



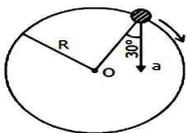
**Physics - Section A**

Section A Shall Consist Of 35 (Thirty-five) Questions In Each Subject .All Questions Are Compulsory.

1. A man standing in the rain hold a umbrella at an angle  $30^\circ$  from vertical. He throws the umbrella and starts running with 10 km/hr. He find that the rain drops are hitting his head vertically. Find the velocity of rain w.r.t. running man?

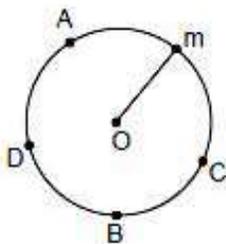
- (1) 10 Km /h                      (2)  $\frac{10}{\sqrt{3}}$  Km /h  
 (3)  $10\sqrt{3}$  Km /h              (4)  $20\sqrt{3}$  Km /h

2. In the given figure,  $a = 15 \text{ m/s}^2$  represents the net acceleration of a particle moving in the clockwise direction in a circle of radius  $R = 2.5 \text{ m}$  at a given instant of time. The speed of the particle is



- (1) 6.2 m/s                      (2) 4.5 m/s  
 (3) 5.0 m/s                      (4) 5.7 m/s

3. A particle of mass  $m$  is performing vertical circular motion (see figure). If the average velocity of the particle is increased, then at which point maximum breaking possibility of the string :-



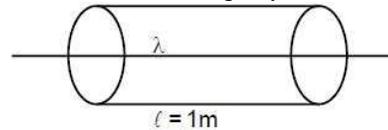
- (1) A                                  (2) B  
 (3) C                                  (4) D

4. A car moves at a constant speed on a road as shown in figure. The normal force by the road on the car is  $N_A$  and  $N_B$  when it is at the points A and B respectively.



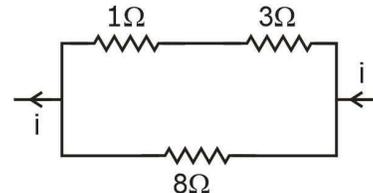
- (1)  $N_A = N_B$                       (2)  $N_A > N_B$   
 (3)  $N_A < N_B$                       (4) insufficient

5. Calculate flux through cylinder ?



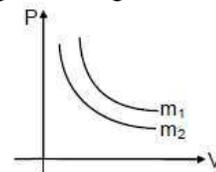
- (1)  $\lambda \cdot \epsilon_0$                       (2)  $\lambda^2 \epsilon_0$   
 (3)  $\lambda / \epsilon_0$                       (4)  $\epsilon_0 / \lambda$

6. Power dissipated across the  $8\Omega$  resistor in the circuit shown here is 2 watt. The power dissipated in watt units across the  $3\Omega$  resistor is :



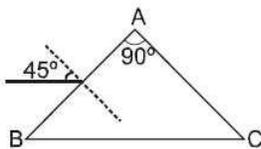
- (1) 2.0                                  (2) 1.0  
 (3) 0.5                                  (4) 3.0

7. The P-V diagrams of two different masses  $m_1$  and  $m_2$  for an ideal gas at constant temperature T is given in figure. Then



- (1)  $m_1 = m_2$                       (2)  $m_1 > m_2$   
 (3)  $m_1 < m_2$                       (4) Data is insufficient

8. Monochromatic light falls on a right-angled prism at an angle of incidence  $45^\circ$ . The emergent light is found to slide along the face AC. Find the refractive index of material of prism.



- (1)  $\frac{2}{\sqrt{3}}$  (2)  $\sqrt{\frac{2}{3}}$   
 (3)  $\sqrt{\frac{3}{2}}$  (4)  $\frac{\sqrt{3}}{2}$
9. If  $\alpha = \frac{F}{v^2} \sin(\beta t)$  (here  $v$  = velocity,  $F$  = force,  $t$  = time). Find the dimension of  $\alpha$  and  $\beta$  respectively

- (1)  $[T^{-1}]$ ,  $[ML^{-1}]$   
 (2)  $[ML^{-1}]$ ,  $[T]$   
 (3)  $[ML^{-1}]$ ,  $[T^{-1}]$   
 (4)  $[ML^{-1}T]$ ,  $[LT^0]$

10. In a simple pendulum, the breaking strength of the string is double the weight of the bob. The bob is released from rest when the string is horizontal. The string breaks when it makes an angle  $\theta$  with the vertical-

- (1)  $\theta = \cos^{-1}(\frac{1}{3})$  (2)  $\theta = 60^\circ$   
 (3)  $\theta = \cos^{-1}(\frac{2}{3})$  (4)  $\theta = 0$

11. The speed of sound in air

- (1) decreases with temperature (2) increases with pressure  
 (3) increases with humidity (4) decreases with pressure

12. A remote - sensing satellite of earth revolves in a circular orbit at a height of  $0.25 \times 10^6$  m above the surface of earth. If earth's radius is  $6.38 \times 10^6$  m and  $g = 9.8 \text{ ms}^{-2}$ , then the orbital speed of the satellite is :

- (1)  $6.67 \text{ km s}^{-1}$  (2)  $7.76 \text{ km s}^{-1}$   
 (3)  $8.56 \text{ km s}^{-1}$  (4)  $9.13 \text{ km s}^{-1}$

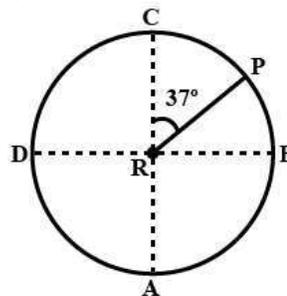
13. If  $\vec{F}$  is the force acting on a particle having position vector  $\vec{r}$  and  $\vec{\tau}$  be the torque of this force about the origin, then :-

