sp^2 hybridized orbitals

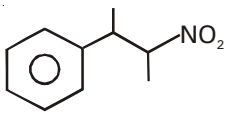
94. Choose the set of correct statements
(1) During retention of configuration in a reaction, optical activity also remains same.
(2) If (±)product is obtained from achiral reagents, then stereocentre formed in the product is a chiral centre
(3) one of the pair of a diastereomer must be optically active
(4) All are correct

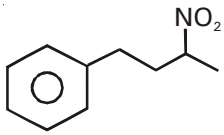
95. **Statement-I** : In Birch reduction but-2-yne gives mainly cis- But-2-ene.
Statement-II : Addition of hydrogen occur by syn mechanism.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

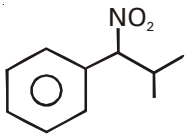
96. Correct set of stability order is
(1) $CH_2=\overset{\oplus}{C}H > CH_3-\overset{\oplus}{C}H_2$
(2) $CH_2=\overset{\ominus}{C}H > CH_3-\overset{\ominus}{C}H_2$
(3) $CH\equiv\overset{\ominus}{C} < CH_2=\overset{\ominus}{C}H$
(4) $CH_2=\overset{\bullet}{C}H > CH_3-\overset{\bullet}{C}H_2$

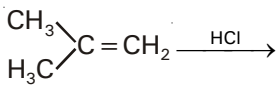
97. 

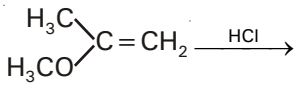
(1) 

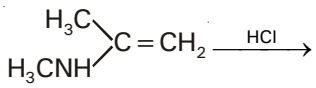
(2) 

(3) 

(4) 

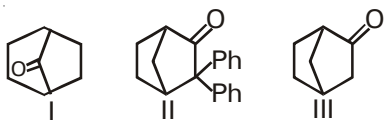
98. Arrange the following reactions in decreasing order of reactivity towards electrophilic addition reaction
A. 

B. 

C. 

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

99. Identify the incorrect statement
(1) Resonating structures do not have real existance.
(2) Energy of resonance hybrid is equal to the average of energies of all resonating structures.
(3) In general, resonance effect is more pronounced than inductive effect
(4) The resonating structures of acetate ion are equivalent

100. Which among the given molecules can exhibit tautomerism?


(1) III only (2) Both I and III
(3) Both I and II (4) Both II and III

ZOOLOGY : SECTION-A

All questions are compulsory in section A

101. Which of the following option is incorrect?
(1) The enlarged end of penis called the glans penis is covered by a loose fold of skin called foreskin
(2) Secretions of male accessory glands constitute the seminal plasma which is rich in fructose, calcium and certain enzymes
(3) Clitoris is a tiny finger-like structure which lies at the lower junction of the two labia minora
(4) Release of sperms into the seminiferous tubules is called spermiation

102. What is not true about Cu ions releasing IUDs?
(1) Prevents fertilisation
(2) Prevents ovulation
(3) Suppress sperm motility
(4) Leads to increased phagocytosis of sperms

103. Finger like projections which help in collection of ovum are attached to which structure of female reproductive system?
(1) Infundibulum (2) Fimbrae
(3) Uterus (4) Ovary

104. Tertiary follicle is characterised by presence of
(1) only theca interna
(2) development of antrum and single layer of granulosa cells
(3) many layers of granulosa cells and only theca externa
(4) development of antrum and organised theca interna and externa

105. **Assertion :** During pregnancy all events of menstrual cycle stop and there is no menstruation.
Reason : High levels of estrogen and progesterone keep FSH and LH secretions suppressed.
(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.

