

Dated :
22-01-2023

M.L. Syal's Helix Institute

S.C.O. 343-345, Top Floor, Sector 34-A, Chandigarh. Ph : 0172-2623155

MM : 720

XII cum Competition Course for Medical Test - 25

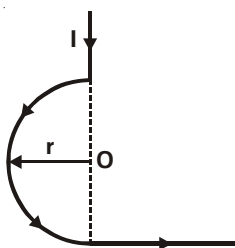
Time : 3 hrs. 20 min.

PHYSICS	: MAGNETIC EFFECTS OF CURRENT, MAGNETISM, EMI AND AC
CHEMISTRY	: ALKYL & ARYL HALIDES, ALCOHOL, PHENOL & ETHER, ALDEHYDE KETONES & CARBOXYLIC ACIDS, AMINES
ZOOLOGY	: EVOLUTION
BOTANY	: GENETICS-II VIZ: MOLECULAR BASIS OF INHERITANCE

PHYSICS : SECTION-A

All questions are compulsory in section A

1.



In the figure, what is magnetic field at the point 'O'?

- (1) $\frac{\mu_0 I}{4\pi r}$ (2) $\frac{\mu_0 I}{4\pi r} + \frac{\mu_0 I}{2\pi r}$
(3) $\frac{\mu_0 I}{4r} + \frac{\mu_0 I}{4\pi r}$ (4) $\frac{\mu_0 I}{4r} - \frac{\mu_0 I}{4\pi r}$

2. A magnetic needle lying parallel to a magnetic field requires W units of work to turn it through 60° . The torque required to maintain the needle in this position will be

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

3. If a proton, deuteron 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) $1 : 1 : \sqrt{2}$

4. A metallic ring with a cut is held horizontally and a magnet is allowed to fall vertically through the ring, then the acceleration of the magnet is

- (1) equal to g
(2) less than g
(3) more than g
(4) zero

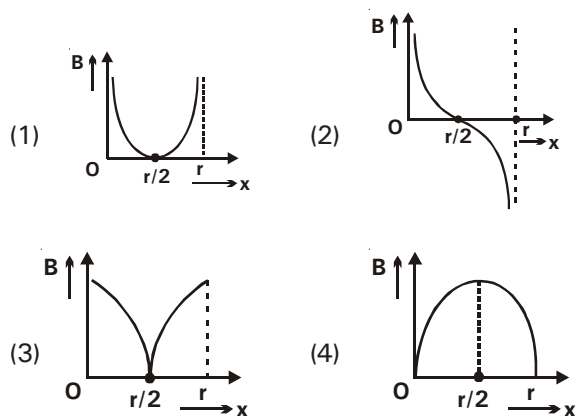
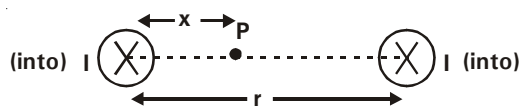
5. A wire of magnetic moment M and length L is bent in semi-circle. Then its new magnetic moment is

- (1) $\frac{M}{\pi}$ (2) $\frac{2M}{\pi}$
(3) M (4) zero

6. If all the linear dimensions of a solenoid are increased by a factor of 3 and the number of turns per unit length of the winding are kept the same, the self inductance of the solenoid increased by a factor of

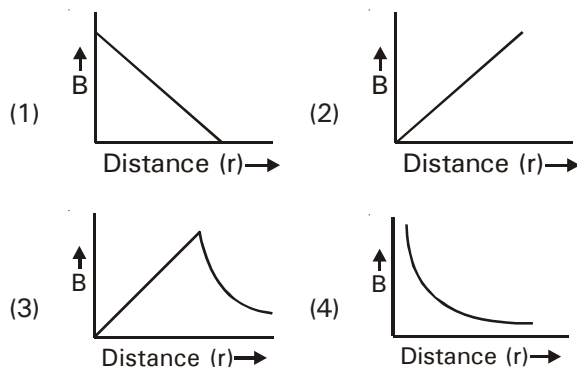
- (1) 9 (2) 27
(3) 3 (4) 81

7. Two thin long straight wires are parallel to each other at a separation ' r ' apart and they carry current ' I ' each along same direction as shown. Magnetic field (B) varies with distance (x) along the line joining two wires as

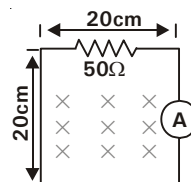


8. A horizontal overhead power line carries a current in north to south direction. What is the direction of the magnetic field due to the current below the line?
- towards south
 - towards east
 - towards west
 - towards north
9. Temperature above which a ferromagnetic substance becomes paramagnetic is called
- Critical temperature
 - Boyle's temperature
 - Debye's temperature
 - Curie temperature

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



11. What is the emf developed between two rails separated by 1 metre when a train travels with a speed of 180 km/hr along the track. Given that the vertical component of earth's magnetic field is 0.2×10^{-4} weber/m².
- 10^{-2} volt
 - 10^{-4} volt
 - 10^{-3} volt
 - 1 volt
12. A resistance of 300Ω and an inductance of $1/\pi$ henry are connected in series to a AC voltage of 20 volts and 200 Hz frequency. The phase angle between the voltage and current is
- $\tan^{-1} \frac{4}{3}$
 - $\tan^{-1} \frac{3}{4}$
 - $\tan^{-1} \frac{3}{2}$
 - $\tan^{-1} \frac{2}{5}$
13. The circuit shown is in a uniform magnetic field that is into the page and is decreasing in magnitude at the rate of 100 tesla/second. The ideal ammeter reads



- 0.1 A
- 0.05 A
- 0.04 A
- 0.08 A

14. An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac in primary is 28 V. The r.m.s. secondary voltage is nearest to
 (1) 50 V (2) 70 V
 (3) 100 V (4) 40 V

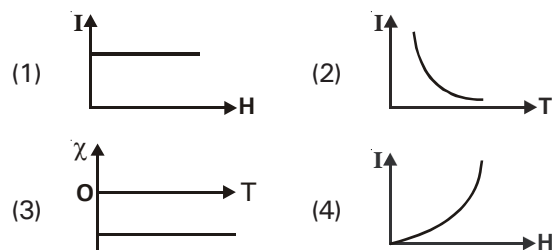
15. A straight section PQ of a circuit lies along the x-axis from $x = \frac{-a}{2}$ to $x = \frac{+a}{2}$ and carries a steady current I. Magnetic field due to section PQ at a point $x = a$ will be
 (1) Proportional to a (2) Proportional to a^2

(3) Proportional to $\frac{1}{a}$ (4) Zero

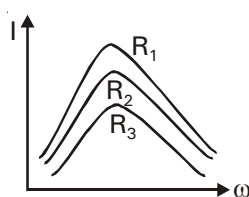
16. A circular coil of area 10 cm^2 and of 20 turns carries a current of 3 amperes. The magnetic dipole moment of the coil is
 (1) 0.02 A-m^2 (2) 0.03 A-m^2
 (3) 0.04 A-m^2 (4) 0.06 A-m^2

17. A coil of resistance 5Ω and an inductance 2 H is connected to a 100 volt battery. Then energy stored in the coil is
 (1) 400 J (2) 125 J
 (3) 200 J (4) 250 J

18. Which of the following may be a curve for a diamagnetic substance? I, H, χ and T respectively represents their standard meaning



19. The resonance curve for series LCR circuit is shown for three different resistances. Then

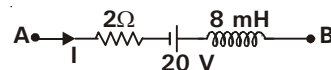


- (1) $R_1 > R_2 > R_3$ (2) $R_1 < R_2 < R_3$
 (3) $R_1 = R_2 = R_3$ (4) None of these

20. A magnet suspended in a vibration magnetometer makes 40 oscillations/minute in a city A. In another city B, the same magnet is found to make 60 oscillations/minute. The ratio of horizontal component of earth's magnetic field in city A to that in city B is

(1) 2 : 3 (2) 4 : 9
 (3) $\sqrt{2} : \sqrt{3}$ (4) 9 : 4

21. The network as shown is part of a complete circuit. If at a certain instant, current I is 2A and it is decreasing at a rate of 10^3 As^{-1} then $V_B - V_A$ equals

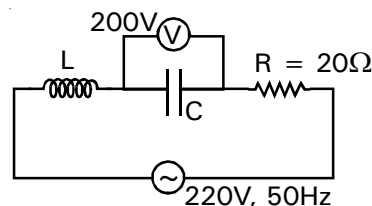


(1) 14 V (2) 16 V
 (3) 24 V (4) 18 V

22. A conducting loop rotates with constant angular velocity about its fixed diameter in a uniform magnetic field which is perpendicular to that fixed diameter.