- (1)  $\vec{r} \cdot \vec{\tau} = 0$  and  $\vec{F} \cdot \vec{\tau} \neq 0$   
 (2)  $\vec{r} \cdot \vec{\tau} \neq 0$  and  $\vec{F} \cdot \vec{\tau} = 0$   
 (3)  $\vec{r} \cdot \vec{\tau} > 0$  and  $\vec{F} \cdot \vec{\tau} < 0$   
 (4)  $\vec{r} \cdot \vec{\tau} = 0$  and  $\vec{F} \cdot \vec{\tau} = 0$

14. A satellite is revolving around the Earth in a circular orbit of radius  $r$ , then the correct statement is

- (1) Linear momentum varies as  $\frac{1}{r}$   
 (2) Angular momentum varies as  $\frac{1}{\sqrt{r}}$   
 (3) Frequency of revolution varies as  $\frac{1}{\sqrt{r^3}}$   
 (4) None of these

15. A particle is moving along a vertical circle of radius  $R$ . The velocity of particle at P will be (assume critical condition at C)



- (1)  $\sqrt{\frac{7}{5}gR}$  (2)  $\sqrt{2gR}$  (3)  $\sqrt{\frac{3gR}{5}}$  (4)  $\sqrt{\frac{3}{2}gR}$

16. A motorcycle is going on an overbridge of radius

- (1) increase (2) decrease  
 (3) remain the same (4) fluctuates normal force on it.

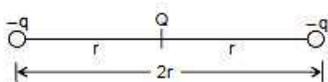
17. A metal rod of length  $L$  is placed normal to a

- (1)  $\pi L^2 Bf$  (2)  $BL/f$   
 (3)  $\pi L^2 B/f$  (4)  $fBL$   
 difference between the ends will be

18. Two conducting loops of radi  $R_1$  and  $R_2$  are concentric and are placed in the same plane. If  $R_1 \gg R_2$ , the mutual inductance  $M$  between them will be directly proportional to-

- (1)  $\frac{R_1}{R_2}$  (2)  $\frac{R_2}{R_1}$   
 (3)  $\frac{R_1^2}{R_2}$  (4)  $\frac{R_2^2}{R_1}$

19. Charges  $-q$ ,  $Q$  and  $-q$  are placed as shown on a straight line. If the total potential energy of the system of three charges is zero, then find the ratio  $Q/q$ .



- (1)  $1/2$                       (2)  $1/4$   
 (3)  $2/3$                       (4)  $3/4$
20. A cell is balanced at 100 cm of a potentiometer wire when the total length of the wire is 400 cm. If the length of the potentiometer wire is increased by 100 cm then the new balancing length for the cell will be
- (1) 100 cm                      (2) 125 cm  
 (3) 80 cm                        (4) 250 cm
21. An electron is travelling horizontally towards east. A magnetic field in vertically downwards direction exerts a force on the electron along :
- (1) East                          (2) West  
 (3) North                        (4) South
22. The elastic energy stored in a wire of Young's modulus  $Y$  is

- (1)  $Y \times \frac{\text{Strain}^2}{\text{Volume}}$   
 (2)  $\text{Stress} \times \text{Strain} \times \text{Volume}$   
 (3)  $\frac{\text{Stress}^2 \times \text{Volume}}{2Y}$   
 (4)  $\frac{1}{2} Y \times \text{stress} \times \text{Strain} \times \text{Volume}$

23. A parallel plate capacitor has capacitance  $C$ . If it is equally filled with parallel layers of materials of dielectric constant  $K_1$  and  $K_2$  its capacity becomes  $C_0$ . The ratio of  $C_0$  to  $C$  is

- (1)  $K_1 + K_2$   
 (2)  $\frac{K_1 K_2}{K_1 - K_2}$   
 (3)  $\frac{K_1 + K_2}{K_1 K_2}$   
 (4)  $\frac{2 K_1 K_2}{K_1 + K_2}$

24. Which of the following is not represented in correct unit -

- (1)  $\frac{\text{Stress}}{\text{Strain}} = \text{N/m}^2$   
 (2) Surface tension =  $\text{N/m}$   
 (3) Energy =  $\text{kg} - \text{m/sec}$   
 (4) Pressure =  $\text{N/m}^2$

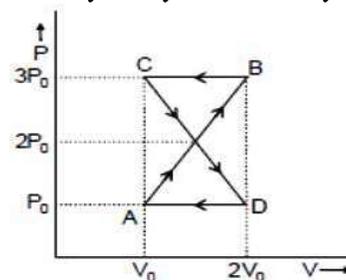
25. The Poisson ratio cannot have value

- (1) 0.7      (2) 0.2      (3) 0.1      (4)  $-0.5$

26. 22 gm of  $\text{CO}_2$  at  $27^\circ\text{C}$  is mixed with 16 gm of  $\text{O}_2$  at  $37^\circ\text{C}$ . If both gases are considered as ideal kinetic theory gases, then the temperature of the mixture is :

- (1)  $32^\circ\text{C}$                       (2)  $27^\circ\text{C}$   
 (3)  $37^\circ\text{C}$                       (4)  $30.5^\circ\text{C}$

27. A thermodynamic system undergoes cyclic process ABCDA as shown in figure. The work done by the system in the cycle is



- (1)  $P_0 V_0$                       (2)  $2P_0 V_0$   
 (3)  $\frac{P_0 V_0}{2}$                         (4) zero

28. In the process  $PV = \text{constant}$ , pressure ( $P$ ) versus density ( $\rho$ ), graph of an ideal gas is :

- (1) a straight line parallel to  $P$ -axis  
 (2) a straight line parallel to  $\rho$ -axis  
 (3) a straight line passing through origin  
 (4) a parabola

29. An unnumbered wall clock shows time 05 : 25, where 1st term represents hours and 2nd represents minutes. What time will its image in a plane mirror show.