106. Identify the structure correctly matched to its feature.
(1) Testis – 2 cm long
(2) Fallopian tube – 10-12 cm long
(3) Seminiferous tubules in a testis –250
(4) All are correctly matched

107. Synapids → A (Extinct member) → B (Extinct member) → Mammals

The transitional links at A and B respectively are
(1) Reptiles, Aves
(2) Therapsids, Pelycosaurs
(3) Sauropsids, Thecodonts
(4) Pelycosaurs, Therapsids

108. Which of the following is not an example of evolution by anthropogenic action?
(1) Resistance against sickle cell trait in heterozygous individuals
(2) Pesticide resistance
(3) Drug resistant varieties
(4) Industrial melanism

109. A terminal method of birth control is
(1) LNG-20 (2) condom
(3) vasectomy (4) pill

110. Scrotum holds the testis & provides a temperature
(1) 2 – 2.5° C lower than normal internal body temperature
(2) 2 – 2.5° C higher than normal internal body temperature
(3) higher than body temperature in summers & lower than body temperature in winters
(4) equal to that of internal body temperature

111. The occurence of large and small beak sizes among seed-eating birds in absence of medium sized beaks is example of _____ selection
(1) Directional (2) Stabilizing
(3) Disruptive (4) Both (1) and (3)

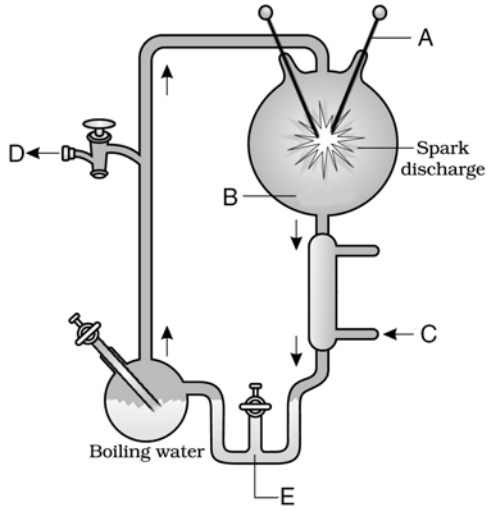
112. Find incorrect match
(1) FSH → sertoli cells → spermiogenic factors
(2) LH → ovary → ovulation
(3) ICSH → sertoli cells → androgens
(4) FSH → ovary → maturation of follicles

113. Which of the following group contain hormone based contraceptive measures?
(1) Progestasert, Cervical caps, Foams, Condoms
(2) LNG-20, Implant, Pills, Injections
(3) Cu7, Multiload 375, LNG-20 pills
(4) Injections, Implants, Lippes Loop, Progestasert

114. Some important events in the human female reproductive cycle are given below. Arrange the events in a proper sequence
A : Secretion of FSH
B : Growth of corpus luteum
C : Growth of the follicle and oogenesis
D : Ovulation
E : Sudden increase in the levels of LH
(1) C → A → D → B → E
(2) A → C → E → D → B
(3) A → D → C → E → B
(4) B → A → C → D → E

115. Invitro fertilization is a technique that involves transfer of which one of the following into the fallopian tube?
(1) Zygote only
(2) Embryo only upto 8 cell stage
(3) Either zygote or early embryo upto 8 cell stage
(4) Embryo of 32 cell stage

116. In the diagram shown, which labelled parts serve for the following respectively?



a. Connecting to vacuum pump.
b. Providing energy.
c. Inlet of water.

(1) C, A, D (2) E, A, C
(3) D, A, C (4) E, C, A

117. Which of the following is incorrect w.r.t. Amniocentesis?
(1) It is test based on chromosomal pattern in cells obtained from amniotic fluid
(2) Detects all types of defects in foetus like cleft palate
(3) Usually done between 14-16 weeks of pregnancy
(4) Legally banned for sex determination in India

118. Which of the following is incorrect regarding mammalian evolution?
(1) Mammals dominated earth with fall in reptiles
(2) Continental drift resulted in joining of South America with North America and the fauna of South America was over ridden by North American fauna
(3) First mammals were oviparous and large sized
(4) Sea cows and seals are mammals that are adapted to live wholly in water