(1) EMF will be maximum at the moment when flux is zero
 (2) Phase difference between the flux and the emf is $\pi/2$
 (3) Both (1) and (2)
 (4) Neither (1) nor (2)

23.



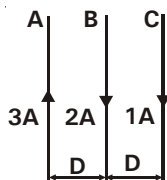
In the above circuit, rms current is 11 A. The potential difference across the inductor is

(1) 220 V (2) 300 V
 (3) 200 V (4) Zero

24. A magnet of dipole moment 'M' and pole strength 'm' is divided in two equal parts by cutting along its length. Then magnetic moment and the pole strength of each part will be

(1) M, m (2) $0.5M$, m
 (3) M , $0.5m$ (4) $0.5M$, $0.5m$

25.



Three long straight wires A, B and C are carrying currents as shown in the figure. The resultant force on C is directed

- (1) away from B
 - (2) towards B
 - (3) perpendicular to the plane of paper inward
 - (4) perpendicular to the plane of paper outward
26. A magnet is moved towards a coil (a) quickly (b) slowly, then the induced charge is
- (1) larger in case (a)
 - (2) smaller in case (a)
 - (3) equal in both cases
 - (4) larger or smaller depending upon the radius of the coil
27. With the decrease of current in the primary coil from 2 ampere to zero in 0.1 second, the e.m.f. generated in the secondary coil is 100 volt. The mutual inductance of the two coils is
- (1) 1.25 henry
 - (2) 2.5 henry
 - (3) 5 henry
 - (4) 10 henry
28. Alternating current may be termed as 'wattless' in case of
- (1) all series LR circuits
 - (2) all series RC circuits
 - (3) all series LC circuits
 - (4) series resonant LCR circuits
29. Current in ampere in an AC circuit is given as $I = (1 + 6\sqrt{2} \sin \omega t)$. The rms value of this current is about
- (1) 5 ampere
 - (2) 8 ampere
 - (3) 7 ampere
 - (4) 6 ampere
30. When a circular wire loop is rotated about a diameter in a magnetic field, direction of induced e.m.f. changes once in each
- (1) $\frac{1}{4}$ revolution
 - (2) $\frac{1}{2}$ revolution
 - (3) 1 revolution
 - (4) 2 revolution

31. Let the horizontal component of earth's magnetic field at a place be 0.2 gauss. If a small magnet is placed in the magnetic meridian with its north pole pointing south, the null point is obtained 10 cm away from the centre of the magnet. The magnetic moment of the magnet is

- (1) 10 A-m²
- (2) 1 A-m²
- (3) 0.2 A-m²
- (4) 0.1 A-m²

32. What is shape of magnet in moving coil galvanometer to make a radial magnetic field ?

- (1) Concave
- (2) Horse shoe magnet
- (3) Convex
- (4) None of these

33. When a magnetic field is applied in a direction perpendicular to direction of cathode rays, then their

- (1) energy decreases
- (2) energy increases
- (3) magnitude of momentum increases
- (4) speed and energy remain unchanged

34. An alternating voltage $E = 200\sqrt{2} \sin(100t)$ volt is connected to a 1 microfarad capacitor through an AC ammeter. The reading of the ammeter shall be

- (1) 10 mA
- (2) 20 mA
- (3) 40 mA
- (4) 80 mA

35. Which of the following is not an application of eddy currents

- (1) Induction furnace
- (2) Galvanometer damping
- (3) Speedometer of automobiles
- (4) potentiometer

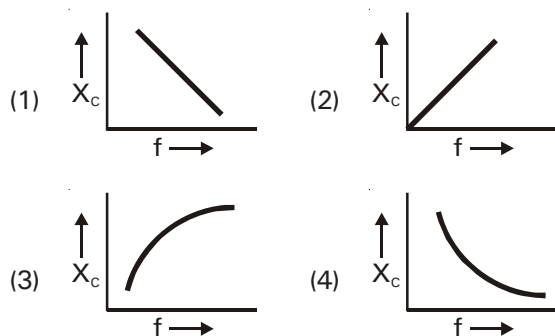
PHYSICS : SECTION-B

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

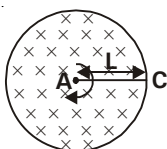
36. The magnetic flux (in weber) linked with the coil varies with time as $\phi = 4t^2 + 2t + 10$. The magnitude of induced emf at $t = 2$ second is

- (1) 24 V
- (2) 18 V
- (3) 16 V
- (4) 14 V

37. The reactance of a capacitor X_C in an ac circuit varies with frequency f of the source voltage. Which one of the following represents this variation correctly?

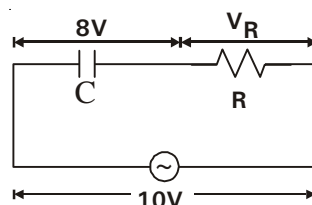


38. When the dip circle is deviated at 37° from the magnetic meridian, the angle of dip was found to be 53° , the true angle of dip is about
- (1) 30° (2) 60°
 (3) 90° (4) 45°
39. A copper rod AC of length L , pivoted at one end A, rotates at constant angular velocity ω , at right angles to a uniform magnetic field of induction B . The e.m.f developed between the point A of the rod and end C is



- (1) $0.25 B \omega L^2$ (2) $0.5 B \omega L^2$
 (3) $0.75 B \omega L^2$ (4) $B \omega L^2$
40. A solenoid having 20 turns per centimeter carries a current of 2 A. Then magnetising force inside the solenoid is
- (1) 4000 A/m (2) 20 A/m
 (3) 2000 A/m (4) 40 A/m

41.



In a series CR circuit shown in figure, the applied voltage is 10 V and the voltage across capacitor is found to be 8V. Then the voltage across R, and the phase difference between current and the applied voltage will respectively be

- (1) 6V, 53° (2) 3V, 37°
 (3) 6V, 45° (4) none of these

42. In LCR circuit the capacitance is changed from C to $4C$. For the same resonant frequency, the inductance should be changed from L to

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

43. At an instant, an electron is moving along z-axis in a magnetic field directed along y-axis. The force on the electron will be along
- (1) negative y-axis (2) positive x-axis
 (3) negative z-axis (4) negative x-axis

44.



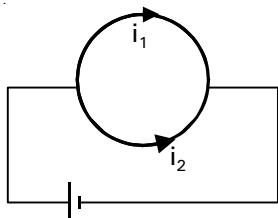
As a result of change in the magnetic flux linked to the closed loop as shown in the figure, an emf V is induced in the loop. Work done in taking a charge Q once round the loop is

- (1) QV (2) $2QV$
 (3) $QV/2$ (4) Zero

45. In a series LCR circuit the voltage across the resistance, capacitance and inductance is 10 V each. If the capacitance is short circuited, the voltage across the inductance will be

- (1) $\frac{10}{3}$ V (2) $\frac{10}{\sqrt{2}}$ V
(3) 10 V (4) 20 V

46.