- (1) 08 : 35                      (2) 06 : 35  
 (3) 07 : 25                      (4) none of these

**30.** A thin uniform rod of length 8 cm lies along the principal axis of a concave mirror of focal length 16 cm. The end closer to the pole is 32 cm away from it. The length of the image is equal to

- (1) 1.3 cm                      (2) 2.3 cm  
 (3) 5.3 cm                      (4) 9.3 cm

**31.** Upto what height should water ( $\mu = \frac{4}{3}$ ) be filled into a vessel of height 21 cm such that it appears half filled when viewed from the top?

- (1) 16 cm                      (2) 13.5 cm  
 (3) 21 cm                      (4) 12 cm

**32.** If focus of a magnifying glass is 5 cm, at what distance an object is placed so that image will at least distance of distinct vision (if  $D = 20$  cm)

- (1) 3.4 cm                      (2) 3 cm  
 (3) 4 cm                        (4) 6.67 cm

**33.** In Young's double slit experiment, separation between slits is 1 mm, distance of screen from slits is 2.5 m. If wavelength of incident light is 400 nm. Determine distance between 4<sup>th</sup> bright fringe and 3<sup>rd</sup> dark fringe.

- (1)  $\frac{1}{2}$  mm                      (2)  $\frac{3}{2}$  mm  
 (3)  $\frac{2}{3}$  mm                      (4) None

**34.** A screen is placed at 50 cm from a single slit, which is illuminated with 600 nm light. If separation between the first and third minima in the diffraction pattern is 3.0 mm, then width of the slit is

- (1) 0.4 mm                      (2) 0.1 mm  
 (3) 0.3 mm                      (4) 0.2 mm

**35.** An unpolarized light incident on a slab of refractive index  $\mu$ . If angle of polarization for this slab is  $53^\circ$  then refractive index  $\mu$  of slab will be

- (1) 4                              (2)  $\frac{4}{3}$   
 (3) 2                              (4) can't calculate

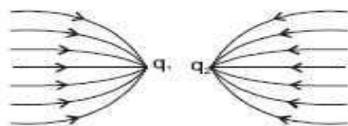
**Physics - Section B**

**Section B Shall Consist Of 15 (Fifteen) Questions In Each Subject. Candidate Needs To Attempt Any 10 (Ten) Questions Out Of 15 (Fifteen) In Each Subject.**

**36.** Suppose the kinetic energy of a body oscillating with amplitude A and at a distance x is given by  $K = \frac{BX}{X^2+A^2}$ . The dimensions of B are the same as that of -

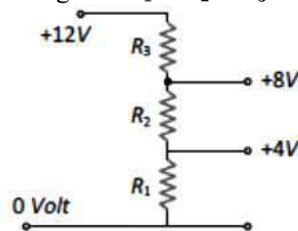
- (1) work/time                      (2) work  $\times$  distance  
 (3) work/distance                      (4) work  $\times$  time

**37.** The given figure gives electric lines of force due to two charges  $q_1$  and  $q_2$ . What are the signs of the two charges ?



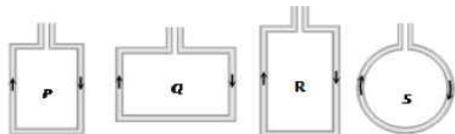
- (1) Both are negative  
 (2) Both are positive  
 (3)  $q_1$  is positive but  $q_2$  is negative  
 (4)  $q_1$  is negative but  $q_2$  is positive

**38.** A potential divider is used to give outputs of 4V and 8V from a 12V source. Which combination of resistances, ( $R_1, R_2, R_3$ ) gives the correct voltages ?  $R_1 : R_2 : R_3$

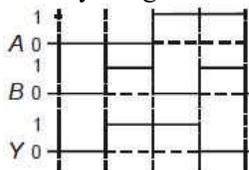


- (1) 2 : 1 : 2                      (2) 1 : 1 : 1  
 (3) 2 : 2 : 1                      (4) 1 : 1 : 2

39. Four wires each of length 2.0 metres are bent into four loops P, Q, R and S and then suspended into uniform magnetic field. Same current is passed in each loop. Which statement is correct



- (1) Torque on loop P will be the highest  
 (2) Torque on loop Q will be the highest  
 (3) Torque on loop R will be the highest  
 (4) Torque on loop S will be the highest
40. There is a gate with two inputs A and B, and one output Y. Using the input and output wave forms identify the gate



- (1) NAND (2) NOR  
 (3) X-OR (4) AND
41. The minimum projection velocity of a body from the earth's surface so that it becomes the satellite of the earth ( $R_e = 6.4 \times 10^6$  m)

- (1)  $11 \times 10^3$  m/s (2)  $8 \times 10^3$  m/s  
 (3)  $6.4 \times 10^3$  m/s (4)  $4 \times 10^3$  m/s

42. Two coils of self inductances 2 mH and 8 mH are located so close together that the effective flux in one coil is completely linked with the other. The mutual inductance between these coils is :-

- (1) 10 mH (2) 6 mH  
 (3) 4 mH (4) 16 mH

43. A dynamo-

- (1) creates electrical energy  
 (2) converts mechanical energy into electrical energy  
 (3) converts electrical energy into mechanical energy  
 (4) creates mechanical energy

44. Two coils A and B having turns are placed near each other, on a passing a current of 3.0A in coil A, the flux linked with coil A is  $1.2 \times 10^{-4}$  weber and with coil B it is  $9.0 \times 10^{-5}$  weber. The mutual inductance of the system is-

- (1)  $2 \times 10^{-5}$  henry  
 (2)  $3 \times 10^{-5}$  henry  
 (3)  $4 \times 10^{-5}$  henry  
 (4)  $6 \times 10^{-5}$  henry

45. A step down transformer connected to an ac mains supply of 220 V is made to operate at 11 V, 44W lamp. Ignoring power losses in the transformer, what is the current in the primary circuit.