119. Which of the following statement is FALSE?
(1) Jawless fish evolved around 350 mya
(2) Sea weeds existed around 320 mya
(3) The first organisms that invaded land were plants
(4) The first cellular forms of life appeared 3 bya

120. The pouched mammals of Australia survived due to
(1) escape from *Tyranosaurus* as continental drift separated Australia
(2) abundant food resources despite severe competition
(3) favourable climatic condition
(4) lack of competition from placental mammal due to continental drift

121. Choose the examples of analogous organs
a. Mouth parts of *Periplaneta* and *Apis*
b. Heart of man and heart of *Columba*
c. Wings of *Corvus* and *Musca*
d. Forelimb of human and chimpanzee
e. Eye of *Octopus* and that of *Felis*

(1) a, c & e (2) b, c & d
(3) a & c (4) c & e

122. Which of the following is the group that include male contraceptive measures?
(1) Vasectomy, diaphragm, coitus interruptus
(2) Condoms, vaults, coitus interruptus
(3) Condoms, vasectomy, coitus interruptus
(4) All of these

123. **Statement-I** : The male sex accessory ducts include rete testis, vasa efferentia, epididymis and vas deferens.

Statement-II : Vasa efferentia leave the testis and open into epididymis, located along the anterior surface of each testis.
(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

124. At the end of first meiotic division the male and female germ cells differentiate respectively into
(1) primary spermatocytes and primary oocytes
(2) secondary spermatocytes & first polar body
(3) secondary oocyte and first polar body
(4) secondary spermatocyte & second polar body

125. Which of the following is not included in five factors known to affect Hardy-Weinberg equilibrium?
(1) Gene flow and genetic recombinations
(2) Genetic drift
(3) Natural selection
(4) Non-random mating

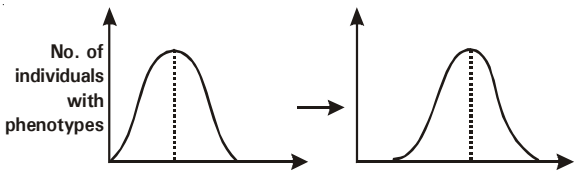
126. Find the correct match
a. Agriculture — 10,000 years ago
b. Human settlement — 18,000 years ago
c. Prehistoric cave art — 18,000 years ago
d. *Homo sapiens* arose — 75,000–10,000 years ago
e. Neanderthal man — 100,000–40,000 years ago

(1) a, c, d, e (2) a, b, c, d, e
(3) a, c, d (4) a, e, d

127. The most accepted line of descent in human evolution is
(1) *Australopithecus* → *Homo erectus* → *Homo sapiens* → *Homo habilis*
(2) *Dryopithecus* → *Australopithecus* → *Homo erectus* → *Homo sapiens*
(3) *Ramapithecus* → *Homo habilis* → *Dryopithecus* → *Homo sapiens*
(4) *Australopithecus* → *Ramapithecus* → *Homo erectus* → *Homo habilis* → *Homo sapiens.*

128. How many of the following statements are correct?
a. The geological history of earth closely correlates with the biological history of earth
b. Different-aged rock sediments contain fossils of different life-forms who probably died during the formation of the particular sediment
c. Evolution is a stochastic process based on chance events in nature and chance mutation in the organisms
d. Darwin's finches are example of adaptive radition
e. Evolution for Darwin was gradual while deVries believed mutation caused speciation
(1) two (2) four
(3) three (4) five

129. Parturition is induced by a complex neuroendocrine mechanism involving which of the following steroid hormones?
(1) Estrogen and oxytocin
(2) Oxytocin,progesterone
(3) Estrogen, cortisol
(4) Cortisol and oxytocin

130.