A cell is connected between two points of a uniformly thick circular conductor as shown in figure. Magnetic field at the centre of the loop due to the circular conductor will be

- (1) Zero (2) $\frac{\mu_0}{2a} (i_1 - i_2)$
(3) $\frac{\mu_0}{2a} (i_1 + i_2)$ (4) $\frac{\mu_0}{a} (i_1 + i_2)$

47. A hollow cylinder having infinite length and carrying uniform current per unit length λ along the circumference as shown. Magnetic field inside the cylinder is



- (1) $\frac{\mu_0 \lambda}{2}$ (2) $\mu_0 \lambda$
(3) $2 \mu_0 \lambda$ (4) Zero

48. An ideal transformer has 200 turns in its primary. An input current of 0.5A gives an output power of 1 kW. The number of turns in secondary for an output voltage of 200 V is

- (1) 20 (2) 100
(3) 200 (4) 2000

49. Power delivered by the source of a series LCR circuit becomes maximum, when

- (1) $\omega L = \omega C$ (2) $\omega L = \frac{1}{\omega C}$
(3) $\omega L = \left(\frac{1}{\omega C}\right)^2$ (4) $\omega L = \sqrt{\omega C}$

50. Kinetic energy of charged particle of mass m , charge q revolving in a magnetic field B and radius r in a cyclotron is given by

- (1) $\frac{Bqr}{2m}$ (2) $\frac{Bqr}{m}$
(3) $\frac{B^2 q^2 r^2}{m}$ (4) $\frac{B^2 q^2 r^2}{2m}$

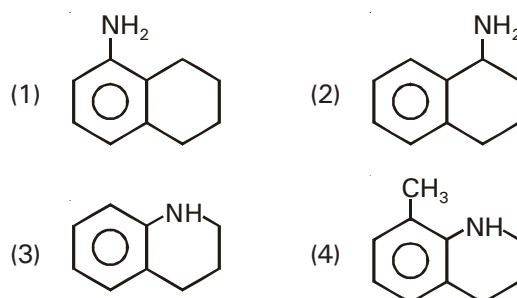
CHEMISTRY : SECTION-A

All questions are compulsory in section A

51. The conversion of alcohols to alkyl halides can not be done by treating alcohol with

- (1) PCl_5 (2) $\text{KI} + \text{H}_3\text{PO}_4$
(3) Anhyd $\text{ZnCl}_2 + \text{HCl}$ (4) NaCl

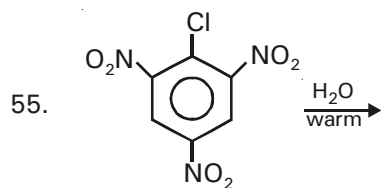
52. Which of the following is the strongest base?



53. Addition of water to acetylene in the presence of H_2SO_4 and HgSO_4 gives

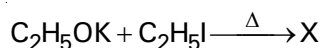
- (1) acetone (2) acetaldehyde
(3) ethanol (4) ethene

54. Strongest acid among the following is
 (1) $\text{NO}_2\text{CH}_2\text{COOH}$ (2) CH_3COOH
 (3) FCH_2COOH (4) $\text{C}_6\text{H}_5\text{COOH}$



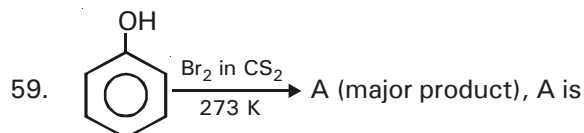
The product of the above reaction is

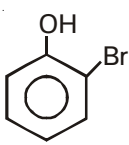
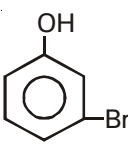
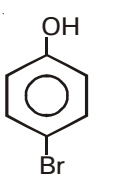
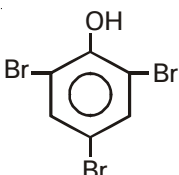
- (1) 2, 4, 6-trinitro benzene
 (2) phenol
 (3) 2, 4, 6-trinitrophenol
 (4) there is no reaction
56. The total isomers (including stereoisomers) obtained on monochlorination of $(\text{CH}_3)_3\text{C}-\text{C}_2\text{H}_5$ are
 (1) 3 (2) 4
 (3) 2 (4) 6
57. In the following reaction



X is a pleasant smelling liquid. 'X' can be prepared from ethyl bromide by treating it with

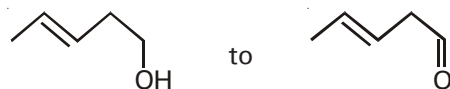
- (1) Sodium (2) Dry silver oxide
 (3) Ethyl chloride (4) Dry silver powder
58. $(\text{C}_6\text{H}_5\text{CH}_2)_2\text{Cd} + 2\text{CH}_3\text{COCl} \rightarrow \text{A}$, A is
 (1) $\text{C}_6\text{H}_5\text{CH}_2\text{COCH}_2\text{C}_6\text{H}_5$
 (2) $\text{CH}_3\text{COC}_6\text{H}_5$
 (3) $\text{C}_6\text{H}_5\text{CH}_2\text{COCH}_3$
 (4) CH_3COCH_3



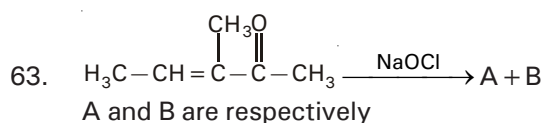
- (1)  (2) 
 (3)  (4) 

60. On heating aniline with fuming sulphuric acid at 180°C , the compound formed will be
 (1) aniline disulphate
 (2) aniline 2,4,6-trisulphonic acid
 (3) sulphanilic acid
 (4) anilinium hydrochloride

61. The most suitable reagent for conversion of



- (1) MnO_2 (2) $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4$
 (3) PCC (4) Red P/HI
62. Which of the following will occur when a tertiary alcohol react with Cu at 573K ?
 (1) Dehydration (2) Dehydrogenation
 (3) Oxidation (4) Reduction



- (1) $\text{H}_3\text{C}-\text{CH}=\text{C}(\text{CH}_3)-\text{COONa}$ and CHCl_3
 (2) $\text{H}_3\text{C}-\text{CH}=\text{C}(\text{CH}_3)-\text{COOH}$ and HCOOH
 (3) $\text{H}_3\text{C}-\text{CH}=\text{C}(\text{CH}_3)-\text{CH}_2-\text{OH}$ and CH_3OH
 (4) none of these
64. n-Butane nitrile may be prepared by heating
 (1) Isopropyl alcohol with KCN
 (2) Butyl alcohol with KCN
 (3) Butyl chloride with KCN
 (4) n-propyl chloride with KCN

65. Monochlorination of toluene in sunlight followed by hydrolysis with aq. NaOH yields.

- (1) o-Cresol
 (2) m-Cresol
 (3) 2, 4-Dihydroxytoluene
 (4) Benzyl alcohol

66. The reaction of CH_3ONa with $(\text{CH}_3)_3\text{C}-\text{Br}$ exclusively gives

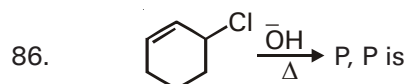
- (1) 2-methyl propene
 (2) 2-methyl-2-methoxypropane
 (3) 2-methyl but-1-ene
 (4) methoxymethane