- (1) 4A (2) 0.2A  
 (3) 0.4 A (4) 2A

46. Out of a photon and an electron, the equation  $E = pc$ , is valid for

- (1) both (2) neither  
 (3) photon only (4) electron only

47. The wave function (in S.I. units) for an electromagnetic wave is given as-  
 $\Psi(x, t) = 10^3 \sin \pi(3 \times 10^6 x - 9 \times 10^{14} t)$ . The speed of the wave is-

- (1)  $9 \times 10^{14}$  m/s (2)  $3 \times 10^8$  m/s  
 (3)  $3 \times 10^6$  m/s (4)  $3 \times 10^7$  m/s

48. A and B are isotopes. B and C are isobars. If  $d_A$ ,  $d_B$  and  $d_C$  be the densities of nuclei A, B and C respectively then -

- (1)  $d_A > d_B > d_C$  (2)  $d_A < d_B < d_C$   
 (3)  $d_A = d_B = d_C$  (4)  $d_A = d_B < d_C$

49. Energy released in the fission of a single  ${}_{92}\text{U}^{235}$  nucleus is 200 MeV. The fission rate of a  ${}_{92}\text{U}^{235}$  fuelled reactor operating at a power level of 5W is

- (1)  $1.56 \times 10^{+10} \text{ s}^{-1}$  (2)  $1.56 \times 10^{+11} \text{ s}^{-1}$   
 (3)  $1.56 \times 10^{+16} \text{ s}^{-1}$  (4)  $1.56 \times 10^{+17} \text{ s}^{-1}$

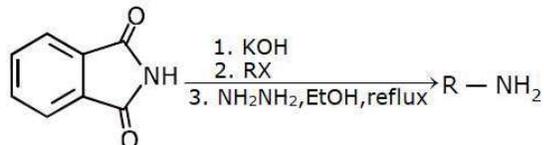
## Chemistry - Section A

Section A Shall Consist Of 35 (Thirty-five) Questions In Each Subject .All Questions Are Compulsory.

51. The biodegradable polymer is :

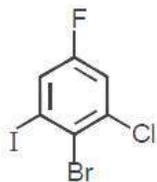
- (1) nylon-6                      (2) Buna-S  
(3) nylon-6,6                  (4) nylon 2-nylon 6

52. Which of the following alkyl halides is not a reasonable substrate for the Gabriel synthesis?



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

53. The IUPAC name of is-



- (1) 1-Bromo-2-chloro-3-fluoro-6-iodo benzene  
(2) 2-Bromo-1-chloro-5-fluoro-3-iodo benzene  
(3) 4-Bromo-2-chloro-5-iodo-1-fluoro benzene  
(4) 2-Bromo-3-chloro-1-iodo-5-fluoro benzene

54.  $\text{CH}_3\text{-CH}_2\text{-CN} \xrightarrow{\text{H}_3\text{O}^{\oplus}} \text{X} \xrightarrow[\text{(ii) electrolysis}]{\text{(i) KOH}} \text{Y}$ ;

Y can not be-

- (1)  $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3$   
(2)   
(3)  $\text{CH}_2=\text{CH}_2$   
(4)  $\text{CH}_3\text{-CH}_2\text{-CH}_3$

55.

The product C is-

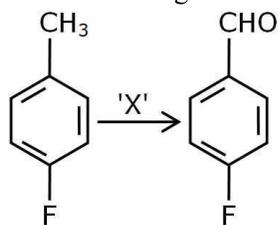
- (1)
- (2)
- (3)
- (4)

56.

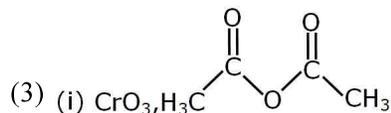
Y is-

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

57. 'X' in following conversion is-



- (1)  $C_5H_5NH^{\oplus}[CrO_3 Cl]^{-}$   
 (2) (i)  $CrO_2Cl_2$ , (ii)  $H_3O^+$



(ii)  $H_3O^{\oplus}, \Delta$

(4) Both (B) and (C)

58. Which of the following equimolar solution have highest vapour pressure?

- (1) Glucose (2) NaCl  
 (3)  $K_2SO_4$  (4)  $K_4[Fe(CN)_6]$

59. The relationship between the values of osmotic pressure of 0.1M solutions of  $KNO_3(P_1)$  and  $CH_3COOH(P_2)$  is-

- (1)  $P_1 > P_2$  (2)  $P_2 > P_1$   
 (3)  $P_1 = P_2$  (4)  $\frac{P_1}{P_1+P_2} = \frac{P_2}{P_1+2P_2}$

60. A basic buffer solution can be prepared from a mixture of -

- (1) Sodium acetate and acetic acid in water  
 (2) Ammonia and ammonium chloride in water  
 (3) (1) and (2) both  
 (4) Ammonia and sodium hydroxide in water

61. Brine solution on electrolysis will not give-

- (1) NaOH (2)  $Cl_2$   
 (3)  $H_2$  (4)  $O_2$

62. A first order reaction has a half life period of 69.3 sec. At 0.10 mol  $L^{-1}$  reactant concentration, rate will be-

- (1)  $10^{-4} M sec^{-1}$  (2)  $10^{-3} M sec^{-1}$   
 (3)  $10^{-1} M sec^{-1}$  (4)  $6.93 \times 10^{-1} M sec^{-1}$

63. An element ( $d = 6.8 gm cm^{-3}$ ) crystallises in bcc structure with cell edge of 290 pm. Calculate the number of atoms present in 200 g of the element-

- (1)  $24.09 \times 10^{23}$  atoms  
 (2)  $5.05 \times 10^{21}$  atoms  
 (3)  $12.03 \times 10^{23}$  atoms  
 (4)  $24.09 \times 10^{21}$  atoms

64. Which of the following is the most favorable conditions for real gas?

- (1) High pressure and high temperature.  
 (2) Low pressure and low temperature.  
 (3) Low pressure and high temperature  
 (4) High pressure and low temperature.

