Dated : 14-04-2023

M.L. Syal's Helix Institute

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

Test Series [Option-1] for NEET-2023

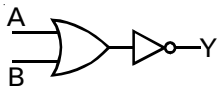
MM : 720 **Time : 3 hrs. 20 min.**

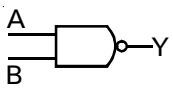
Full Syllabus -XII

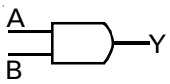
PHYSICS : SECTION-A

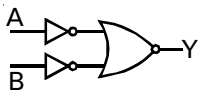
All questions are compulsory in section A

1. The first diffraction minima due to a single slit diffraction is at 37° for a light of wavelength 5000 Å. The width of the slit is
   (1) 1.4×10^{-6} m (2) 6.3×10^{-7} m
   (3) 8.3×10^{-7} m (4) 5.0×10^{-6} m
2. A freshly prepared radioactive source of half life 4 hr emits radiation of intensity which is 256 times permissible safe level. Minimum time, after it would be possible to work safely with this source, is
   (1) 24 hr (2) 12 hr
   (3) 16 hr (4) 32 hr
3. If $\vec{E}$ and $\vec{B}$ are the electric and magnetic field vectors of E.M. waves then the direction of propagation of E.M. wave is along the direction of
   (1) $\vec{E}$ (2) $\vec{B}$
   (3) $\vec{E} \times \vec{B}$ (4) $\vec{B} \times \vec{E}$
4. The circuit corresponding to the given boolean expression is $Y = \bar{A} + \bar{B}$

   (1) 

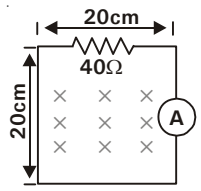
   (2) 

   (3) 

   (4) 

5. **Assertion** : When unpolarised light passes through a polaroid, its intensity becomes one half.
   Reason : The amplitude of transmitted light wave becomes one half.
   (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
6. A moving coil galvanometer has a coil of effective area 1 cm^2 and number of turns in the coil is 500. The suspension provides a restoring torque of 10^{-2} N-m/rad. If the magnetic field between the pole pieces is 0.6T, current sensitivity of this galvanometer will be
   (1) 1 rad/amp (2) 3 rad/amp
   (3) 2 rad/amp (4) 4 rad/amp
7. The momentum of photon of energy 1 MeV will approximately be
   (1) 10^{-22} Kg-m/s (2) 5×10^{-22} Kg-m/s
   (3) 3×10^{6} Kg-m/s (4) 0
8. Two electric bulbs rated P_1 & P_2 100 watt and 60 watt at 220 volt are connected in series across 220 volt mains. Then their total power consumption is
   (1) 37.5 watt (2) 45 watt
   (3) 80 watt (4) 160 watt

9. The circuit shown is in a uniform magnetic field that is into the page and is decreasing in magnitude at the rate of 250 tesla/second. The ideal ammeter reads



(1) 0.15 A (2) 0.45 A
(3) 0.35 A (4) 0.25 A

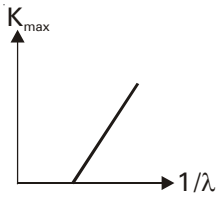
10. A luminous point object is moving along the principal axis of a concave mirror of focal length 10 cm towards it. When its distance from mirror is 12 cm its velocity is 5 cm/s. The velocity of the image in cm/s at that instant is
(1) 125 towards the mirror
(2) 125 away from the mirror
(3) 80 away from the mirror
(4) 80 towards the mirror

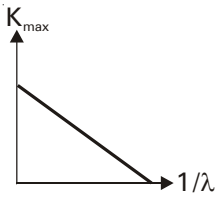
11. In an n-type Si semiconductor
a. at room temperature, most of the donor atoms get ionised
b. the donor energy level is much below the bottom of the conduction band
c. at room temperature, conduction band will have most electrons coming from donor impurities
(1) a only (2) both a & c
(3) a, b & c (4) both b & c

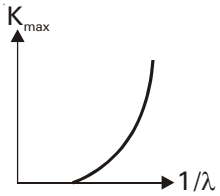
12. When an electromagnetic wave enters a glass slab with $\mu_r = 1$ and $\varepsilon_r = 2.25$, then
a. its wavelength decreases by 50%
b. its frequency remains unchanged
c. its speed decreases
(1) a, b & c (2) b & c
(3) a & c (4) a & b

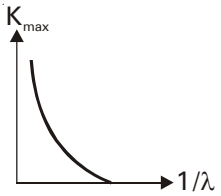
13. Binding energy of electron in first excited state in doubly ionized lithium atom is
(1) 122.4 eV (2) 30.6 eV
(3) 54.4 eV (4) 3.4 eV

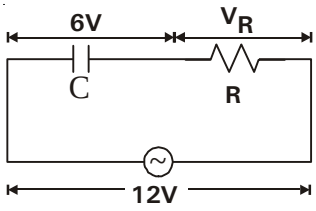
14. The correct graph between the maximum energy of a photoelectron and the inverse of wavelength of the incident radiation is given by the curve

(1) 

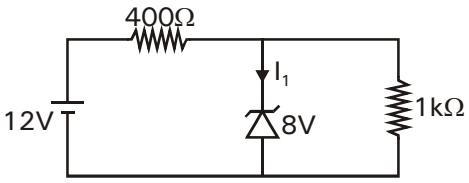
(2) 

(3) 

(4) 

15. 

In the CR circuit shown in figure, the phase difference between current and the applied voltage will be
(1) 53° (2) 37°
(3) 45° (4) 30°

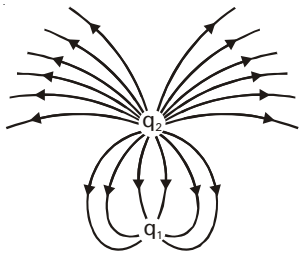
16. 

Current flowing through the zener diode in the circuit shown is
(1) 2 mA (2) 2.4 mA
(3) 1 mA (4) 4 mA

17. In Young's double-slit experiement using monochromatic light of wavelength λ and slits of same size, intensity of light at a point on the screen where path difference is λ is K units. What is the intensity of light where path differnece is $\lambda/4$?
(1) 0.25 K (2) 0.33 K
(3) 0.5 K (4) zero

18. An air core solenoid has 50 turns per centimeter and is one metre long. If its cross-sectional area is 10 cm^2, then its self inductance is
(1) 20π mH (2) 40π mH
(3) 10π mH (4) 25π mH

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



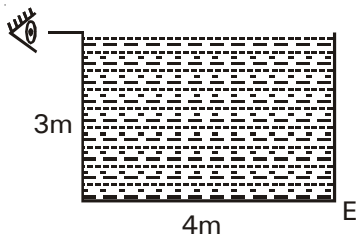
(1) 1 : 3 (2) 3 : 1
(3) 1 : 1 (4) 1 : 2

20. A step down transformer transforms a supply line voltage of 4000 volts into 100 volts. The primary coil has 3000 turns. The efficiency and power transmitted by the transformer are 75% and 5 kilowatt. Current in primary coil is
(1) 1.67 A (2) 2.5 A
(3) 1.33 A (4) 2 A

21. An astronomical telescope has an angular magnification of magnitude 8 for distant objects. The separation between the objective and the eye piece is 63 cm and the final image is formed at infinity. The focal length f_o of the objective and the focal length f_e of the eye piece are
(1) f_o = 3 cm and f_e = 60 cm
(2) f_o = 7 cm and f_e = 56 cm
(3) f_o = 56 cm and f_e = 7 cm
(4) f_o = 60 cm and f_e = 3 cm

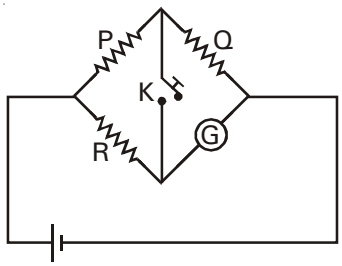
22. Let a nucleus with A = 240 (binding energy per nucleon about 7.6 MeV) breaks into two fragments each of A = 120 (binding energy per nucleon about 8.5 MeV). Then the total gain in binding energy is
(1) 240 MeV (2) 216 MeV
(3) 160 MeV (4) 306 MeV

23. A rectangular tank is filled with a certain liquid. The observer, whose eye is in level with the top of the tank, and who is looking parallel to width of the tank as shown, can just see the point E of the base and not any other point on the base. Then, the refractive index of the liquid is



(1) 1.67 (2) 1.50
(3) 1.33 (4) 1.25

24.