Which of the following example can best define the above graph of natural selection?
(1) Normalising selection
(2) Balancing selection
(3) Directional selection
(4) Disruptive selection

131. Birth canal is formed by
(1) vagina & uterus
(2) fallopian tube & uterus
(3) vaginal canal & cervical canal
(4) uterus & cervical canal

132. What are the similarities among diaphragms, cervical caps and vaults?
a. Reusable
b. Made of rubber
c. Are spermicidal
d. Protect the user from contracting STIs
(1) a and b only (2) a, b and d only
(3) a, b and c only (4) a, b, c and d

133. Choose the correct statements about uterus
(1) Its upper part is called cervix where the oviduct opens
(2) Its outer glandular layer undergoes cyclical changes during menstrual cycle
(3) It is paired structure
(4) It is also called womb and serve as the site for foetal development

134. How many statements are correct among the following?
a. Chorionic villi are surrounded by uterine tissue and maternal blood
b. Umbilical cord helps in the transport of substances only towards the embryo
c. hCG, hPL, relaxin and progesterone are produced only during pregnancy
d. Relaxin is produced throughout the pregnancy by ovary only
e. Inner cell mass has certain stem cells which can give rise to all the tissues and organs
(1) two (2) three
(3) four (4) one

135. ___(i)___ visited ___(ii)___ islands on his ship called ___(iii)___. He was amazed to see diversity of creatures especically ___(iv)___. What are i–iv respectively.
(1) Lamarck, Galapagos, Atlanta, giant tortoises
(2) Darwin, Malay Archepelago, Atlanta, giant tortoises
(3) Darwin, Galapagos, H.M.S. Beagle, small black birds
(4) Lamarck, Malay Archepelago, H.M.S. Beagle, small black birds

ZOOLOGY : SECTION-B

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

136. Which one of the following sequence was proposed by Darwin and Wallace for organic evolution?
(1) Variation, constancy of population size, overproduction, natural selection
(2) Overproduction, constancy of population size, variation, natural selection
(3) Variation, natural selection, overproduction, constancy of population size
(4) Over production, variations, constancy of population size, natural selection

137. Which of the following set of techniques involve in-vivo fertilisation?
(1) ICSI, ZIFT (2) ZIFT, IUT
(3) GIFT,AI (4) IUI,ICSI

138. How many statements are not correct?
a. Secretions of acrosome and nucleus help the sperms to enter ovum
b. Cyclic menstruation is an indicator of normal reproductive phase
c. Milk produced during initial days of lactation is rich in antibodies IgA
d. A stimulatory reflex occurs between uterine contractions and oxytocin secretion that causes parturition
(1) Four (2) One
(3) Three (4) Two

139. **Assertion** : All copulatious donot lead to fertilization and pregnancy.
Reason : Fertilization can only occur if the ovum and sperms. are transported simultaneously to the ampulla.
(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

140. Choose the correct option of the ancient man and its description
(1) *Homo erectus* – Evolved around 1.5 mya and essentially ate fruits
(2) *Australopithecus* – Fossils were discovered in Java in 1891
(3) *Homo habilis* – Ate meat, had a cranial capacity around 900 cc
(4) *Homo sapiens* – Arose in Africa, about 75000-10000 years ago

141. Which of the following is a correct pairing of a placental mammal with its marsupial counterpart?
(1) Flying squirrel – Tasmanian wolf
(2) Lemur – Spotted cuscus
(3) Bobcat – Numbat
(4) Wolf – Flying phalanger

142. How many statements are correct w.r.t. contraceptive pill 'Saheli'?
a. Developed by scientists at CDRI Lucknow
b. Once a week pill
c. Non-steroidal preparation
d. High contraceptive value
e. Prevents implantation
(1) two (2) three
(3) four (4) five

143. Extra testicular ducts among the following are
(1) Rete testes, vasa efferentia
(2) Vasa efferentia, vas deferens
(3) Vas deferens, Rete testes
(4) Vas deferens, epididymis