67. $\text{CH}_3\text{CH}_2\text{COOH} \xrightarrow{\text{Red P/Br}_2} \text{A} \xrightarrow{\text{alc. KOH}} \text{B}$
Identify B in the above sequence of reaction
- (1) $\text{CH}_2=\text{CH}-\text{COOH}$
 - (2) $\text{CH}_3-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{COOH}$
 - (3) $\text{CH}_3-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{C}-\text{O}-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{C}-\text{CH}_3$
 - (4) $\text{HO}-\text{CH}_2-\text{CH}_2-\text{COOH}$
68. Propene on hydroboration - oxidation produces
- (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
 - (2) $\text{CH}_3\text{CHOHCH}_3$
 - (3) $\text{CH}_3\text{CH}_2\text{CHO}$
 - (4) $\text{CH}_3\text{CHOHCH}_2\text{OH}$
69. Which one of the following is reduced with Zn-Hg and HCl to give butane?
- (1) Propanone
 - (2) Butanone
 - (3) Ethanoic acid
 - (4) Propanoic acid
70. The following reaction gives
- $$\text{4-nitrotoluene} \xrightarrow[\text{H}_2\text{SO}_4]{\text{K}_2\text{Cr}_2\text{O}_7}$$
- (1) 4-nitrobenzyl alcohol
 - (2) 4-nitrobenzaldehyde
 - (3) 4-nitrobenzoic acid
 - (4) 4-aminotoluene
71. Which of the following has lowest boiling point ?
- (1) Butanal
 - (2) Butanol
 - (3) 2-Butanone
 - (4) diethyl ether
72. $\text{CH}_3\text{CHO} \xrightarrow{\text{LiAlH}_4} \text{A}$
 $\text{CH}_3\text{COCH}_3 \xrightarrow{\text{LiAlH}_4} \text{B}$
A and B can not be differentiated by
- (1) Victor meyer test
 - (2) Reaction with Cu at 573K
 - (3) Caustic potash and iodine
 - (4) Lucas reagent
73. Which of the following is/are higher for chlorobenzene than for cyclohexyl chloride?
- (1) Dipole moment
 - (2) Solubility in water
 - (3) Percentage s-character in hybrid orbital of C attached to Cl
 - (4) Ease of nucleophilic substitution
74. Partial oxidation of methyl benzene by CrO_2Cl_2 gives
- (1) Phenol
 - (2) Benzaldehyde
 - (3) Benzoic acid
 - (4) 2-Phenylethanal
75. Which of the following reagents would not be a good choice for reducing an nitro benzene compound to an amine?
- (1) H_2 (excess)/Pt
 - (2) LiAlH_4 in ether
 - (3) Fe and HCl
 - (4) Sn and HCl
76. Isopropyl benzene is subjected to aerial oxidation and then the product is hydrolysed to finally yield
- (1) Benzene
 - (2) Benzaldehyde
 - (3) Phenol
 - (4) Acetophenone
77. Match the Column I with Column II
- | Column I | Column II |
|----------------------|---------------------|
| a. Methyl alcohol | (i) Rubbing alcohol |
| b. Ethyl alcohol | (ii) Wood spirit |
| c. Phenol | (iii) Grain alcohol |
| d. Isopropyl alcohol | (iv) Carbolic acid |
- (1) a-ii ; b-iii ; c-iv ; d-i
 - (2) a-i ; b-ii ; c-iv ; d-iii
 - (3) a-iii ; b-ii ; c-i ; d-iv
 - (4) a-ii ; b-iv ; c-ii ; d-iv
78. Which of the following will not give Hoffmann bromamide reaction ?
- (1) $\text{CH}_3-\overset{\text{O}}{\text{C}}-\text{NH}_2$
 - (2) $\text{Ph}-\overset{\text{O}}{\text{C}}-\text{NH}_2$
 - (3) $\text{CH}_3-\overset{\text{O}}{\text{C}}-\text{NH}-\text{Br}$
 - (4) $\text{Ph}-\overset{\text{O}}{\text{C}}-\text{NH}-\text{Ph}$

79. A compound 'A' ($C_8H_{10}O$) upon treatment with alkaline solution of iodine gives a yellow precipitates. The filtrate on acidification gives a white solid 'B' ($C_7H_6O_2$) what is incorrect about A and B?
- A is an aromatic compound having methyl ketone group
 - A is an aromatic compound having methyl carbinol group
 - B is more acidic in nature than phenol
 - B can be prepared by reaction of phenol with $CHCl_3$ in presence of alkali
- b & c
 - a & d
 - a & c
 - only d
80. Which of the following carboxylic acids undergoes decarboxylation easily?
- $C_6H_5CO-CH_2COOH$
 - $C_6H_5COCO_2H$
 - $C_6H_5-CH(OH)-COOH$
 - $C_6H_5-CH(NH_2)-COOH$
81. Balz Schiemann's reaction is used for the preparation of
- fluorobenzene
 - iodo benzene
 - toluene
 - aniline
82. 'A' compound with molecular formula $C_8H_8O_2$ gives negative iodoform test and positive Tollen's test. The compound 'A' on reaction with conc. NaOH undergoes Cannizzaro's reaction. The structure of the compound is
- -
 -
 -
83. The major product of the following reaction is
- $$CH_3-C_6H_4-COOAg \xrightarrow{Br_2, CCl_4}$$
- p-bromotoluene
 - 2-bromo-p-xylene
 - 4-methylbenzylbromide
 - none of these
84. $CH_3CH_2OH \xrightarrow[413\text{ K}]{H_2SO_4} A$ (major product), A is
- $CH_2=CH_2$
 - $C_2H_5-O-C_2H_5$
 - CH_3-O-CH_3
 - CH_3CHO
85. Acetophenone can be converted into tertiary alcohol by
- $NaBH_4$
 - CH_3MgBr/H_3O^+
 - $Zn-Hg/HCl$
 - $LiAlH_4$

CHEMISTRY : SECTION-B

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



- (1) Allyl alcohol
- (2) Vinyl alcohol
- (3) Benzene
- (4) Cyclohexa-1-3-diene

87. The reaction of Br_2 and hot conc. KOH results in the formation of the following products

- (1) KBrO
- (2) KBrO_3
- (3) O_2
- (4) Br_2

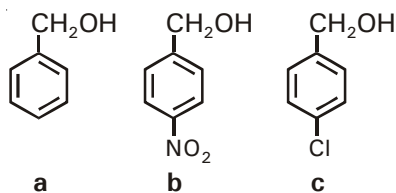
88. The change in hybridisation which occurs when nucleophilic addition occurs to the carbonyl compound is

- (1) sp to sp^2
- (2) sp^2 to dsp^2
- (3) sp^2 to sp^3
- (4) sp^3 to sp^3d^2

89. The major product of acid catalysed dehydration of 1-methylcyclohexanol is

- (1) 1-methylcyclohexene
- (2) 2-methylcyclohexene
- (3) 1-methylcyclohex-2-ene
- (4) cyclohexene

90. Mark the correct increasing order of reactivity of the following compounds with HBr/HCl .

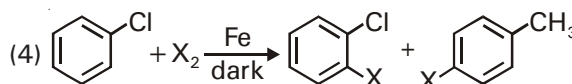
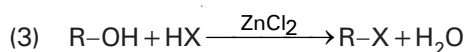
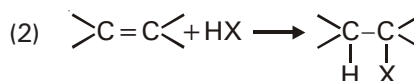


- (1) $a < b < c$
- (2) $b < a < c$
- (3) $b < c < a$
- (4) $c < b < a$

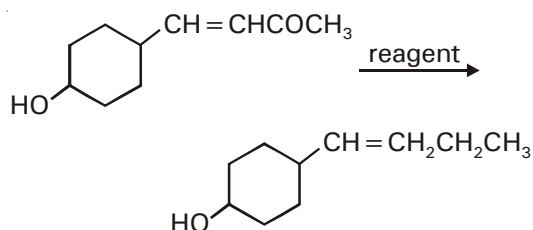
91. Chloroform was employed as a general anaesthetic in surgery but now it has been replaced by less toxic, safer anaesthetics. Which of the following are harmful effects of CHCl_3 ?

- (1) Inhaling chloroform vapours depresses the central nervous system.
- (2) Breathing a small amount of CHCl_3 for a short time can cause dizziness, fatigue and headache.
- (3) Chronic chloroform exposure may cause damage to the liver and to the kidneys and some people develop sores when the skin is immersed in CHCl_3 .
- (4) All of the above

92. Which of the following is electrophilic substitution reaction?



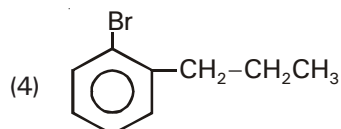
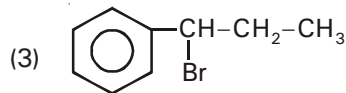
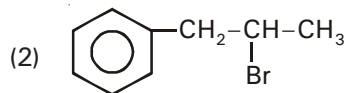
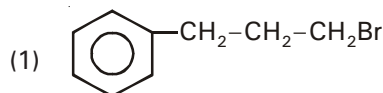
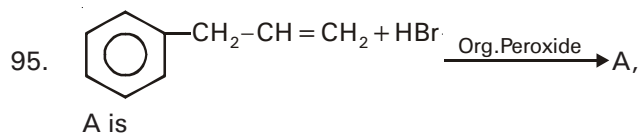
93. In the given transformation, which of the following is the most appropriate reagent?