65. At high concentration of soap in water, soap behaves as....

- (1) molecular colloid (2) associated colloid  
 (3) macromolecular colloid (4) lyophilic colloid

66. Two oxides of a metal contain 50% and 60% oxygen respectively. If the formula of first oxide is  $MO_2$ , the formula of second oxide will be-

- (1)  $MO_2$  (2)  $MO_3$   
 (3)  $M_2O$  (4)  $M_2O_5$

67. Magnetic moment of  $X^{3+}$  ion of 3d series is  $\sqrt{35}$  BM. What is atomic number of  $X^{3+}$  ?

- (1) 25 (2) 26  
 (3) 27 (4) 28

68. The molecular mass of a gas which diffuse through a porous plug of  $1/6^{th}$  of the speed of hydrogen under identical conditions is-

- (1) 27 (2) 72 (3) 36 (4) 48

69. In which of the following equilibrium  $K_c$  and  $K_p$  are not equal ?

- (1)  $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$   
 (2)  $NO_2(g) + SO_2(g) \rightleftharpoons SO_3(g) + NO(g)$   
 (3)  $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$   
 (4)  $2C(s) + O_2(g) \rightleftharpoons 2CO_2(g)$

70. Which of the following reactions is associated with the most negative change in entropy ?

- (1)  $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{SO}_3(\text{g})$
- (2)  $\text{C}_2\text{H}_4(\text{g}) + \text{H}_2(\text{g}) \longrightarrow \text{C}_2\text{H}_6(\text{g})$
- (3)  $\text{C}(\text{s, graphite}) + \text{O}_2(\text{g}) \longrightarrow \text{CO}_2(\text{g})$
- (4)  $3\text{C}_2\text{H}_2(\text{g}) \longrightarrow \text{C}_6\text{H}_6(\text{g})$

71. In the reaction :  $\text{A}^{-n_2} + \text{x e}^- \longrightarrow \text{A}^{-n_1}$   
here x will be-

- (1)  $n_1 + n_2$
- (2)  $n_2 - n_1$
- (3)  $n_1 - n_2$
- (4)  $n_1 \cdot n_2$

72. Which of the following is arranged in order of increasing radius ?

- (1)  $\text{K}^+(\text{aq}) < \text{Na}^+(\text{aq}) < \text{Li}^+(\text{aq})$
- (2)  $\text{Na}^+(\text{aq}) < \text{K}^+(\text{aq}) < \text{Li}^+(\text{aq})$
- (3)  $\text{K}^+(\text{aq}) < \text{Li}^+(\text{aq}) < \text{Na}^+(\text{aq})$
- (4)  $\text{Li}^+(\text{aq}) < \text{Na}^+(\text{aq}) < \text{K}^+(\text{aq})$

73. Which one of the following is tridentate ligand?

- (1)  $\text{NO}_2^-$
- (2) Oxalate ion
- (3) Glycinate ion
- (4) Dien

74. Which one of the following platinum complexes is used in cancer chemotherapy ?

- (1) cis -  $[\text{PtCl}_2(\text{NH}_3)_2]$
- (2) trans -  $[\text{PtCl}_2(\text{NH}_3)_2]$
- (3)  $[\text{Pt}(\text{NH}_3)_4]^{2+}$
- (4)  $[\text{Pt}(\text{Cl}_4)]^{2-}$

75. In the extraction of silver,  $\text{Ag}_2\text{S}$  is dissolved in-

- (1)  $\text{HCl}$
- (2)  $\text{HNO}_3$
- (3)  $\text{KCN}$
- (4)  $\text{H}_2\text{SO}_4$

76. The following reactions take place in the blast furnace in the preparation of impure iron. Identify the reaction pertaining to the formation of the slag-

- (1)  $2\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow 2\text{CO}(\text{g})$
- (2)  $\text{Fe}_2\text{O}_3(\text{s}) + 3\text{CO}(\text{g}) \rightarrow 2\text{Fe}(\text{l}) + 3\text{CO}_2(\text{g})$
- (3)  $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
- (4)  $\text{CaO}(\text{s}) + \text{SiO}_2(\text{s}) \rightarrow \text{CaSiO}_3(\text{s})$

77. Maximum bond order is present in-

- (1)  $\text{N}_2^+$
- (2)  $\text{C}_2$
- (3)  $\text{N}_2$
- (4)  $\text{O}_2$

78. Which atom is tetravalent in ground state?

- (1) C
- (2) Si
- (3) both
- (4) None

79. In which of the following substances the carbon atom is arranged in a regular tetrahedral structure?

- (1) Diamond
- (2) Benzene
- (3) Graphite
- (4) Carbon black

80. Transition elements show variable oxidation states because they lose electrons from the following orbitals-

- (1) ns and np
- (2)  $(n-1)d$  and ns
- (3)  $(n-1)d$
- (4) ns

81. Incorrect statement for Be is-

- (1) Hardest s-block metal
- (2) least reactive s-block metal
- (3) Weakest reducing agent in s-block
- (4) Apple green flame colour

82. Which of the following alkali metals, generally forms superoxide ?

- (1) Li
- (2) Na
- (3) Rb
- (4) All of these

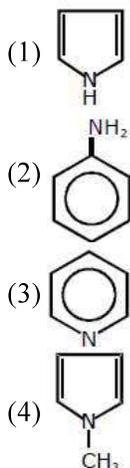
83. With respect to drug-enzyme interaction, identify the wrong statement-

- (1) Allosteric inhibitor competes with the enzyme's active site
- (2) Competitive inhibitor binds to the enzyme's active site
- (3) Non-competitive inhibitor binds to the allosteric site
- (4) Allosteric inhibitor changes the enzyme's active site

## Chemistry - Section B

Section B Shall Consist Of 15 (Fifteen) Questions In Each Subject. Candidate Needs To Attempt Any 10 (Ten) Questions Out Of 15 (Fifteen) In Each Subject.