144. After ovulation, many follicular cells in the collapsed follicle on surface of ovary change into
(1) granulosa cells that secrete progesterone
(2) granulosa cells that secrete estrogen
(3) luteal cells that secrete FSH
(4) luteal cells that secrete progesterone

145. If Cowper's glands become nonfunctional, how will it affect reproduction?
(1) Sperms will not become motile
(2) Lubrication of reproductive tract will be affected
(3) Storage of sperms in male reproductive system will not be possible
(4) Both (1) and (2)

146. **Statement-I** : Human beings possess the property of language skill and self consciousness.
Statement-II : *Homo sapiens* arose in Africa and moved across different continent and developed into different races.
(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

147. Match the ARTS with their description

i.	Collected gametes are made to form zygote in the lab	a.	ZIFT
ii.	Transfer of ovum from donor to the oviduct of the recipient	b.	GIFT
iii.	Sperm is injected into the ovum in vitro.	c.	ICSI
		d.	AI
		e.	IVF

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

148. Identify the correct statement
(1) FSH first binds with specific receptor on ovarian cell membrane
(2) FSH stimulates the secretion of estrogen and progesterone
(3) Oestrogen binds with receptors on uterine cell membrane
(4) Progesterone acts on ovarian intracellular receptors

149. Mark the option with examples of marsupial mammals
(1) Banded anteater, lemur, tigercat, wolf
(2) Bobcat, spotted cuscus, kangaroo, sugarglider
(3) Numbat, wombat, koala, tigercat
(4) Koala, tigercat, lemur, mole

150. Extrusion of IInd polar body from egg nucleus occurs
(1) after entry of sperm before completion of fertilization
(2) after completion of fertilization
(3) before entry of sperm
(4) without any relation to sperm

BOTANY : SECTION-A

All questions are compulsory in section A

151. Father of experimental genetics is
(1) Morgan (2) Mendel
(3) Bateson (4) Beadle and Tatum

152. Which is not true regarding the chromosomal theory of linkage?
(1) Linked genes are present on the same chromosome
(2) Linked genes are present linearly on a chromosome
(3) The strength of linkage is inversely proportional to the distance between linked genes
(4) Linked genes always remain in their original combination during the course of inheritance

153. In RNA, every nucleotide residue has an additional ___(a)___ group present at ___(b)___ position in the ribose. Also, in RNA the uracil is found at the place of ___(c)___.
(1) a–CH_3, b–2, c–Adenine
(2) a–OH, b–3, c–Thymine
(3) a–OH, b–2, c–Thymine
(4) a–CH_3, b–3, c–Thymine

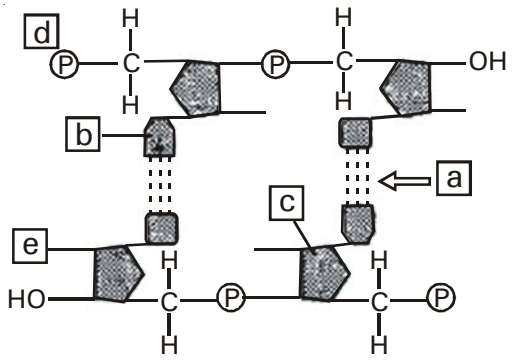
154. In the absence of glucose if lactose is provided in a growth medium of bacteria, lactose is transported into the cells through the action of
(1) RNA polymerase (2) transacetylase
(3) beta-galactosidase (4) permease

155. The packaging of chromatin at higher level occurs with the help of
(1) histones
(2) basic proteins
(3) non-histone chromosome proteins
(4) RNA and polyamines

156. **Statement-I** : Process of translation requires transfer of genetic information from a polymer of nucleotides to a polymer of amino acids .
Statement-II : Genetic code could direct the sequence of amino acids during synthesis of proteins.
(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