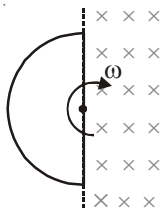


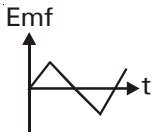
In the above figure, to measure the resistance S of the galvanometer G, the relation $\frac{P}{Q} = \frac{R}{S}$ is satisfied if the galvanometer shows
(1) a deflection only when K is closed
(2) a deflection only when K is open
(3) same deflection whether K is open or closed
(4) no deflection whether K is open or closed

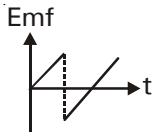
25. A bar magnet is placed north-south with its north pole due north. The points of zero magnetic field will be in which direction from the centre of the magnet?
(1) North and south
(2) East and west
(3) North-east and south-west
(4) North-west and south-east

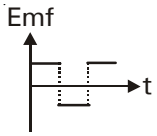
26. If a nucleus ${}^{A}_{Z}x$ emits an α particle & a β^- particle, then the daughter nucleus will have which of the following configurations ?
(1) A - 4 nucleons (2) A - Z - 3 neutrons
(3) both (1) & (2) (4) neither (1) nor (2)

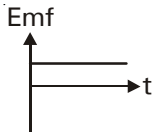
27. A semi-circular loop is rotating with constant angular speed 'ω' into a uniform magnetic field as shown. The graph that correctly explains the emf induced in the loop with time 't' is



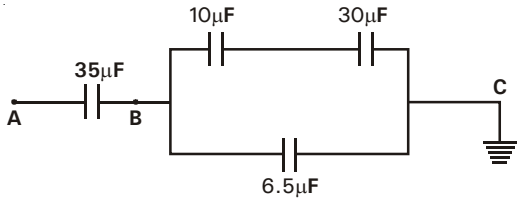
(1) 

(2) 

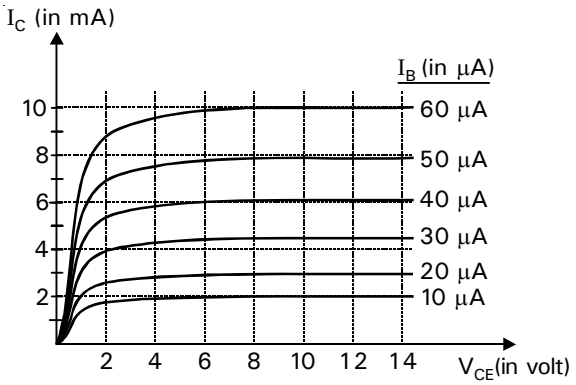
(3) 

(4) 

28. In the given circuit, if point C is connected to earth and a potential of $+1000$ V is given to point A, then the potential at B is



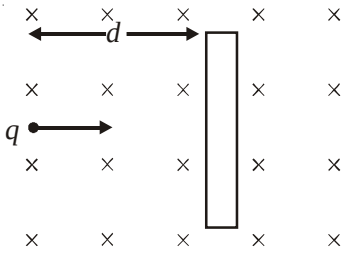
(1) 286 V (2) 714 V
(3) 312 V (4) 688 V

29. 

With reference to above output characteristics, the value of current amplification factor β_{ac} of the transistor when $V_{CE} = 6V$ and $I_C = 6$ mA is closest to
(1) 170 (2) 140
(3) 200 (4) 100

30. Work function of a metal is 1eV. Maximum speed of photoelectrons with a certain monochromatic incident radiation is 1×10^6 m/s. Incident radiation is changed so that maximum speed of photoelectrons becomes less by 20%. Wavelength of new incident radiation is about
(1) 3600 angstrom (2) 4400 angstrom
(3) 5200 angstrom (4) 4000 angstrom

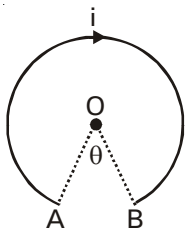
31. A charge q of mass m enters in a magnetic field B with K.E. = K. There is a wooden plate lying in the magnetic field at a distance d as shown. What should be the minimum value of B, so that charge q can't strike the plate?



(1) $\frac{\sqrt{2mk}}{qd}$ (2) $\frac{\sqrt{qd}}{2mk}$

(3) $\sqrt{\frac{2mk}{qd}}$ (4) $\sqrt{\frac{qd}{2mk}}$

32. 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) $\frac{\mu_0 i}{2R}(2\pi-\theta)^2$

33. A thin prism P_1 with angle 6° made of glass of refractive index 1.6 is combined with another thin prism P_2 made of glass of refractive index 1.5 to produce dispersion without deviation. The angle of the prism P_2 is

(1) 5° (2) 9°

(3) 6.8° (4) 7.2°

34. In Bohr model of hydrogen atom, the force on the electron depends on the principal quantum number n as

(1) $F \propto \frac{1}{n^3}$ (2) $F \propto \frac{1}{n^4}$

(3) $F \propto \frac{1}{n^5}$ (4) $F \propto \frac{1}{n^2}$

35. n identical cells are joined in series in a loop with two of the cells A and B with reversed polarities. EMF of each cell is E and internal resistance 'r'. If $n > 4$, potential difference across cell A or B is

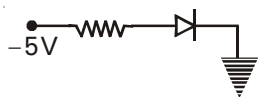
(1) $\frac{2E}{n}$ (2) $2E\left(1-\frac{1}{n}\right)$

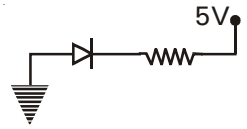
(3) $\frac{4E}{n}$ (4) $2E\left(1-\frac{2}{n}\right)$

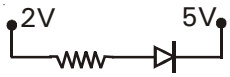
PHYSICS : SECTION-B

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

36. Which of the following diode is forward biased?

(1) 

(2) 

(3) 

(4) 

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

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

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

38. A glass plate is held in vertical plane on a horizontal table with a horizontal beam of unpolarised light falling on its surface at polarising angle of 57° with the normal. Electric vector in reflected light will vibrate in a

(1) vertical plane
(2) horizontal plane
(3) plane making an angle of 57° with vertical
(4) plane making an angle of 57° with horizontal

39. For the magnetic field to be maximum due to a small element of current carrying conductor at a point, the angle between the element and the line joining the element to the given point must be

(1) 0° (2) 90°
(3) 180° (4) 45°

40. A person is able to see objects clearly from a closest distance of 40 cm. The lens required by him to see objects placed 25 cm away clearly is

(1) concave lens of focal length 66.7 cm
(2) convex lens of focal length 66.7 cm
(3) concave lens of focal length 48 cm
(4) convex lens of focal length 48 cm

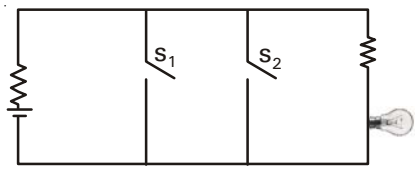
41. What is the ratio of de Broglie wavelength of a dust particle of mass 1.0×10^{-9} kg drifting with a speed of 2.2 m/s to that of a ball of mass 0.06 kg moving at a speed of 1.1 m/s?