86. Which of the following is most basic in nature?



87. Two solutions A and B are separated by a semipermeable membrane. If liquid flows from A to B then-

- (1) A is more concentrated than B
- (2) A is less concentrated than B
- (3) Both solutions have same concentration
- (4) None of the above

88. Which of the following is the ionisation constant of 0.01 M aniline (0.02% ionised)?

- (1)  $4.0 \times 10^{-4}$
- (2)  $4.0 \times 10^{-5}$
- (3)  $4.0 \times 10^{-9}$
- (4)  $4.0 \times 10^{-10}$

89. When the reactants are present at one mole per litre each the rate equation is, Rate =  $[A]^X[B]^{1/Y}[C]^{X/Y}$ . The order of the reaction is-

- (1)  $X + \frac{(1+X)}{Y}$
- (2)  $X - Y + \frac{X}{Y}$
- (3)  $X + Y + \frac{X}{Y}$
- (4)  $2(X + Y)$

90. (i)  $\text{Cu} + 2\text{HCl} \rightarrow \text{CuCl}_2 + \text{H}_2$ ;  $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34$  V

V

(ii)  $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$ ;  $E^\circ_{\text{Zn}^{2+}/\text{Zn}} = -0.76$  V

V

(iii)  $\text{Ag} + \text{HCl} \rightarrow \text{AgCl} + \frac{1}{2}\text{H}_2$ ;  $E^\circ_{\text{Ag}^+/\text{Ag}} = +0.80$  V

Which of the above reactions is feasible?

- (1) (ii)
- (2) (i)
- (3) (iii)
- (4) All of these

91. In a multi layered close-packed structure-

- (1) there are twice as many tetrahedral holes as there are close-packed atoms
- (2) there are as many tetrahedral holes as there are closed packed atoms
- (3) there are twice as many octahedral holes as there are close-packed atoms
- (4) there are as many tetrahedral holes as there are octahedral holes

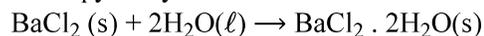
92. Following Hund's rule, which of the following element contains six unpaired electron-

- (1) Fe
- (2) Co
- (3) Ni
- (4) Cr

93. The decomposition of  $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$  is carried out at 573 K. When equilibrium is reached 0.2 mole of  $\text{N}_2\text{O}_4$  and  $2 \times 10^{-3}$  mole of  $\text{NO}_2$  are present in 2 L vessel. The equilibrium constant is

- (1)  $10^3$
- (2)  $10^{-5}$
- (3)  $10^6$
- (4)  $2 \times 10^{-5}$

94. The enthalpy of dissolution of  $\text{BaCl}_2$  (s) and  $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$  (s) are -20 and 8 kJ/mol. The enthalpy of hydration for-



- (1) -28 kJ
- (2) +28 kJ
- (3) -12 kJ
- (4) +12 kJ

95. The species given below that does NOT show disproportionation reaction is-

- (1)  $\text{BrO}_2^-$                       (2)  $\text{BrO}_4^-$   
(3)  $\text{BrO}^-$                         (4)  $\text{BrO}_3^-$

96. Which of the following complexes are not correctly matched with hybridisation of their central metal ion?

- (1)  $[\text{Ni}(\text{CN})_4]^{2-} - \text{sp}^3$   
(2)  $[\text{CoF}_6]^{3-} - \text{sp}^3\text{d}^2$   
(3)  $[\text{Fe}(\text{CN})_6]^{3-} - \text{d}^2\text{sp}^3$   
(4)  $[\text{Ni}(\text{CO})_4] - \text{sp}^3$

97. Which of the following is correct ?

- (1)  $\text{Li} > \text{Be}$  (IP)                (2)  $\text{Li} > \text{Be}$  (size)  
(3)  $\text{Li} < \text{Be}$  (EA)                (4)  $\text{Li} > \text{Be}$  (EN)

98. Bauxite has the formula-

- (1)  $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$                 (2)  $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$   
(3)  $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$                 (4)  $\text{KAlSi}_3\text{O}_8$

99. Which has the highest lattice energy?

- (1)  $\text{LiF}$                               (2)  $\text{LiCl}$   
(3)  $\text{NaCl}$                             (4)  $\text{MgO}$

100. Which of the following organic compounds has same hybridization as its combustion product  $\text{CO}_2$ ?

- (1) Ethane                            (2) Ethyne  
(3) Ethene                            (4) Ethanol

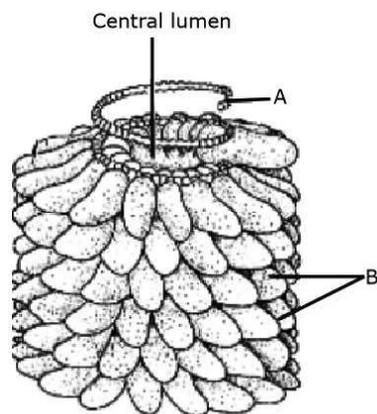
### Botany - Section A

Section A Shall Consist Of 35 (Thirty-five) Questions In Each Subject .All Questions Are Compulsory.