- (1) $\text{Zn-Hg}/\text{HCl}$
- (2) Na, Liq. NH_3
- (3) NaBH_4
- (4) $\text{NH}_2\text{-NH}_2, \text{OH}^-$

94. LiAlH_4 converts ester into

- (1) alkanes
- (2) primary alcohol
- (3) secondary alcohol
- (4) tert. alcohol



96. Which of the following is most reactive for S_N1 reaction?

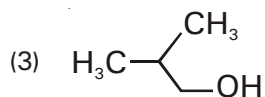
- (1) $C_6H_5CH_2Br$
- (2) $C_6H_5CH(C_6H_5)Br$
- (3) $C_6H_5CH(CH_3)Br$
- (4) $C_6H_5C(CH_3)(C_6H_5)Br$

97. The pair of compounds which can be distinguished by Tollen's reagent is

- (1) Acetophenone and Acetaldehyde
- (2) Acetic acid and acetone
- (3) Acetaldehyde and formic acid
- (4) Acetaldehyde and Benzaldehyde

98. Among the following the one that gives positive iodoform test upon reaction with I_2 and $NaOH$ is

- (1) $CH_3CH_2CH(OH)CH_2CH_3$
- (2) $C_6H_5CH_2CH_2OH$

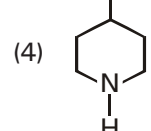
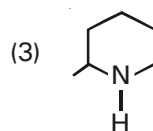
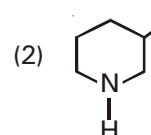
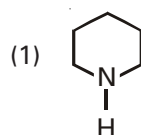
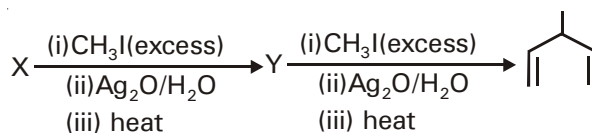


99. **Assertion:** Formaldehyde can not be prepared by Roesenmunds reduction.

Reason: $HCOCl$ is a stable compound.

- (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

100. Identify the compound X in given sequence of reaction



ZOOLOGY : SECTION-A


All questions are compulsory in section A

101. Plants of the Galapagos islands show resemblance most closely to the plants of

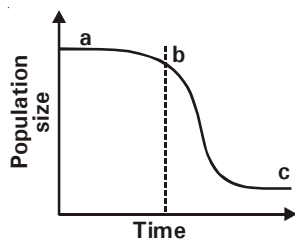
- (1) Asia
- (2) Australia
- (3) North America
- (4) South America

102. The Darwin's finches of the Galapagos islands provide us an example of

- (1) Adaptive radiation
- (2) Biogeographical evidence of evolution
- (3) Divergent evolution
- (4) All the above

103. Ancestral giraffes had necks of varied length, long necked giraffes were found to be more suitable for obtaining foliage from trees. Therefore, competition led to the survival of long necked individuals. This supports.
 (1) Lamarck's theory (2) Darwin's theory
 (3) De Vries theory (4) None of these
104. The blood proteins of a peacock are closely related with which living amniote?
 (1) Crocodile (2) *Archaeopteryx*
 (3) Parrot (4) Dinosaur
105. The theory that evolution proceeds by large discrete and sudden changes, was put forward by
 (1) Darwin (2) Lamarck
 (3) DeVries (4) Wallace
106. Identify incorrect statement
 (1) *Latimeria* is a connecting link between fishes & amphibians
 (2) Some of the land reptiles that evolved into fish like reptiles around 200 mya were *Ichthyosaurus*
 (3) Jawless fishes evolved about 350 bya
 (4) First fossil of horse was found in North America
107. The type of selection observed in peppered moth during industrial melanism is
 (1) stabilising (2) directional
 (3) disruptive (4) normalising
108. **Assertion** : Banding pattern of human chromosomes 3 and 6 is similar to that of particular autosomes in the chimpanzee.
Reason : There is common ancestry of great apes and man .
 (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
109. Haeckel's biogenetic law or recapitulation theory states that
 (1) life history of an animal reflects evolutionary history of the same
 (2) progeny resembles parents
 (3) mutations are acquired characters
 (4) all organisms begin their life from zygote
110. Match the column-I with column-II and select the correct option
- | Column-I | Column-II |
|--------------------------|---|
| a. Mutation | i. Crossing over |
| b. Genetic drift | ii. Gene migration occurring multiple times |
| c. Genetic recombination | iii. Preadaptive variation |
| d. Gene flow | iv. Binomial sampling error |
- (1) a-iii, b-iv, c-ii, d-i (2) a-i, b-iv, c-iii, d-ii
 (3) a-iii, b-iv, c-i, d-ii (4) a-ii, b-iv, c-iii, d-i
111. The transformation of the reducing primitive atmosphere into an oxidizing atmosphere occurred due to the emergence of
 (1) Cyanobacteria
 (2) Angiosperms
 (3) First photosynthetic bacteria
 (4) Eukaryotic algae
112. An isolated population of moths with approximately equal numbers of white winged and black winged members was disturbed by a calamity. Only a few white-winged moths remained to form the next generation. This kind of change in the gene pool is called
 (1) gene migration
 (2) genetic recombination
 (3) blocked gene flow
 (4) genetic bottle neck effect
113. **Population 'A'** **Population 'B'**
- 
- Organisms from population 'A' move to population 'B' and interbreeding between the two populations occurs. 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 and diffusion of genes into population 'B' if it occurs several times
 (4) Both (2) & (3)
114. An incorrect statement is
 (1) the rate of appearance of new forms is linked to life span of the organisms
 (2) there must be a genetic basis for any trait to be selected naturally in order to evolve
 (3) new alleles added to a population by genetic recombination always enhance the effect of selection
 (4) sampling errors often reduce the genetic variability of the population
115. Which of the following instances describe an evolving population?
 (1) Gene frequencies remain constant
 (2) No migration, genetic drift, natural selection or mutations taking place
 (3) Mating is random in the large population & all genes have equal chance of passing on to next generation
 (4) None of these

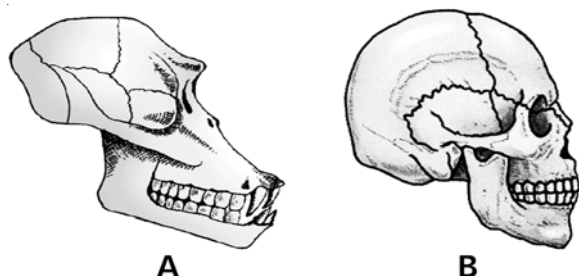
116.



The graph illustrates changing population size in a small population of a certain species due to chance events. What is true for population at 'c'?

- (1) Reduced genetic variation
- (2) Increased heterozygosity
- (3) Decreased homozygosity
- (4) All of these

117. The illustration below show the skull of two different mammals. Which of the following accurately describes the difference between these skulls?



- (1) A is the skull of baby ape and B is the skull of human
- (2) A is skull of an ape and B is skull of human
- (3) A is skull of infant and B is skull of chimpanzee
- (4) All the statements are incorrect

118. **Statement-I** : Evolution is not a direct process in sense of determinism.

Statement-II : Evolution is based on chance events in nature and chance mutation in organisms.

- (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

119. Correct statements among the following are

- i. Increase in the frequency of melanic moths after industrialization in Britain supports Darwin's theory
- ii. When more individuals of a population acquire a mean character value, it is called disruption
- iii. Change in allelic frequency in a population will lead to Hardy - Weinberg equilibrium
- iv. Genetic drift does not alter the existing allelic frequency

- (1) only ii
- (2) only i
- (3) ii and iv
- (4) i and iii

120. The novelty and brilliant insight of Darwin was that he asserted that variations are

- (1) non inheritable and make resource utilization better for few individuals
- (2) Inheritable and make resource utilization better for few individuals
- (3) inheritable and make some individuals to leave more progeny
- (4) both (2) & (3)

121. Given : 1 = Inheritance of useful variations, 2 = variations 3=survival of the fittest; 4=struggle for existence. According to Darwinism, which of the following represents the correct sequence of events in speciation?