(1) 3×10^{7} (2) 2×10^{9}
(3) 4×10^{5} (4) 3×10^{6}

42. The electron in a hydrogen atom makes a transition from an excited state to the ground state. Which of the following statements is true?

(1) Its kinetic energy increases and its potential and total energies decrease
(2) Its kinetic energy decreases, potential energy increases & its total energy remains the same
(3) Its kinetic and total energies decrease and its potential energy increases
(4) Its kinetic, potential & total energies decrease

43. The circuit shown above is equivalent to



(1) OR gate (2) NOR gate
(3) AND gate (4) NAND gate

44. A light bulb is placed between two plane mirrors inclined at an angle of 60° The number of images formed are

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

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

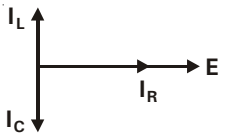
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

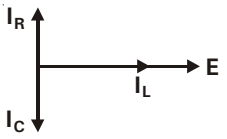
46. Match the physical quatities in column-I with the dimensions in column II

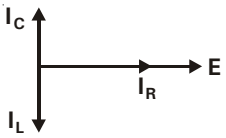
Column I	Column II
a. Magnetic permeability	p. $[MT^{-2}A^{-1}]$
b. Magnetic flux	q. $[ML^2T^{-2}A^{-1}]$
c. Magnetic induction	r. $[MLT^{-2}A^{-2}]$

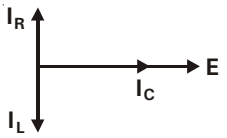
(1) a-r, b-q, c-p (2) a-p, b-q, c-r
(3) a-q, b-r, c-p (4) a-r, b-p, c-q

47. An alternating emf is applied across a resistance R, capacitance C and an inductance L independently. If I_R, I_L, I_C are the currents through R, L and C respectively, then the diagram which correctly represents, the phase relationship among I_R, I_L, I_C and source emf E, is given by

(1) 

(2) 

(3) 

(4) 

48. The colour sequence in a carbon resistor is green, blue, grey and gold. The resistance of the resistor is

(1) $45 \times 10^7 \Omega \pm 10\%$ (2) $4.5 \times 10^7 \Omega \pm 5\%$
(3) $5.6 \times 10^8 \Omega \pm 5\%$ (4) $56 \times 10^8 \Omega \pm 5\%$

49. Let the lengths of three wires of same metal are in the ratio 3 : 2 : 1 and their electrical resistances are in the ratio 24 : 8 : 1. Then their masses are in ratio

(1) 1 : 2 : 4 (2) 3 : 8 : 12
(3) 3 : 4 : 8 (4) 2 : 3 : 5

50. The electric potential V is given as a function of distance x (metre) by $V = (x^2 + 4x - 8)$ volt. Value of electric field at $x = 2$ is

(1) –6 V/m (2) 6 V/m
(3) 10 V/m (4) –8 V/m

CHEMISTRY : SECTION-A

All questions are compulsory in section A

51. Which of the following can not form pentahalide?

(1) Nitrogen (2) Phosphorus
(3) Arsenic (4) Both (1) and (3)

52. $A \xrightarrow[573]{Cu}$ Ketone, A will be a/an

(1) Aldehyde (2) Primary alcohol
(3) Secondary alcohol (4) Tertiary alcohol

53. Ether can act as

(1) Lewis acid
(2) Lewis base
(3) Bronsted acid
(4) Amphiprotic species

54. EAN of the complex $[Co(NH_3)_6]Cl_3$ is

(1) 54 (2) 36
(3) 18 (4) 88

55. Which of the following is not a co-polymer?

(1) Buna–S (2) Neoprene
(3) PHBV (4) Nylon 6,6

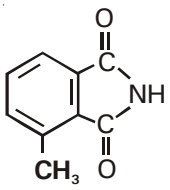
56. To avoid bends, as well as, the toxic effects of high concentrations of nitrogen in the blood, the tanks used by scuba divers are filled with 11.7% _____, 56.2% _____and 32.1%_____

(1) nitrogen, oxygen, helium
(2) helium, nitrogen, oxygen
(3) oxygen, nitrogen,helium
(4) helium, oxygen , nitrogen

57. Coordination compounds have great importance in biological systems. In this context which of the following statements is incorrect?

(1) Cyanocobalamin is B_{12} and contains cobalt.
(2) Haemoglobin is the red pigment of blood and contains iron.
(3) Chlorophyll is a green pigment in plants and contains calcium.
(4) Carboxypeptidase-A is an enzyme and contains zinc.

58. The isomerism exhibited by $[Pt(NH_3)(Br)(Cl)(Py)]$ is/are
(1) both geometrical & optical
(2) only geometrical
(3) only optical
(4) Neither geometrical nor optical

59. Among the following compounds which is expected to behave as a weakest base
(1) $C_6H_5NH_2$ (2) $C_6H_5CONH_2$
(3)  (4) $CH_3CH_2NH_2$

60. The rate expression for a chemical reaction, $2NO_2Br \rightarrow 2NO_2 + Br_2$ is given as :
Rate = k $[NO_2Br]$. Rate determining step is
(1) $2NO_2Br \rightarrow 2NO_2 + Br_2$
(2) $NO_2Br + Br \rightarrow NO_2 + Br_2$.
(3) $NO_2Br \rightarrow NO_2 + Br$.
(4) $NO_2 + Br \rightarrow NO_2Br_2$.

61. When 1 mol $CoCl_3(NH_3)_5$ is treated with excess of $AgNO_3$, 2mol of AgCl are obtained. The number of ionic chlorine(s) is
(1) 1 (2) 2
(3) 3 (4) zero

62. For a first order reaction,

$$\log K = -(2000)\frac{1}{T} + 6$$

The pre-exponential factor A is
(1) $10^{16}\ s^{-1}$ (2) $6\ s^{-1}$
(3) $10^{-1}\ s^{-1}$ (4) $10^{6}\ s^{-1}$

63. Which statement is false?
(1) Some disinfectants can be used as antiseptics at low concentration
(2) sulphadiazine is a synthetic antibacterial
(3) Ampicillin is a natural antibiotic
(4) Aspirin is analgesic and antipyretic both

64. At 100°C, Cu has fcc unit cell structure with cell edge length of xÅ. The approximate density of Cu (in g/cc) at this temperature is(At.wt. of Cu = 63.5)
(1) $\frac{211}{x^3}$ (2) $\frac{205}{x^3}$
(3) $\frac{105}{x^3}$ (4) $\frac{422}{x^3}$

65. Which one of the following complexes is spin free complex?
(1) $[Co(NH_3)_6]^{+3}$ (2) $[Fe(CN)_6]^{-3}$
(3) $[Fe(CN)_6]^{-4}$ (4) $[Ni(NH_3)_6]^{+2}$