101. Prions consist mainly of :-

- (1) Protein                          (2) DNA  
(3) RNA                                (4) Both DNA and RNA

102. Study the given figure structure of TMV (Tobacco Mosaic Virus) and select the option that correctly identifies the labelling A and B :



- (1) ssDNA— Capsomeres                      (2) dsDNA— Capsomeres  
(3) ssRNA— Capsomeres                      (4) dsRNA— Tail fibres

103. Which of the following is diploid?

- (1) Egg                                (2) Synergids  
(3) Antipodals                      (4) Secondary nucleus

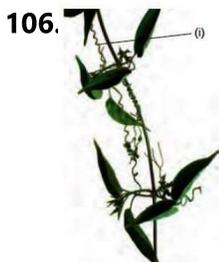
104. The respiratory quotient of germinating fatty seeds is :-

- (1)  $\infty$                                 (2) 1  
(3)  $< 1$                                 (4)  $> 1$

**105.** Match the following population interaction with the respective examples and the feature of relationship :

(a)	Commensalism	(p)	Balanus & Chathamalus	(t)	-
(b)	Mutualism	(q)	Sparrow feeding on grain	(u)	+, 0
(c)	Predation	(r)	Mycorrhizae	(v)	+, -
(d)	Competition	(s)	Orchid on mango branch	(w)	+, +

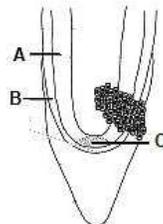
- (1)  
 a → q → u  
 b → p → w  
 c → s → t  
 d → r → v
- (2)  
 a → r → u  
 b → s → w  
 c → q → v  
 d → p → t
- (3)  
 a → s → u  
 b → r → w  
 c → q → v  
 d → p → t
- (4)  
 a → p → v  
 b → s → t  
 c → q → u  
 d → r → w



In the above diagram, (i) represents

- (1) Stipular tendril
- (2) Axillary bud modified into tendril
- (3) Leaf tendril
- (4) Stem tendril

**107.** Identify A, B and C indicated in the diagram of root apex given below :



- (1) A – Vascular bundle, B – Epidermis, C – Root apical meristem
- (2) A – Cortex, B – Epidermis, C – Root apical meristem
- (3) A – Cortex, B – Protoderm, C – root apical meristem
- (4) A – Cortex, B – Epidermis, C – Protoderm

**108.** Organisms living in salty areas are called as

- (1) Methanogens
- (2) Halophiles
- (3) Heliophytes
- (4) Thermoacidophiles.

**109.** In the light of recent classification of living organisms into three domains of life (bacteria, archaea and eukarya), which one of the following statements is true about archaea ?

- (1) Archaea completely differ from both prokaryotes and eukaryotes
- (2) Archaea completely differ from prokaryotes
- (3) Archaea resemble eukarya in all respects
- (4) Archaea have some novel features that are absent in other prokaryotes and eukaryotes

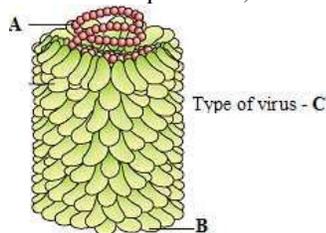
**110.** Archaeobacteria differ from eubacteria in:

- (1) Cell membrane
- (2) Mode of nutrition
- (3) Cell shape
- (4) Mode of reproduction

**111.** Select correctly match :-

- (a) Viroids – ssRNA
  - (b) Mycophage – DsRNA
  - (c) Cyanophage – DsDNA
  - (d) AIDS virus – ssRNA
- (1) Only a & b
  - (2) Only a, b & c
  - (3) Only b, c & d
  - (4) All a, b, c, d

112. Given below is the diagram of a virus. In which one of the options A, B and C are correct?



- (1) A - RNA, B - Capsid, C - Tobacco Mosaic Virus  
 (2) A - DNA, B - Capsid, C - Tobacco Mosaic Virus  
 (3) A - RNA, B - Lipid, C - Tobacco Mosaic Virus  
 (4) A - RNA, B - Protein, C - HIV

113. Production of maximum number of pollen grain is character of-

- (1) Entomophilous flowers  
 (2) Anemophilous flowers  
 (3) Hydrophilous flowers  
 (4) All of the above

114. During absorption of water by roots, the water potential of cell sap is lower than that of

- (1) Pure water and soil solution  
 (2) Neither pure water nor soil solution  
 (3) Pure water but higher than that of soil solution  
 (4) Soil solution but higher than that of pure water

115. Which one of the following acts as a barrier in the apoplastic pathway?

- (1) Epidermis  
 (2) Plasmodesmata  
 (3) Casparian strips  
 (4) Metaxylem

116. Electron flow in Z-scheme is necessary for the production of-

- (1) ATP  
 (2) NADH<sub>2</sub>  
 (3) ATP & NADH<sub>2</sub>  
 (4) ATP & NADPH<sub>2</sub>

117. The complete oxidation of Acetyl CoA into CO<sub>2</sub> and H<sub>2</sub>O occurs during-

- (1) Glycolysis  
 (2) Krebs's cycle  
 (3) Link reaction  
 (4) Calvin cycle

118. Maximum amount of macronutrients that is generally present in plant tissue is :-

- (1) 10.5 m mole kg<sup>-1</sup> of dry matter  
 (2) 9.5 m mole kg<sup>-1</sup> of dry matter  
 (3) 1.0 m mole kg<sup>-1</sup> of dry matter  
 (4) More than 10 m mole kg<sup>-1</sup> of dry matter

119. Which of the following molecules can be used by us as a source of energy?

- (1) Carbohydrates only  
 (2) Fats only  
 (3) Carbohydrates or fats  
 (4) Carbohydrates, fats and vitamins

120. In a mature seed the activity of enzyme amylase and lipase is respectively inhibited and promoted by :-

- (1) Auxin & Gibberellin  
 (2) Gibberellin & ABA  
 (3) Gibberellin & Auxin  
 (4) ABA & Gibberellin