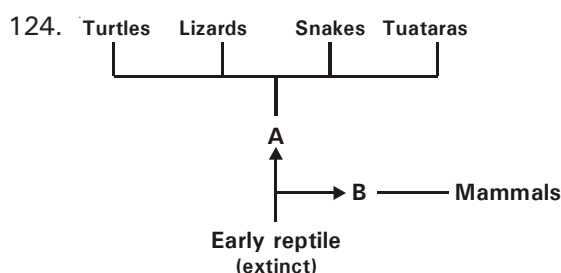
- (1) 1, 2, 3, 4
- (2) 2, 3, 1, 4
- (3) 3, 4, 1, 2
- (4) 4, 2, 3, 1

122. In an area of black rocks as well as white rocks the rabbits with black fur (BB) could hide amongst black rocks & survive, likewise rabbits with white fur (bb) survived amongst white rocks. The rabbits with grey fur (Bb), however could stand out and get noticed in all areas of habitat & suffered greater predation. What type of selection could be operating in that area?

- (1) Stabilizing selection
- (2) Disruptive selection
- (3) Directional selection
- (4) Normalising selection

123. Most populations are stable in size even though their reproductive potential is very high, which factual observation is responsible for this ?

- (1) Natural resources are limited
- (2) Struggle for existence
- (3) Natural selection
- (4) All of these



The ancestral reptiles giving rise to reptiles and mammals representing at A and B respectively are

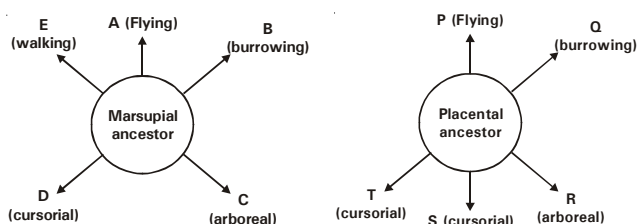
- (1) Therapsids and Sauropsids
- (2) Synapsids and Therapsids
- (3) Sauropsids and Synapsids
- (4) Therapsids and Pelycosaurids

125. How many of the following factors will not lead to speciation?

- a. Geographical barrier
- b. Polyploidy
- c. Genetic drift
- d. Stabilising selection
- e. Reproductive isolation

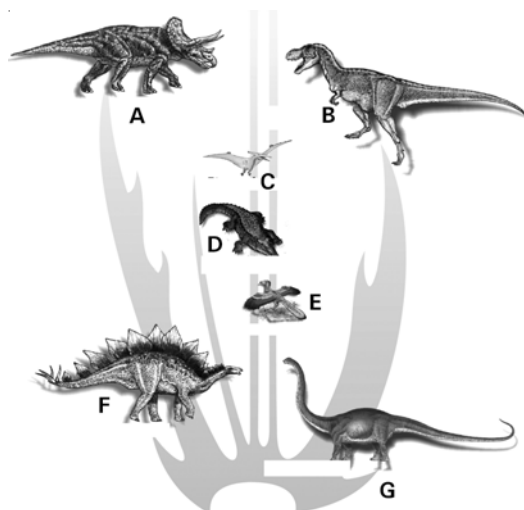
- (1) Two
- (2) One
- (3) Four
- (4) Five

126. How many among the following are false statement?
- Fitness is end result of ability to adapt and get selected by nature
 - Rate of appearance of new forms is not linked to life span
 - Genetic bottleneck often leads to formation of new species
 - Natural selection is driving force behind adaptive radiation
- (1) 3 (2) 2
(3) 4 (4) 1
127. Which of the following is a correct match?
- Dryopithecus* – existed about 1.5 mya
 - Homo habilis* – had brain size around 900 cc
 - Prehistoric cave paintings – Bhimbetka rock shelter, Raisen district
 - Agriculture came around – 1000 years ago
128. "In animals the same structure developed along different directions due to adaptation to different needs. This is _____ and these structures are _____." Complete the statement by using correct option
- divergent evolution, homologous
 - convergent evolution, homoplastic
 - adaptive radiation, analogous
 - convergent evolution, analogous
129. Which of the following show convergent evolution?



- (1) E & C (2) B & D
(3) B & Q (4) S & T
130. Find the odd one out
- Thorns and tendrils of Bougainvillea and Cucurbita, respectively
 - Brain of Fish, Frog and Human
 - Heart of Crocodile and lung fish
 - Eyes of octopus and a mammal
131. How many among the following are Australian Marsupials?
- Flying phalanger, Bobcat, Wombat, Koala, Bear, Numbat, Spotted cuscus, Bandicoot, Tiger cat, Lemur, Flying squirrel
- (1) Five (2) Six
(3) Four (4) Seven
132. What is wrong about the Urey and Miller experiment?
- It was performed in the year 1953
 - CH_4 , NH_3 and H_2 were taken in the ratio of 2:1:2
 - Temperature was kept around 800°C
 - Compounds like purine, pyrimidine and hydrogen cyanide were formed after about 20 days.

133. What is incorrect about the connotations in the theory of special creation?
- Earth is about 4000 years old
 - Diversity was always the same since creation and will be the same in future also
 - All living organisms were created as such
 - Life has originated from decaying and rotting matter
134. Point 'a' and 'b' describe the characters of two type of human ancestors. These are respectively
- Arose in Africa about 75000 – 10000 years ago
 - Fossils were discovered in Java in 1891
- Homo sapiens*, *Homo sapiens neanderthelinsis*
 - Homo habilis*, *Ramapithecus*
 - Homo sapiens*, *Homo erectus*
 - Homo erectus*, *Homo sapiens*
135. Select the correct statement about the various forms (A - G) given below



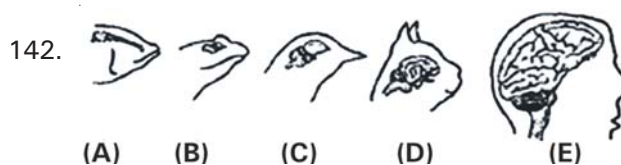
- B became extinct around 250 mya
- E is a missing link between reptiles and mammals
- thecondonts can be considered as ancestral forms of D
- G was 20 feet high with fearsome, dagger like teeth

ZOOLOGY : SECTION-B

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

136. The Hardy Weinberg principle cannot operate if
- The population is very large
 - Frequent mutations occur in the population
 - The population has no chance of interaction with other populations
 - Free interbreeding occurs among all members of the populations

137. What is common to spiny ant eater and banded ant eater?
- Both are prototherians
 - Both are connecting links between reptiles and mammals
 - Both have mammary glands
 - All of above
138. **Assertion** : When we see stellar structures like stars, we are apparently peeping into past.
Reason : Light emitted by stars started its journey millions of year back and from trillions of kilometres away.
- Both Assertion and Reason are true and the reason is the correct explanation of the assertion
 - Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
 - Assertion is true statement but Reason is false
 - Assertion is false
139. What is true about genetic drift?
- Gene frequencies fluctuate purely by chance
 - It results in reduction in genetic variability
 - Mutation arising in a small population may either be fixed or lost
 - All of above
140. Choose an odd member in each group a, b and c and the right option
- vestigial organs in humans → Body hair, vestiges of pelvis, auricular muscles
 - connecting links → *Protopterus*, *Balanoglossus*, *Herdmania*
 - Stem modification → Cladode, sweet potato, phylloclade
- Auricular muscles, *Balanoglossus*, sweet potato
 - Vestiges of pelvis, *Herdmania*, sweet potato
 - Vestiges of pelvis, *Balanoglossus*, cladode
 - Body hair, *Herdmania*, cladode
141. How many examples gives below show analogy ?
- Flippers of penguins and dolphins
 - Mouthparts of housefly and cockroach
 - Brain of eagle and elephant
 - Sting of honey bee and scorpion
 - Trachea of cockroach and lungs of rabbit
- 3
 - 4
 - 2
 - 1



142.