66. Lowering in vapour pressure is highest for
(1) 0.2 M urea (2) 0.1 M glucose
(3) 0.1 M $MgSO_4$ (4) 0.1 M $BaCl_2$

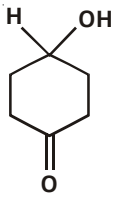
67. Identify the correct statement
(1) metals with very high enthalpy of atomisation are highly reactive
(2) metals of the second and third series have greater enthalpies of atomisation than corresponding elements of the first series
(3) there is much more frequent metal-metal bonding in compounds of light transition metals
(4) in general, greater the number of valence electrons, weaker is the resultant bonding

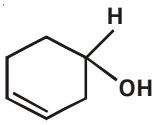
68. Match list I with list II and select the correct answer using codes given below in the lists

List I	List II
i. Cyanide process	a. Ultra pure Ge
ii. Floatation process	b. Pine oil
iii. Electrolytic reduction	c. Extraction of Al
iv. Zone refining	d. Extraction of Au

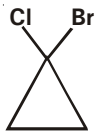
(1) i-c, ii-a, iii-d, iv-b (2) i-d, ii-b, iii-c, iv-a
(3) i-c, ii-b, iii-d, iv-a (4) i-d, ii-a, iii-c, iv-b

69. Which of the following compounds possesses a chiral centre?

(1) 

(2) 

(3) 

(4) 

70. **Statement-I** : The actual rate constant of ester hydrolysis in acidic medium has the units of 2nd order.
Statement-II : A pseudounimolecular reaction is a reaction of 2nd order in which one of the reactants is present in large excess.
(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

71. Order of reactivity of alcohols towards sodium metal is
(1) $3^{o} > 2^{o} > 1^{o}$ (2) $1^{o} > 2^{o} > 3^{o}$
(3) $2^{o} > 3^{o} > 1^{o}$ (4) $3^{o} < 2^{o} > 1^{o}$

72. $Cu^{+} + e^{-} \rightarrow Cu$, $E^{o} = x_1$ volt
$Cu^{+2} + 2e^{-} \rightarrow Cu$, $E^{o} = x_2$ volt, then for
$Cu^{+2} + e^{-} \rightarrow Cu^{+}$, E^{o} (volt) will be
(1) $x_1 = 2x_2$ (2) $x_1 + 2x_2$
(3) $x_1 - x_2$ (4) $2x_2 - x_1$

73. An interhalogen compound has a T-shape and on hydrolysis it produces HF and $HClO_2$. The interhalogen compound must be
(1) ClF_3 (2) ClF_5
(3) ClF_7 (4) ClF

74. Which alkyl halide will not prefer E_1 reaction?
(1) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-Br$ (2) $C_6H_5-CH_2-CH_2-F$
(3) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2-I$ (4) $C_6H_5-\underset{\displaystyle CH_3}{\overset{\displaystyle Br}{\overset{|}{\underset{|}{C}}}}-C_2H_5$

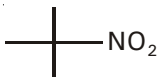
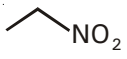
75. Alkene R – CH = CH_2 reacts with B_2H_6 in the presence of H_2O_2 to give
(1) $R-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$ (2) $R-\underset{\displaystyle OH}{\overset{\displaystyle OH}{\overset{|}{CH}}}-\underset{\displaystyle OH}{\overset{\displaystyle }{\overset{|}{CH_2}}}$
(3) RCH_2CHO (4) $RCH_2\,CH_2-OH$

76. How many statements are correct?
a. All aldehydes and ketones are fairly soluble in organic solvents like benzene, ether etc.
b. The lower aldehydes have sharp pungent odours.
c. As the size of the aldehyde molecule increases, the odour becomes more pungent and less fragrant.
d. Many naturally occurring aldehydes and ketones are used in the blending of perfumes and flavouring agents
(1) Three (2) Four
(3) Two (4) One

77. Which of the following will not give HVZ reaction?
(1) $C_2H_5-\underset{\displaystyle OH}{\overset{\displaystyle }{\overset{|}{CH}}}-COOH$
(2) $(CH_3)_3CCOOH$
(3) $C_2H_5-CH_2-COOH$
(4) $(CH_3)_2CHCOOH$

78. The correct formula of rust is
(1) Fe_3O_4 (2) $Fe_2O_3.xH_2O$
(3) $FeO.xH_2O$ (4) FeO

79. Schotten Baumann reaction is when
(1) PhOH is reacted with CH_3COCl in presence of pyridine
(2) PhOH is reacted with C_6H_5COCl in presence of H_2SO_4
(3) PhOH is reacted with C_6H_5COCl in presence of NaOH
(4) PhOH is reacted with $(CH_3CO)_2O$ in presence of NaOH

80. Which of these fails to react with nitrous acid?
(1)  (2) 
(3)  (4) 

81. **Assertion** : In chemi sorption, adsorption always keeps on increasing with temperature.
Reason : Heat keeps on providing more and more activation energy.
(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

82. Which of the following species are involved in the carbylamine test?
(1) R—CN (2) $CHCl_3$
(3) $COCl_2$ (4) $NaNO_2 + HCl$

83. Reaction of propanamide with Br_2 /KOH (aq) produces
(1) Propane nitrile (2) Propylamine
(3) Ehtyl nitrile (4) Ethyl amine

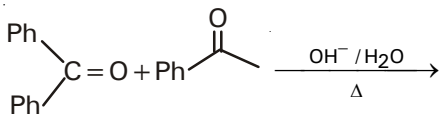
84. The correct order of liquification of noble gases is
(1) Xe > Kr > Ar > Ne > He
(2) He > Ne > Ar > Kr > Xe
(3) Xe > Ar > Kr > Ne > He
(4) Kr > Ar > Ne > Xe > He

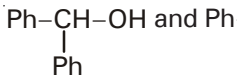
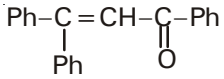
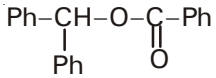
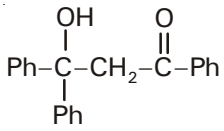
85. The coordination number of Co in $[Co(en)_3]_2 (SO_4)_3$ is
(1) 2 (2) 4
(3) 3 (4) 6

CHEMISTRY : SECTION-B

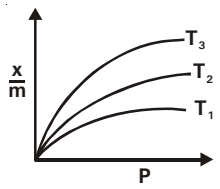
This section has 15 questions, attempt any 10 questions of them.

86. Which of the following pairs has the same size?
(1) Zr, Ti (2) Zr, Hf
(3) Zn, Hf (4) Zn, Ni

87. 

The major production which can be isolated from this reaction is
(1) 
(2) 
(3) 
(4) 

88. $3MnO_4^{2-} + 4H^+ \rightarrow$ 'A' + MnO_2 + $4OH^-$.
What is incorrect about 'A'?
(1) It can be formed by reaction of mangnese (II) salt and perexodisulphate
(2) Its crystals are isostructural with $KClO_4$
(3) 'A' has tetrahedral shape having π - bonding between p-orbital of manganese and p-orbital of oxygen
(4) It oxidises H_2S and precipitates of sulphur are formed

89. 