157. How many pollen grains out of a total of 4800, formed by a dihybrid pea plant, would have both dominant factors?
(1) 2400 (2) 1600
(3) 1200 (4) 800

158. Study the following diagram carefully and label a, b, c, d and e respectively



(1) Glycosidic bond, N-base, ribose sugar, 5′-P, 3′-OH group
(2) Hydrogen bond, N–base, deoxyribose sugar, 5′-P, 3′-OH group
(3) Hydrogen bond, N–base, ribose sugar, 5′-P, 2′-OH group
(4) Hydrogen bond, N–base, deoxyribose sugar, 5′-P, 2′-H group

159. **Assertion** : If *E.coli* was allowed to grow for 80 minutes then proportion of light and heavy densities of DNA will be 1:7 (Meselson and Stahl experiment).
Reason : The samples were separated independently on CsCl gradients to measure the densities of DNA.
(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

160. In Snapdragon, a cross is made between red and white flower plants. Out of 50 offsprings, in the F_2 generation, the number of plants with red flowers are

(1) 36 (2) 12
(3) 40 (4) 50

161. Which of the following statement is incorrect w.r.t tRNA?

(1) tRNA has an anticodon loop that has bases complementary to the code
(2) It has an amino acid acceptor end to which it binds to amino acids
(3) tRNA are specific for each amino acid
(4) tRNA, earlier called sRNA (soluble RNA) was discovered after the postulation of genetic code

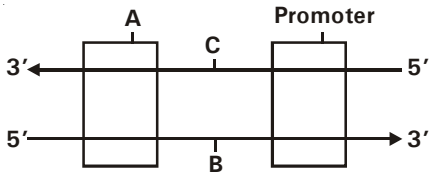
162. Among the seven pairs of contrasting traits in pea plant as studied by Mendel, the number of traits related to flower, pod and seed are

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

163. Haemophilia is more common in males because it is a

(1) recessive character carried by Y chromosomes
(2) dominant character carried by Y chromosomes
(3) dominant trait carried by X-chromosomes
(4) recessive trait carried by X-chromosome

164. In the following diagram the two DNA strands represented are ready for transcription. Identify A, B, C and select correct option



(1) A-terminator gene, B-template strand, C-coding strand
(2) A-template strand, B-terminator gene, C-coding strand
(3) A-coding strand, B-template strand, C-terminator gene,
(4) A-terminator gene, B-coding strand, C-template strand

165. A molecule which act as a genetic material should

(1) shows fast mutation
(2) be chemically stable
(3) not express itself
(4) not replicate

166. Select the incorrect option

a. α -thallesemia may occurs due to deletion of a gene located on chromosome 16.
b. In β -thallesemia production of β -globin chain is affected and it occurs due to mutation of one or both HBB genes on chromosome 11.
c. Colour blindness is an autosomal recessive disorder.
d. In human, chromosomal disorders are caused due to excess, absence or abnormal arrangement of one or more genes on chromosome.

(1) a, c and d (2) only d
(3) only c (4) only b

167. Well known Indian breeds e.g. Sahiwal cows of Punjab were developed from wild ancestral cows by

(1) hybridisation
(2) artificial selection and domestication
(3) mutation and selection
(4) genetic engineering

168. In birds the females are

(1) XX (2) WZ
(3) XO (4) YY

169. Human genome project was launched in

(1) 1992 (2) 2003
(3) 1990 (4) 2006

170. VNTR's are useful in DNA fingerprinting because they

a. are inheritable
b. show very high degree of polymorphism
c. synthesise different proteins

(1) a, b & c are correct (2) b is incorrect
(3) a & b are correct (4) a & c are incorrect

171. Which of the following statements is incorrect w.r.t. sickle cell anaemia disease?

(1) It is an autosome linked recessive trait
(2) It can be transmitted from parents to offspring when both partners are heterozygous
(3) It is controlled by a pair of alleles, Hb^A and Hb^S
(4) It is caused by substitution of Valine (Val) by glutamic acid (Glu) at sixth position of the beta globin chain of haemoglobin molecule