In the above diagram, the development of brain in different vertebrates exhibit

- homology with increasing structural and functional complexity
 - analogy with increasing structural and functional complexity
 - analogy with increasing structural complexity and decreasing functional complexity
 - homolgy with increasing structural complexity and decreasing functional complexity
143. Palaeontological evidences suggest
- new life forms have arisen at different times on earth
 - life forms varied over time
 - certain life forms are restricted to certain geological time
 - different rock sediments contain different life forms
 - fossils in different sedimentary layer indicate geological period of their existance
- a, b, c, d, e
 - b, c, d, e
 - a, b, c, d
 - a, b, d, e
144. Which character is incorrect about the characteristics of protobionts as given in the abiogenic origin of life?
- They were partially isolated from the surroundings
 - They could maintain an internal environment
 - They were able to reproduce sexually
 - They could separate combinations of molecules from the surroundings
145. **Statement-I** : Human evolution is phyletic speciation showing adaptive radiation.
Statement-II : Evoluiton of man appear to parallel evolution of human brain and language .
- Both statement-I and statement-II are correct
 - Both statement-I and statement-II are incorrect
 - Statement-I is correct but statement-II is incorrect
 - Statement-I is incorrect but statement-II is correct
146. A person discovered an organism but not able to assign proper taxonomic position. Which according to you can help him to assign a systemic position?
- Study of its biogeography
 - Study of its internal morphology
 - Study of its some vestigial characters
 - Study of its developmental stages

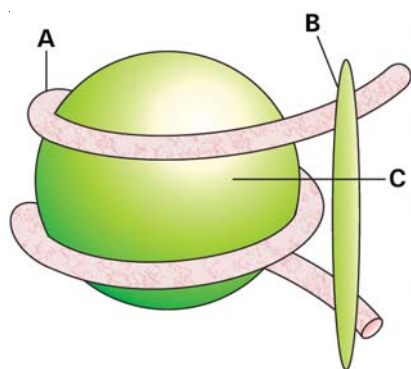
147. A young couple lost their lower limbs in an accident, their children will be having
 (1) normal and well developed limbs
 (2) well developed upper limbs but underdeveloped lower limbs
 (3) underdeveloped both upper and lower limbs
 (4) normal lower but underdeveloped upper limbs
148. A person moving in a jungle puts his feet unknowingly on a mould where ants were living. A number of ants died due to this; choose the correct statement about the inference which we can draw from this incident
 (1) It certainly led to the elimination of those ants which were weak
 (2) The surviving ants certainly possess better genes/alleles which led to their survival
 (3) Nothing can be predicted about the fact that genes/alleles which are left/fixed are better than those which are eliminated
 (4) The incident would not bring about any change in the gene pool of the surviving population of ants
149. **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
150. Which of the following is an example of evolution by anthropogenic action?
 a. Resistance against sickle cell trait in heterozygous individuals
 b. Pesticide resistance
 c. Drug resistant varieties
 d. Industrial melanism
 (1) a, b, c & d (2) a, b & c
 (3) b, c & d (4) a, c & d
154. Biochemical characterization of Transforming Principle was done by
 (1) Griffith
 (2) Avery et al
 (3) Hershey and Chase
 (4) Meselson and Stahl
155. Steps involved in Experiment performed by Hershey and Chase were in sequence
 (1) Infection - Blending - Centrifugation
 (2) Blending - Infection - Centrifugation
 (3) centrifugation - Infection - Blending
 (4) blending - Centrifugation - Infection
156. How many of the following statements are false?
 a. Transfer RNA is about 70-80% of the RNA of the cell.
 b. snRNA protein/snurps takes part in splicing process.
 c. The genetic code is nearly universal.
 d. Change in nucleic acids is responsible for change in amino acids in a protein
 (1) One (2) Two
 (3) Three (4) Four
157. **Statement-I** : The classical example of point mutation is sickle cell anemia.
Statement-II : The size of VNTR varies from 0.1 to 20 bp.
 (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. Which of the following is true regarding requirements of translocation during protein synthesis?
 (1) GTP and release factors.
 (2) ATP and peptidyl transferase.
 (3) ATP and amino acyl tRNA synthetase
 (4) GTP and translocase
159. In eukaryotes and prokaryotes the transcription units are respectively
 (1) polycistronic & monocistronic
 (2) monocistronic & polycistronic
 (3) monocistronic & monocistronic
 (4) polycistronic & polycistronic
160. A nitrogenous base is linked to the pentose sugar through a
 (1) C-glycosidic linkage
 (2) Phosphoester linkage
 (3) N-glycosidic linkage
 (4) Phosphodiester linkage

BOTANY : SECTION-A

All questions are compulsory in section A

151. Which of the following statement is correct w.r.t Double helix structure of DNA?
 (1) DNA is made of two parallel polynucleotide chains.
 (2) Backbone of DNA is constituted by sugar-phosphate groups
 (3) The pitch of DNA is 2 nm
 (4) Guanine is bonded with Thymine with 3 H-bonds
152. Number of base pairs found in *E.coli* are
 (1) 5386 (2) 48502
 (3) 3.3×10^9 (4) 4.6×10^6
153. In a DNA segment of 1000 base pairs of *E.coli*, number of Phosphodiester bonds, spirals and nucleosomes present will be respectively
 (1) 999, 100, 5
 (2) 1998, 100, 0
 (3) 2000, 200, 20
 (4) 500, 10, 200

161. What is the dual role of deoxyribonucleoside triphosphates in DNA replication?
- Act as substrate
 - Provide energy for phosphorylation reaction
 - Provide energy for polymerisation reaction
 - Makes the process highly efficient
- (1) a and b (2) a and c
 - (3) b and c (4) c and d
162. In the experiment of Meselson and Stahl the heavy DNA (N^{15} DNA) was allowed to undergo four rounds of replication in N^{14} medium. The isolated DNA would show
- (1) 2 bands in $CsCl$ (2) 1 band in $CsCl$
 - (3) 3 bands in $CsCl$ (4) 4 bands in $CsCl$
163. Choose the correct match
- (1) Thymine – 5-methyl uracil
 - (2) Euchromatin – darkly stained
 - (3) Heterochromatin – active and lightly stained
 - (4) hnRNA – RNA polymerase-I
164. Refer the given figure of nucleosome and select the option that correctly identifies parts A, B, C



- (1) A–Histone octamer, B–DNA, C– H_1 histone
 - (2) A–DNA, B–Histone octamer, C– H_1 histone
 - (3) A–Histone octamer, B– H_1 histone, C–DNA
 - (4) A–DNA, B– H_1 histone, C–Histone octamer
165. Choose the incorrect statement
- (1) Nucleosomes are repeating unit of chromatin
 - (2) Packaging of chromatin at higher level require additional proteins called as non-histone chromosomal proteins
 - (3) Process of splicing represents the dominance of RNA world
 - (4) Severo Ochoa enzyme catalyse polymerisation of RNA (*in vitro*) in a template dependent manner