In the above adsorption isotherm the relation between T_1, T_2, T_3 is

(1) $T_1 > T_3 > T_2$ (2) $T_1 > T_2 > T_3$
(3) $T_1 = T_2 = T_3$ (4) $T_3 > T_2 > T_1$

90. The correct match between list -I & List -II

	List -I		List-II
a.	HDPE	i.	peroxide catalyst
b.	PAN	ii.	Condensation at high temp. & pressure
c.	Novolac	iii.	Ziegler-Natta catalyst
d.	Nylon 6	iv.	Acid or base catalyst

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

91. Conc. H_2SO_4 is not used during the reaction of alcohols with KI as H_2SO_4.
(1) oxidises I^- to I_2
(2) is an weak dibasic acid
(3) is an effective drying agent.
(4) converts KI to HIO_3

92. The C.F.S.E for the complex $K_4[Fe(CN)_6]$ is
(1) $0.6\ \Delta_0$ (2) $-3.6\ \Delta_0$
(3) $-2.4\,\Delta_0$ (4) $-0.4\,\Delta_0$

93. Atoms of element B form *hcp* lattice and those of the element A occupy 2/3rd of tetrahedral voids. The formula of the compound formed by the elements A and B is
(1) A_3B_2 (2) A_2B_3
(3) A_4B_3 (4) A_3B_4

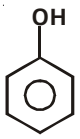
94. **Assertion** : Sulphur exhibits paramagnetic behaviour in vapour state.
Reason : In vapour state sulphur exist as S_2 molecule which has two unpaired electrons in antibonding π-orbitals.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion 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

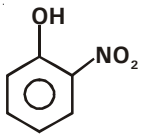
95. For the reaction $2NO \rightarrow N_2 + O_2$ the expression $-\frac{1}{2}\frac{d}{dt}[NO]$ represents
(1) the rate of formation of NO
(2) the average rate of the reaction
(3) the instantaneous rate of the reaction
(4) all of the above

96. **Statement-I** : Maltose is a reducing sugar while sucrose is not.
Statement-II : Maltose is a monosaccharide and sucrose is disaccharide.
(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

97. A sugar solution is formed by dissolving 34.2g of sugar in 1000g of water. Identify the correct statement(s) regarding this solution. (K_f of $H_2O = 1.86K/m$)
I. The whole (1034.2g) of solution freezes at 272.814K
II. Depression in freezing point is 0.186
III. Ice crystals start appearing at $-0.186°C$
(1) I, II, III (2) only III
(3) II and III only (4) only II

98. Which one of the following fails to turn blue litmus red?

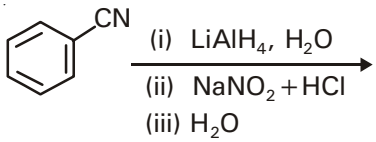
(1) 

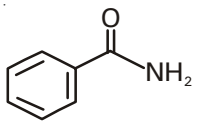
(2) 

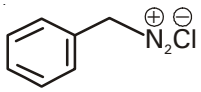
(3) CH_3COOH (4) CH_3CH_2OH

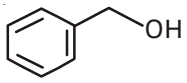
99. In the equation $\Lambda = \Lambda_m^o - Ac^{1/2}$, the constant A depends upon
(1) $c^{1/2}$
(2) stoichiometry of the electrolyte
(3) resistance
(4) specific conductivity

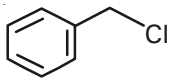
100. The product formed from the following reaction sequence is



(1) 

(2) 

(3) 

(4) 

ZOOLOGY : SECTION-A

All questions are compulsory in section A

101. Use of bioresources by multinational companies without proper authorisation from the countries concerned is called
(1) biopatent (2) biopiracy
(3) bioethics (4) GEAC

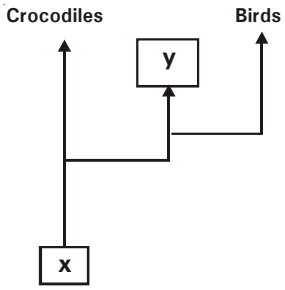
102. Endotoxin produced by *Bacillus thuringiensis* has helped in controlling caterpillars of some insect pests as it
(1) prevents them from moulting
(2) prevents them from reproducing
(3) punches holes in thier intestinal cells causing them to burst
(4) inhibits chitin synthesis

103. Which of the following is component of implants?
(1) Progesterone and centchroman
(2) Oxytocin and progesterone
(3) Relaxin and oestrogen
(4) Progesterone and oestrogen

104. Palindrome in DNA is a sequence of base pairs that reads same on the two strands
(1) when orientation of reading is kept opposite
(2) when orientation of reading is kept the same
(3) if one is read from 5′-3′ & other is from 3′-5′
(4) both (1) and (3)

105. A healthy person acquires the infection by inhaling the droplets/aerosols released by an infected person or even by sharing glasses and utensils with an infected person for which of the following disease
(1) Pneumonia (2) Cholera
(3) Typhoid (4) Diarrhoea

106. Identify x and y



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

107. EcoRI recognises _____ base pairs and the site of cut is between _____ on _____ strand/s
(1) 8, A and T, single (2) 6, G and A, Single
(3) 8, A and T, both (4) 6, G and A, both

108. **Statement-I** : AIDS is caused by HIV, a member of a retrovirus group which is non enveloped virus having RNA genome.
Statement-II : Transmission of HIV-infection generally occurs by sexual contact with infected person or by transfusion of contaminated blood and blood products or by sharing infected needles.
(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

109. Biological control of pests is aimed at
a. preserving variety in a landscape for higher sustainability
b. reducing the dependence on toxic chemicals & pesticides
c. eradication of predatory insects from the agricultural field
d. keeping insects at a manageable level by a complex system of checks & balances within a living & vibrant ecosystem
(1) a, b, c & d (2) a, b & c
(3) a, b & d (4) b & c

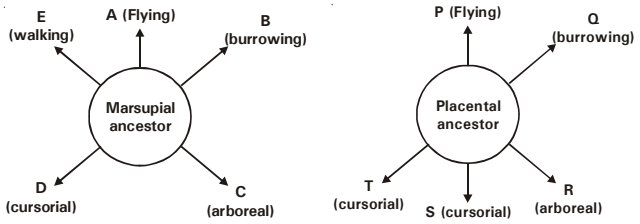
110. Which of the following is true w.r.t. stage of oocyte present in ovary of a newly born female child?
(1) Secondary oocyte with one polar body
(2) Secondary oocyte with no polar body
(3) Primary oocyte with one polar body
(4) Primary oocyte with no polar body

111. Selection of RNAi technology has been used in producing transgenic tobacco resistant to a/an
(1) lepidopteran
(2) aschelminth
(3) dipteran
(4) coleopteran

112. Complete the following statemets using the the correct option :
"Plasmodium enters the human body as _____ (infectious form) through the bite of infected female _____mosquito. The parasites. initially multiply within_____and then attack the _____ "
(1) sporozoites, Anopheles, red blood, liver cells
(2) sporozoites, Aedes, liver cells, red blood cells
(3) sporozoites, culex, liver cells, red blood cells
(4) sporozoites, Anopheles, liver cells, red blood cells

113. Foreign gene that codes for enzyme which can convert the substrate into orange colour was introduced in a plasmid. After introduction of plasmid in bacteria present in the petridish containing substrate.
(1) recombinants will give orange colour and non-recombinants will give white colour
(2) recombinants and non-recombinants both produced white colour
(3) recombinants and non-recombinants both produced orange colour
(4) recombinants will give white colour and non-recombinants will give orange colour

114. Which of the following show convergent evolution?



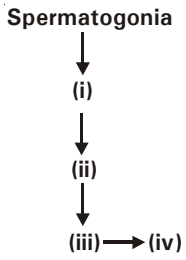
(1) E & C (2) B & D
(3) B & Q (4) S & T

115. What is true for *cry* genes?
a. *cry* IAc and *cry* IAb control cotton bollworms.
b. *cry* IIAb control the cotton bollworms as well as corn borer.
c. *cry* IAc and *cry*IIAb control cotton bollworms.
d. *cry* IAb controls corn borer.
(1) a, b, c, d (2) c, d
(3) b, c, d (4) only d