172. Which statement is not according to Watson and crick model?

(1) Adenine pairs with thymine and guanine pairs with cytosine
(2) The double helix is 2 nm in diameter
(3) The plane of one base pair stacks over the other
(4) If the sequence of bases in one strand is known then the sequence in other strand can not be predicted

173. Inducible enzymes
(1) are usually involved in anabolic pathways
(2) are produced when a small molecule inactivates the repressor proteins
(3) are produced when an activator molecule enhances the attachment of RNA polymerase with the operator
(4) are regulated by inherently inactive repressor molecules

174. Select the incorrect match w.r.t HGP
(1) Chromosome 1 – 2968 genes
(2) Chromosome 22 – 231 genes
(3) Average gene – 3000 bases
(4) Human genome – 3164.7 million bases

175. In lac operon model repressor protein binds to
(1) Regulator (2) Promoter
(3) Operator (4) Structural genes

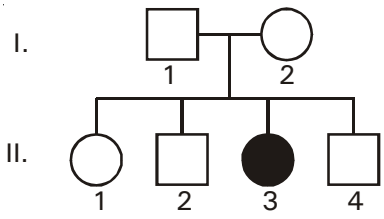
176. How many statements are true?
a. Sex linked traits show criss-cross inheritance.
b. Morgan and Bridges proved that genes are located on chromosomes.
c. In fruitfly, strength of linkage between body colour gene and eye colour gene is higher than that between genes for eye colour and wing size.
d. Morgan discovered linkage in sweetpea.
(1) Four (2) Two
(3) Three (4) None

177. If the sequence of bases in DNA template is ATTCGATG, then the sequence of bases in its transcript will be
(1) CAUCGAAU (2) UAAGCUAC
(3) GUAGCUUA (4) AUUCGAUG

178. Identify the chromosomal disorder characterised by these symptoms
A. Gynaecomastia
B. Mental retardation.
C. Tall stature
(1) Edward's syndrome
(2) Patau's syndrome
(3) Klinefelter's syndrome
(4) Turner's syndrome

179. A child with blood group genotype I^AI^B is born of a woman with genotype I^BI^B. The father could not be a man of genotype
(1) I^AI^A (2) I^AI^B
(3) I^BI^B (4) I^Ai

180. Study the pedigree given for albinism. What is the probability of parent generation I(1) being heterozygous?



(1) 50% (2) 25%
(3) 33% (4) 100%

181. Select the option in which all the entries are correctly filled

	DNA, coding strand,5′–3′	mRNA codon, 5′–3′	Anticodon	Amino acid
(1)	UAC	AUG	UAC	methionine
(2)	ACC	UGG	ACC	tryptophan
(3)	TAG	UAG	AUC	tyrosine
(4)	AGT	AGU	UCA	serine

182. The evidence for semi conservative mode of replication of chromosome in *Vicia faba* was proved by using
(1) N^{15} (2) P^{32}
(3) S^{35} (4) tritiated thymidine

183. The unequivocal proof that DNA is the genetic material came from the experiments of
(1) O.T. Avery (2) Hershey and Chase
(3) Nirenberg (4) Ochoa

184. Operon is a
(1) sequence of three nitrogen bases determining a single amino acid
(2) gene responsible for 'switching on' and 'switching off' of other genes
(3) set of closely placed genes regulating a metabolic pathway in prokaryotes
(4) segment of DNA specifying a polypeptide

185. In man brown eye is dominant over blue. A lady with brown eyes, whose father was blue eyed is married to a man with blue eyes. What percentage of her progeny will be blue eyed?
(1) 0% (2) 25%
(3) 100% (4) 50%

BOTANY : SECTION-B

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

186. First and last chromosome sequenced out of 24 chromosomes of human genome are respectively
(1) Y and 1 (2) X and 1
(3) 22 and 1 (4) X and Y

187. What is the total number of nucleotides present in DNA of phage $\phi \times 174$?
(1) 5386 (2) 48502
(3) 10772 (4) 4.6×10^6

188. Hardy-Weinberg principle is not applicable in which of the following conditions ?
(1) Random mating population
(2) Population in which migration occurs.
(3) Large sized population
(4) Population in which no mutations occur.