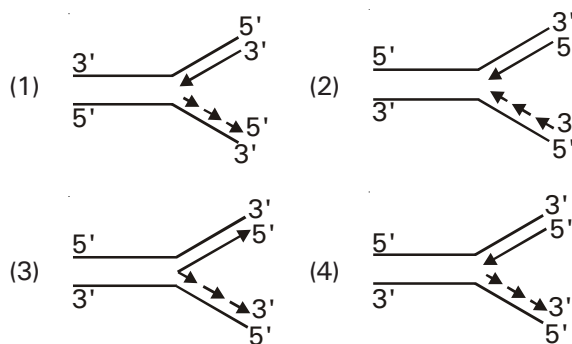
166. How many statements is/are correct?
- The sequence of chromosome 1 was completed in May 2006
 - HGP address legal, ethical and social issues that may arises from the project
 - UTRs are present at both 5'-end after start codon and at 3'-end before stop codon
 - SNPs stands for single nucleotide polymorphism
 - Repeated sequences make up very large portion of Human genome
- (1) Five (2) Three
 - (3) Two (4) Four
167. Transcription resembles replication in all except
- (1) works on rule of complementary base pairing
 - (2) polymerise nucleotides in a template dependent manner
 - (3) only one strand of DNA is used as template
 - (4) catalysed polymerisation in one direction only i.e. $5' \rightarrow 3'$
168. **Assertion** : Lactose is the substrate for the enzyme beta-galctosidase in Lac-operon.
Reason : Glucose regulates switching on and off of the operon.
- (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
169. Match the following
- | | |
|------------------------|--------------------|
| i. Promoter | a. Termination |
| ii. Rho factor | b. Initiation |
| iii. RNA polymerase II | c. hn RNA |
| iv. Splicing | d. σ factor |
| | e. m RNA |
| | f. introns |
| | g. prokaryotes |
- (1) i-b, d ; ii-a, g ; iii-c, e ; iv-f
 - (2) i-b, a ; ii-d, g ; iii-c, e ; iv-f
 - (3) i-a, d ; ii-b ; iii-c, e ; iv-f
 - (4) i-b, a ; ii-f, e ; iii-c, d ; iv-f
170. The tRNA anticodon $3'-CUA-5'$ will pair with the mRNA codon
- (1) $3'-CUA-5'$ (2) $5'-CUA-3'$
 - (3) $5'-GAU-3'$ (4) $5'-UAG-3'$
171. How many statements are correct?
- A cistron is a segment of DNA coding for a polypeptide
 - In eukaryotes, structural genes have introns
 - Intervening sequences do not appear in mature RNA
 - Frame shift mutation forms the genetic basis of proof that codon is triplet
- (1) Four (2) Three
 - (3) Two (4) One

172. Which enzyme facilitates opening of the DNA helix during transcription ?
 (1) Helicase (2) Topoisomerase
 (3) RNA polymerase (4) Gyrase
173. A complex of ribosomes attached to a single strand of RNA is known as
 (1) polypeptide (2) Okazaki fragment
 (3) polysome (4) polymer
174. In the human genome project (HGP) the method where in the whole set of genome is sequenced and later the functions are assigned to different regions is called
 (1) Expressed Sequence Tags (ESTs)
 (2) Sequence Annotation
 (3) DNA polymerisation
 (4) DNA denaturation
175. Identify the incorrect match
 (1) UUU – Phenylalanine
 (2) AUG – Methionine
 (3) AGU – Glycine
 (4) UGA – Stop codon
176. Which of the following is incorrect w.r.t. DNA finger printing?
 (1) It helps in finding out variations in individuals of a population at DNA level
 (2) It works on principle of polymorphism in DNA sequences
 (3) This technique was initially developed by Dr. Lalji Singh and Dr. V.K. Kashyap in America
 (4) It has immense application in field of forensic science, genetic biodiversity and evolutionary biology
177. In the elongation step of protein synthesis, tRNA carrying the amino acid enters from which site of ribosome?
 (1) 'A' site (2) 'P' site
 (3) Anticodon site (4) Recognition site
178. Amino acid sequence in polypeptide is dictated by
 (1) DNA (2) mRNA
 (3) tRNA (4) rRNA
179. In lac operon lactose molecules bind to
 (1) Promotor sequence
 (2) Operator sequence
 (3) Structural sequence
 (4) Repressor
180. 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
181. The molecule which reads the code on one hand and binds to a specific amino acid on the other hand is _____. Its presence was postulated by _____
 (1) tRNA ; Crick (2) tRNA ; Holley
 (3) mRNA ; Crick (4) rRNA ; Holley
182. The process of translation begins when
 (1) The large subunit of ribosome encounters mRNA
 (2) tRNA encounters mRNA
 (3) Small subunit dissociates from large subunit of ribosome
 (4) Small subunit of ribosome encounters mRNA
183. mRNA codon for the amino acid proline is CCA. How many proline molecules are present in the polypeptide containing six amino acids, coded by the following DNA template ?
 CCAGGTAACGGTCCACCA
 (1) 3 (2) 2
 (3) 1 (4) 5
184. The fragments were sequenced using automated DNA sequencers that worked on the principle of a method developed by
 (1) Watson and Crick (2) Taylor et al
 (3) Fredereick Sanger (4) Griffith
185. How many statements are true?
 a. A transcriptional unit has 3 main regions in DNA—a promoter, the structural gene and a terminator
 b. The strand which does not code for anything is called coding strand
 c. Histone proteins are rich in basic amino acids lysines and arginines
 d. mRNA play structural and catalytic role during translation
 (1) 1 (2) 2
 (3) 3 (4) 4

BOTANY : SECTION-B

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

186. Which one of the following correctly represents the manner of replication of DNA?



187. DNA fingerprinting involve identifying differences in some specific region in DNA sequences called as
 (1) Polymorphism (2) Satellite DNA
 (3) Repetitive DNA (4) SNPs
188. **Assertion:** Genetic code is non ambiguous.
Reason: A single amino acid may be specified by more than one codon.
 (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
189. Which of the following is odd one out w.r.t. genetic material?
 (1) TMV (2) Rabies virus
 (3) QB bacteriophage (4) $\phi \times 174$
190. Experimental proof for semi-conservative mechanism of DNA replication was provided by
 (1) Meselson and Stahl, 1958
 (2) Taylor, 1959
 (3) Beadle and Tatum, 1958
 (4) Crick, 1952
191. Identify the incorrect statement
 (1) In prokaryotes, control of the rate of transcriptional initiation is the predominant site for control of gene expression
 (2) The operator region is adjacent to the promotor elements in most operons
 (3) Each operon has its specific operator and specific repressor
 (4) The regulatory proteins in a operon can act only as activators
192. A molecule which can act as a genetic material must not
 (1) replicate (2) express it self
 (3) be chemically stable (4) show fast mutation
193. How many of following statements are correct?
 a. Genetic material should change during different stages in the life cycle
 b. In RNA, 2' -OH group of ribose sugar present at every nucleotide is a reactive group
 c. DNA is chemically more reactive and structurally more stable than RNA
 d. Both DNA and RNA are able to mutate
 e. RNA can directly code for synthesis of proteins
 (1) 1 (2) 2
 (3) 3 (4) 5
194. Primer is composed of
 (1) Nucleotides of DNA
 (2) Nucleotides of RNA
 (3) Nucleosides of DNA
 (4) None of these
195. Choose a incorrect statement
 (1) Tryptophan is coded by a single codon and does not show degeneracy
 (2) If sequence of nucleotides is known in mRNA then we can predict the exact sequence of aminoacid in a polypeptide chain
 (3) Codon is a sequence of three nucleotides in mRNA which codes for single aminoacid
 (4) 18 SrRNA act as ribozyme for peptide bond formation in prokaryotes
196. Pick the wrong match w.r.t. tRNA
 (1) Anticodon loop – Complementary to a codon
 (2) CCA end – Amino acid binding site
 (3) DHU loop – Aminoacyl synthetase binding site
 (4) Secondary – inverted L-shaped structure of tRNA
197. The base pairing confers a very unique property to the polynucleotide chains. They are said to be complementary to each other because
 (1) purines pair with purines
 (2) if the sequence of bases in one strand is known then the sequence in other strand can be predicted
 (3) if the sequence of bases in one strand is known then the sequence in other strand cannot be predicted
 (4) pyrimidines pair with pyrimidines
198. Which of the following gene codes for permease in lac operon?
 (1) z (2) y
 (3) a (4) i
199. **Statement-I** : Translation unit in mRNA is the sequence of mRNA that is flanked by start codon and stop codon.
Statement-II : The RNA polymerase enzyme is only capable of catalysing the process of elongation.
 (1) Both statement-I and statement-II are correct
 (2) Both statement-I and statement-II are incorrect
 (3) Statement-I is correct but statement-II is incorrect
 (4) Statement-I is incorrect but statement-II is correct
200. In a transcription unit, template strand is the one which
 (1) has promoter at its 5' end
 (2) has terminator at its 3' end
 (3) is read in 3' \rightarrow 5' direction
 (4) possesses 7^mG cap at its 5' end.