116. How many of the following are correct statements?
a. Health simply mean 'absence of disease' or 'physical fitness'.
b. Health may increase productivity but never brings economic prosperity.
c. Health also increases longevity of people and reduces infant and maternal mortality.
d. Balanced diet, personal hygiene and regular exercise are very important to maintain good health.
e. Diseases can be broadly grouped into infectious and non-infectious
(1) 5 (2) 4
(3) 2 (4) 3

117. Which of the following statement is true ?
(1) most important component of oral contraceptive pill is luteinizing hormone
(2) Amniocentesis can be used to detect cleft palate
(3) Cu-T inhibits gametogenesis
(4) MTP is considered safe during first trimester of pregnancy

118. Choose the correct statement about i, ii, iii, iv. If given cell is precursor of sperm



(1) (i) are diploid and formed during fetal life

(2) (iii) are haploid and formed as a result of IInd meiotic division

(3) (iv) are formed by the process called spermiation

(4) (ii) are diploid and undergo meiosis to form Sertoli cells

119. The technique which involves collection of sperm and ova from donors and induced to form zygote under simulated conditions in the laboratory is called_____

(1) in vivo fertilization
(2) in vitro fertilisation
(3) ZIFT
(4) GIFT

120. How many of these are applicable to the DNA segment transferred to host cell by the "natural genetic engineer"?

Virulence gene, ori, Tumor inducing genes, independent replication in host cell, gene encoding chemicals required by pathogen

(1) Two (2) Three
(3) Four (4) Five

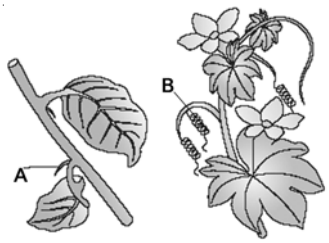
121. Mark the correct option

	Scientific name	Type of organism	Acid produced
(1)	*Lactobacillus*	Bacterium	Acetic acid
(2)	*Acetobacter*	Fungus	Lactic acid
(3)	*Aspergillus*	Fungus	Acetic acid
(4)	*Clostridium*	Bacterium	Butyric acid

122. The main lymphoid organ where all blood cells including lymphocytes are produced.

(1) bone marrow
(2) thymus
(3) spleen and peyer's patches
(4) bone marrow and thymus

123. What is true about structures A and B shown in the figure?



(1) A is modified stem while B is modified root

(2) Both A and B show divergent evolution

(3) Both the modifications develop as a result of similar habitat

(4) A is modified root while B is modified stem

124. Natural selection can lead to stabilization in which

(1) more individuals acquire value other than mean character value

(2) more individuals acquire peripheral character value at both the ends of distribution cure

(3) more individual acquire mean character value

(4) None of these

125. **Assertion** : Cellulase, Chitinase, RNase, DNase & protease are lysing enzymes used to break cell wall.

Reason : Sticky ends facilitate the action of molecular glue called DNA ligase

(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

126. Find the correct statement

a. About 3-4 mya, ape-like primates walked in Eastern Africa

b. Brain capacity of *Homo habilis* was between 650–800 cc

c. Neanderthal man lived in East & Central Asia

d. Agriculture came around 18,000 years back

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

127. Untreated STIs, may cause

(1) Pelvic inflammatory disease
(2) Ectopic pregnancy
(3) Cancer of reproductive tract
(4) All of the above

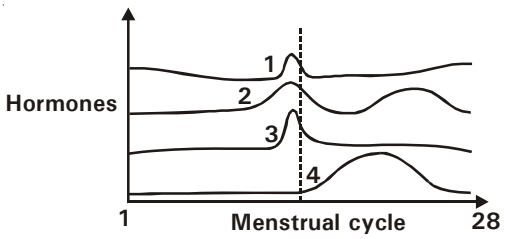
128. Choose the incorrect match
(1) Microinjection — direct injection of r-DNA in nucleus
(2) Biolistic — bombardment of microparticles with DNA
(3) Gene gun — transfer of disarmed pathogen
(4) PCR — multiple copies of DNA *in vitro*

129. Match the enzymes under column I with their use under column II

	Column-I		Column-II
a.	Lipase	p.	fibrinolysis
b.	Pectinase	q.	detergent formulation
c.	Streptokinase	r.	clarification of fruit juices

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

130. Choose the correct pair
(1) Sertoli cells – secrete androgens
(2) Interstitial cells – sperm formation
(3) Spermatogonia – Nourish germ cells
(4) Rete testis – Male sex accessory duct

131. 

In the diagram shown above, 1, 2, 3 and 4 are respectively.
(1) Estrogen, LH, FSH, Estrogen
(2) Progesterone, Estrogen, FSH, LH
(3) FSH, Estrogen, LH, Progesterone
(4) LH, FSH, Progesterone, Estrogen

132. Transformation of normal cells into cancerous neoplastic cells may be induced by
(1) physical, chemical or biological agents.
(2) carcinogens
(3) ionising radiations like X-rays and gamma rays
(4) all of these

133. Which of the following methods is not completely curative for SCID treatment ?
(1) Bone marrow transplant
(2) Enzyme replacement therapy
(3) Introduction of c-DNA for ADA into lymphocytes of patient
(4) All of these

134. In males, each testis has about 250 ____(i)_____ Latter contains highly coiled ___(ii)____. Latter contain ___(iii)____ which undergo meiotic divisions to form sperms. In the above sentence i, ii, and iii are respectively.
(1) (i)-seminiferons tubules, (ii) testicular lobules (iii) spermatogonia
(2) (i) testicular lobules, (ii) seminiferous tubules , (iii) spermatogonia
(3) (i) Interstitial cells, (ii) testicular lobules (iii) Sertoli cells
(4) Testicular tubules, (ii) seminiferous tubules , (iii) Sertoli cells.

135. A-limbs, B-heart, C-eyelid, D-hair on head
Correct sequence of development of above structures in human embryo is
(1) A–B–C–D (2) B–A–D–C
(3) A–C–B–D (4) B–A–C–D

ZOOLOGY : SECTION-B

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

136. How many of the given hormones are produced in a pregnant female in first trimester?
Cortisol, Progesterone, Estrogen, Thyroxine, Thymosin, Parathormone, Calcitonin, Aldosterone, ADH, hCG
(1) Five (2) Ten
(3) Eleven (4) Eight

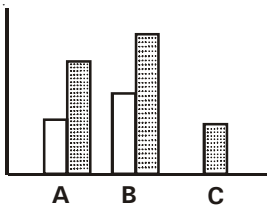
137. More BOD means_____
(1) more polluting potential
(2) more inorganic waste
(3) more dissolved oxygen
(4) all of these

138. Which of the following is incorrect with respect to MOET?
(1) It is a programme for herd imporvement
(2) Cow is administered with hormones with FSH - like activity
(3) They produce 6-8 eggs as yield per cycle
(4) Fertilised eggs at 8-16 cell stages are recovered surgically and transferred to surrogate mothers

139. Find the correct statements for one of the most infectious human ailments
a. Rhino viruses cause – the common cold.
b. They infect the nose and respiratory passage and lungs.
c. The common cold is characterised by nasal congestion and discharge, sore throat, hoarseness, cough, headache, tiredness,
d. which usually last for 17 to 30 days.
(1) a and b (2) b and c
(3) a and c (4) a, b and d

140. Which phenomenon accentuate variations leading to appearance of new species ?
(1) Habitat fragmentation
(2) Founder effect
(3) Bottle neck effect
(4) All of these

141. Bar graphs given below represent levels of hormones in blood of a woman pre-pregnancy (□) and during pregnancy (▦) A, B and C are likely to be