189. Which of the following biochemical reaction in living system is catalysed by a ribozyme?
(1) Joining of okazaki fragments
(2) Charging of tRNA
(3) Formation of peptide bond
(4) Repair of DNA

190. In tailing, _____ residues are added at _____ end in a template independent manner
(1) methyl guanosine triphosphate; 5′–end
(2) methyl guanosine triphosphate; 3′–end
(3) adenylate; 5′–end
(4) adenylate; 3′–end

191. **Statement- I** : The split gene arrangement in eukaryotes is an ancient feature of the genome and the presence of introns is reminiscent of antiquity.
Statement- II : The process of splicing involves *snurps* and represents the dominance of RNA world.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

192. Female AaBb is crossed to male AAbb, the gametes shall be
(1) female AB and ab, male AA and bb
(2) female Aa and Bb, male AA and bb
(3) female AB, Ab, aB, ab and male Ab
(4) female AA, bb, AB and ab male Ab

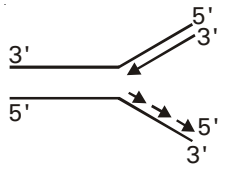
193. The cross AB/ab $\times$ ab/ab produces offsprings, of which 40% were ab/ab. What is the recombinant percentage?
(1) 80% (2) 40%
(3) 20% (4) 10%

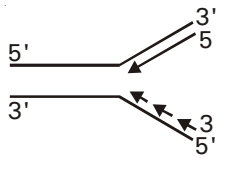
194. Match the column

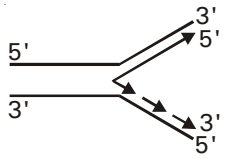
	Column-I		Column-II
a.	Incomplete dominance	(i)	*Drosophilla*
b.	Law of segregation	(ii)	*Antirhinum majus*
c.	linkage	(iii)	*Pisum sativum*

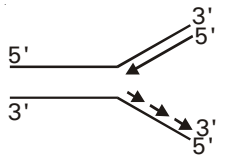
(1) a–(i), b–(ii), c–(iii) (2) a–(ii), b–(iii), c–(i)
(3) a–(iii), b–(ii), c–(i) (4) a–(iii), b–(i), c–(ii)

195. Given one is a dihybrid test cross
(1) Tt $\times$ tt (2) TtRR $\times$ ttrr
(3) tt $\times$ rr (4) TtRr $\times$ ttrr

196. Which one of the following correctly represents the manner of replication of DNA?
(1) 

(2) 

(3) 

(4) 

197. A core of nucleosome contains the following group of histone proteins
(1) H_2A, H_2A, H_2B, H_4. (2) H_1, H_2A, H_2B, H_3.
(3) H_2, H_2, H_3, H_4. (4) H_3, H_2A, H_2B, H_4.

198. Which one is incorrect w.r.t. Chargaff's rule?
(1) A = T & G = C (2) $\frac{A+T}{G+C} = 1$
(3) $\frac{A+T}{G+C}$ = constant (4) Both (2) & (3)

199. **Assertion** : Since controlled crosses are not possible in humans, pedigree analysis helps to trace inheritance of a specific trait in a family.
Reason : In human genetics, pedigree study provides a strong tool.
(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

200. According to chromosomal theory of inheritance two alleles for one character are located on
(1) homologous sites on nonhomologous chromosomes
(2) different loci on homologous chromososomes
(3) Homologous sites on homologous chromosomes
(4) different loci on non–homologous chromosomes