(1) thyroxine, hCG, human placental lactogen
(2) estrogen, progesterone, hPL
(3) hCG, hPL, progesterone
(4) relaxin, estrogen, hCG

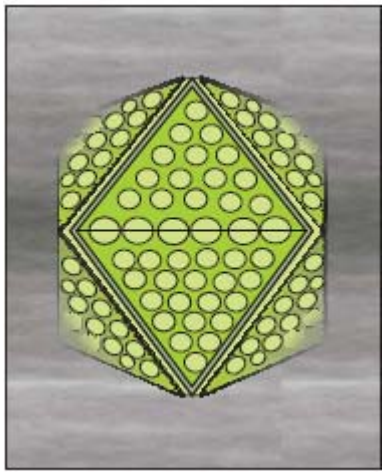
142. Fill in the gap using correct option
Embryological support for evolution was proposed by _____based upon the observation of certain feature during embryonic stage common to all vertebrates that are absent in adult
(1) Von Baer
(2) Ernst Heckel
(3) George Cuvier
(4) Oparin

143. Linear r-DNA was prepared and by mistake exonuclease was added to it.
(1) It will not affect outcome of the experiment
(2) DNA will be digested
(3) DNA will not be digested
(4) DNA will become hydrophobic

144. **Assertion** : Drugs like barbiturates, amphetamines, benzodiazepines are used as medicines to help patients cope with mental illnesses.
Reason : When these drugs are taken for a purpose other than medicinal use or in amounts/frequency that impairs one's physical or psychological functions, it constitutes drug deaddiction.
(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

145. How milk of cow Rosie differs from that of non-transgenic cow?
(1) Fat enriched
(2) Nutritionally more balanced for human babies
(3) Protein enriched
(4) Both 2 & 3

146. Identify the given figure

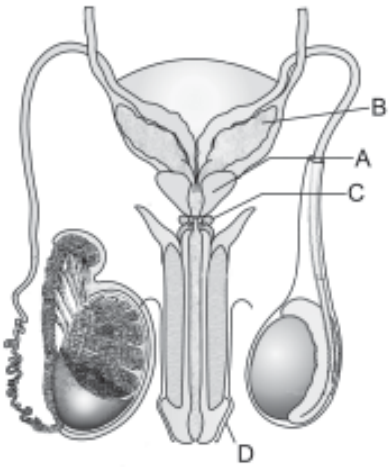


(1) A bacteriophage
(2) Adenovirus which causes respiratory infections
(3) Rod shaped tabacoo mosaic virus
(4) Rod shaped bacterium

147. **Statement-I** : Insertional inactivation of a gene prevents its expression resulting in non production of protein it codes for.
Statement-II : An antibiotic resistance gene codes for protein that makes a particular antibioitic ineffective.
(1) Both statement-I and statement-II are incorrect
(2) Statement-I is correct but statement-II is incorrect
(3) Both statement-I and statement-II are correct
(4) Statement-I is incorrect but statement-II is correct

148. Yellowish fluid colostrum secreted by mother during the initial days of lactation has abundant IgA to protect the infant. The foetus receives some antibodies, through the placenta during pregnancy. These are some examples of
(1) passive immunity
(2) active immunity
(3) primary response
(4) secondary response

149. Identify A, B, C and D respectively from the figure given below w.r.t. male reproductive system



(1) seminal vesicle, cowper's gland, prostate gland, glans penis

(2) prostate gland, seminal vesicle, cowper's gland, foreskin

(3) cowper's gland, seminal vesicle, prostate gland, glans penis

(4) prostate gland, seminal vesicle, cowper's gland, glans penis

150. Match the entities given in column-I with these of column-II

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

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

BOTANY : SECTION-A

All questions are compulsory in section A

151. In _____, control of the rate of transcriptional initiation is predominant site for controling gene expresssion
(1) *Drosophila* (2) *E. coli*
(3) Sweet pea (4) Humans

152. According to IUCN red list 2004, in last 500 years, the number of species which have become extinct are
(1) 338 vertebrates, 300 in vertebrates and 87 plants
(2) 350 vertebrates, 359 invertebrates and 87 plants
(3) 338 vertebrates, 359 invertebrates and 97 plants
(4) 338 vertebrates, 359 invertebrates and 87 plants

153. Which of the following two statements are correct w. r. t Down's syndrome?
A. Occurs due to deletion of chromosome 5.
B. Extra 21 chromosome
C. Autosomal gene disorder
D. Mental retardation
(1) A and B (2) B and C
(3) B and D (4) C and D

154. Which unusual nucleotide is added at 5' end of hnRNA
(1) 5 methyl uracil
(2) 7 methyl guanosine triphosphate
(3) 7 methyl adenosine monophosphate
(4) adenylate residues

155. A diploid organism is heterozygous for 5 loci and homozygous for 2 loci. How many type of gametes can be produced?
(1) 128 (2) 32
(3) 4 (4) 14

156. These characters will favour
(a) well exposed stamens
(b) large number of non-sticky pollen grains
(c) single ovule in each ovary
(d) nectarless and colourless flowers
(1) self – pollination (2) ornithophily
(3) anemophily (4) entomophily

157. Who developed polyblend ?
(1) Ramesh Chandra Dagar
(2) Pandurang Hegde
(3) FOAM (Friends of Arcata Marsh)
(4) Ahmed Khan

158. **Statement-I** : Biofortification is the most practical aspect to improve health of the people.
Statement-II : Biofortification is breeding of crops with higher levels of vitamins or minerals or higher proteins and healthier fats.
(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

159. In a population, frequency of dominant allele is 0.8. what percentage of population will show dominant phenotype?
(1) 64% (2) 32%
(3) 96% (4) 4%

160. Which of the statement is incorrect ?
(1) India has three hot spots of biodiversity
(2) Dachigam National Park, is famous for home to the hangul
(3) Jim Corbett National Park was the first national park to be established in India
(4) In the bufferzone of a biosphere reserve, no human acitivity is allowed

161. Why *Drosophila* was chosen for genetical experiments?
(1) A large number of progeny are produced after each mating
(2) It complete its life cycle in one year
(3) It is bisexual
(4) Larvae are difficult to grow on simple medium

162. Okazaki fragments are joined with the help of the enzyme
(1) DNA ligase
(2) DNA polymerase
(3) Reverse transcriptase
(4) Alkaline phosphatase

163. Pyramid of numbers is:
(1) Always upright
(2) Always inverted
(3) Either upright or inverted
(4) Neither upright nor inverted

164. **Assertion** : The order and sequence of amino acids is defined by the sequence of bases in mRNA.
Reason : In the first phase of translation, amino acids are activated and are linked to their cognate RNA.
(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

165. Which set of viruses given below are RNA viruses i.e. have RNA as genetic material?
(1) TMV & λ phage (2) QB & TMV
(3) λ phage & T_2 (4) λ phage & QB virus

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

167. Choose the correct match
(1) Exine – oily and nourishing
(2) Pollenkit – anemophilous flower
(3) Sporogenous tissue – basal part of ovule
(4) Tapetum – nutritive layer

168. DNA fingerprinting technique was developed for the first time by
(1) Sir Alec Jeffreys (2) Dr. Lalji Singh
(3) Dr. V.K. Kashyap (4) Maheshwari

169. In a family, father has a blood group 'A' and mother has a blood group 'B'. One of the child has a blood group AB and the other has a blood group 'B' indicating that
(1) mother is heterozygous
(2) father is heterozygous
(3) both are heterozygous
(4) father is homozygous

170. 'Rivet popper Hypothesis' explains
(1) species area relationships
(2) concept of species
(3) Importance of biodiversity on earth
(4) gradients of biodiversity

171. If recombination frequency between AB = 13%, BC = 20%, AD = 5%, DB = 8%. Find the distance between CD?
(1) 15 map units (2) 12 map units
(3) 8 map units (4) 13 map units

172. A mutation in 6th codon of β globin gene for haemoglobin has certain consequences. Which of the following is not a consequence of the same?
(1) Mutant Hb undergoes polymerisation at low oxygen tension
(2) RBC becomes sickle shaped
(3) Membrane permeability of RBC changes
(4) Blood loses its clotting ability

173. **Assertion** : Chromosomes like alleles occur in homologous pairs in diploid cells.
Reason : Chromosomes of each pair segregate independently of the other pairs during anaphase-1.
(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

174. Resistance to cereal leaf beetle in wheat is due to
(1) solid stem (2) low sugar content
(3) hairy leaves (4) smooth leaves

175. Which of the following statement is incorrect?
(1) Rotifers show parthenogenesis
(2) Amphibians show external fertilisation
(3) Embryogenesis involves both cell division and cell differentiation
(4) *Chara* is dioecious

176. Select the true statement
(1) Jhum cultivation is a method to save the forest from desertification.
(2) Montreal protocol focused on reducing green house gas emissions.
(3) BOD is a measure of inorganic pollutants in water.
(4) Noise of more than 80 decibels is harmful for human beings.

177. In operon concept, the operator gene combines with
(1) regulator gene to switch off structural gene transcription
(2) regulator protein to switch on structural gene transcription
(3) regulator protein to switch off structural gene transcription
(4) inducer to switch off structural gene transcription

178. Which of the following is incorrect
(1) Seat of sexual reproduction is flower in angiosperm
(2) Pollen represent male sporophyte
(3) Ovules are formed inside ovary in angiosperms
(4) Megasporangium has a reduced female gametophyte represented by embryo sac.

179. Which of the following statement is incorrect ?
(1) Carbon constitutes 49% of dry weight and is therefore, next only to water in abundance
(2) Out of the total global carbon 71% in found in oceans.
(3) Atmospheric reservoir regulates the amount of carbon dioxide in the atmosphere
(4) Annual amount of carbon fixed in photosynthesis and changed to organic compound is 4×10^{13}Kg

180. When Mendel self-pollinated the tall F_1 plants, he found that in the F_2 generation
a. 1/4th of the F_2 plants were dwarf while 3/4th of the F_2 plants were tall
b. Tall and dwarf traits were identical to their parental type
c. The offspring were either tall or dwarf some were of in between height
(1) both b & c (2) both a & b
(3) both a & c (4) a, b & c

181. The amount of nutrients, such as carbon, nitrogen, phosphorus, calcium etc present in the soil at any given time is called
(1) Nutrient cycling (2) Standing crop
(3) Standing state (4) Biomass

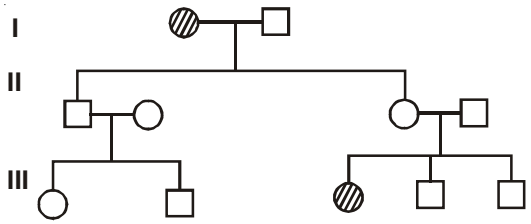
182. Arrange the four wall layers in anther
a. Epidermis b. Endothecium
c. Tapetum d. Middle layers
(1) a, b, c, d (2) b, a, c, d
(3) c, b, a, d (4) a, b, d, c

183. The best way to obtain viruses free plants through tissue culture is
(1) embryo rescue
(2) micropropagation
(3) shoot tip culture
(4) anther culture

184. Match the items in column I and column II.

Column-I	Column-II
a. UV	i. Biomagnificatron
b. Biodegradable organic matter	ii. Eutrophication
c. DDT	iii. Snow blindness
d. Phosphates	iv. BOD

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

185. 

(1) This trait can be myotonic dystrophy (autosomal dominant trait)
(2) Male parent of generation 1 is affected.
(3) It is pedigree for Y linked trait.
(4) The shown trait may be phenylketonuria

BOTANY : SECTION-B

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

186. The rate of formation of new organic matter by consumers is called as
(1) primary productivity
(2) net primary productivity
(3) secondary productivity
(4) gross primary productivity

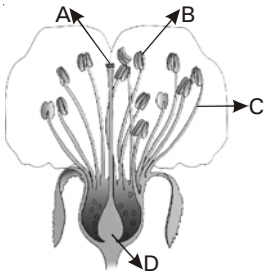
187. Cleistogamous flowers produce assured seed– set even in the absence of pollinator because they
(1) remain open (2) have fragrance
(3) have nectar (4) remain closed

188. Match the characters in column-I with diseases in column-II

Column-I	Column-II
a. Shape of pea seed	i. Sickle cell anaemia
b. RBC sickle shaped	ii. Pleiotropy
c. Valine in place of glutamic acid	iii. 4 alleles
	iv. Secondary effect
d. Coat pigment in rabbit	

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

189. Animals from colder areas have shorter ears and tails. This is known as
(1) Jordon's Rule (2) Gloger's Rule
(3) Allen's Rule (4) Rensch's Rule

190. 

In above figure A, B, C & D are respectively

(1) anther, stigma, filament, ovary
(2) stigma, anther, ovary, filament
(3) stigma, anther, filament, ovary
(4) filament, anther, stigma, ovary

191. **Statement-I** : Law of segregation in Mendelian Genetics is considered as universal.

Statement-II : Linkage works against the law of independent assortment ..

(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. Which of the following is incorrect?

(1) The evil quartet includes the four major causes of biodiversity extinction
(2) Major greenhouse gases are carbon dioxide and methane
(3) Odd environmental phenomena such as El Niño may be related to global climatic changes
(4) Co-extinction is the most important cause driving animals and plants to extinction

193. Decomposers like fungi and bacteria are:

i. autotrophs
ii. heterotrophs
iii. saprotrophs
iv. chemo-autotrophs.

Choose the correct answer:

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

194. Which of the following statement is incorrect?

(1) Many adaptations have evolved over a long evolutionary time and are genetically fixed
(2) Natural selection operates to evolve the desired traits at population level.
(3) Generally organisms with very high intrinsic growth rates have short generation time
(4) Plants are capable of thermo regulation

195. For some organisms in column-I, the chromosome numbers in meiocytes are given in column-II and gametes are given in column-III.

	Column-I	Column-II	Column-III
a.	House fly	12	---
b.	Rat	---	21
c.	Dog	78	---
d.	Cat	---	19
e.	Fruit fly	8	---
f.	*Ophioglossum*	---	630

The numbers in the blank space respectively are

(1) 6, 42, 39, 38, 4, 1260
(2) 38, 4, 1260, 6, 42, 36
(3) 4, 1260, 6, 42, 36, 38
(4) 6, 42, 36, 38, 4, 320

196. Which is incorrect w.r.t species-area relationships?

(1) Species richness increased with increasing area but upto a certain limit
(2) Regression cofficient is generally 0.1-2.0 regardless to taxonomic group or region
(3) $S = CA^z$
(4) For a very large area e.g. whole continent, slope of the line becomes steeper

197. Pick out wheat varieties

a. Taichung native-I
b. Jaya
c. Ratna
d. Shakti
e. Kalyan Sona
f. Sonalika

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

198. Splicing occurs inside

(1) cytoplasm (2) nucleus
(3) mitochondria (4) both (1) and (2)

199. 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 garden pea

(1) Four (2) Two
(3) Three (4) One

200. Which of the following causes biomagnification?

(1) SO_2 (2) Mercury
(3) DDT (4) Both (2) & (3)