121. Some species have evolved the ability to regulate but only over a limited range of environmental conditions, beyond which they can not regulate, they may be called as -

- (1) Regulator  
 (2) Conformer  
 (3) Partial regulator  
 (4) Partial conformer

122. What is common in hydrosere and lithosere ?

- (1) Pioneer community  
 (2) Moisture at starting  
 (3) Seral stages  
 (4) Climax community

123. A stable community should

- (1) Show too much variation in productivity  
 (2) Show regular disturbances  
 (3) Be resistant to disturbances  
 (4) Not show species richness

124. Select the **incorrect** statement about biodiversity:-

- (1) Increase from high to low latitudes  
 (2) Decrease in biodiversity promote niche specilization  
 (3) Habitat destruction or loss is the primary cause for the loss of biodiversity  
 (4) Amount of energy decrease at successive trophic level

**125.**Electrostatic precipitators are used to remove :

- (1) SO<sub>2</sub> pollution            (2) Particulate matter  
(3) CO<sub>2</sub> pollution            (4) NO<sub>x</sub> pollution

**126.**Prime contaminants leading to cultural or accelerated eutrophication are -

- (1) Fecal matter and paper fibres  
(2) Sand and clay  
(3) Phosphates and nitrates  
(4) Nitrates and sulphates

**127.**Five stamen, in epipetalous condition found in:

- (1) In tomato                    (2) In potato  
(3) In Brinjal                    (4) all of these

**128.**First formed primary xylem elements are called ....A.... Later formed primary xylem elements are called ....B.....

A and B in the above statement refers to :

- (1) A–metaxylem, B–protoxylem  
(2) A–Protoxylem, B– metaxylem  
(3) A–Protophloem, B– metaphloem  
(4) A– metaphloem, B– Protophloem

**129.**Reason for Mendel's success in his experiment is:-

- (1) Study the inheritance of one or two character at a time  
(2) Selection of sweet pea  
(3) He studied 7 characters  
(4) He did not know about the linkage

**130.**Tall (T) is completely dominant over dwarf(t). Red flower colour (R) is incompletely dominant over white (r), the heterozygote being pink. Plant having genotype of TtRr is self pollinated. What would be the proportion of plants with dwarf and pink characters in its progeny?

- (1)  $\frac{2}{16}$                             (2)  $\frac{1}{16}$   
(3)  $\frac{9}{16}$                             (4)  $\frac{3}{16}$

**131.**Sex linked disease mostly :-

- (1) Dominant                    (2) Recessive  
(3) Codominant                (4) Incomplete dominant

**132.**DNA is chemically less reactive than RNA due to :-

- (1) DNA is double stranded  
(2) Absence of 2' OH group at every nucleotide in DNA  
(3) Presence of complementary base pairing  
(4) Presence of 2' OH group at every nucleotide in DNA

**133.**When DNA replication starts :

- (1) The leading strand produces Okazaki fragments.  
(2) The hydrogen bonds between the nucleotides of two strands break.  
(3) The phosphodiester bonds between the adjacent nucleotides break.  
(4) The bonds between the nitrogen base and deoxyribose sugar break.

**134.**During splicing of hn-RNA, which enzyme attached 7mG cap on it's 5<sup>th</sup> end :-

- (1) Poly 'A' polymerase    (2) Guanyl transferase  
(3) RNA polymerase        (4) Both (A) and (B)

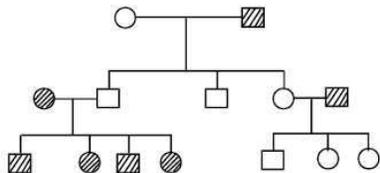
**135.**Which plant breeding step is very tedious and time-consuming

- (1) Selection and testing of superior recombinants  
(2) Cross hybridisation among the selected parents  
(3) Collection of variability  
(4) Evaluation and selection of parents

## Botany - Section B

Section B Shall Consist Of 15 (Fifteen) Questions In Each Subject. Candidate Needs To Attempt Any 10 (Ten) Questions Out Of 15 (Fifteen) In Each Subject.

**136.** Study the given pedigree carefully, the trait indicated is :-



- (1) Autosomal recessive □ : Normal male  
 (2) X-linked recessive ■ : Affected male  
 (3) Maternal imprinting ○ : Normal female  
 (4) Paternal imprinting ● : Affected female

**137.** A flower which never opens and its pollen grains pollinate the carpel to fertilize the ovules is called:-

- (1) Polygamous                      (2) Allogamous  
 (3) Monocarpic                      (4) Cleistogamous

**138.** In which structure of the Angiosperms, micropyle is present :-

- (1) Ovule                                  (2) Pollen grain  
 (3) Seed                                    (4) Both (1) & (3)

**139.** Protandry and protogyny is useful in .

- (1) Self Pollination                  (2) Quick fertilisation  
 (3) Cross Pollination                (4) Delayed fertilisation

**140.** The assimilatory power utilized during CO<sub>2</sub> assimilation in photosynthetic plants is:

- (1) ATP                                    (2) NADPH + H<sup>+</sup>  
 (3) NADH + H<sup>+</sup>                        (4) Both ATP and NADPH + H<sup>+</sup>

**141.** Match Column-I with Column-II and select the correct option.

Column-I	Column-II
(a) Denitrifying bacteria	(i) Thiobacillus
(b) Aerobic bacteria	(ii) Azotobacter
(c) Anaerobic bacteria	(iii) Rhodospirillum
(d) Cyanobacteria	(iv) Nostoc

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

**142.** Photorespiration occurs in -

- (1) Plants having dimorphic chloroplasts  
 (2) Plants possessing Kranz anatomy  
 (3) C<sub>3</sub> plant  
 (4) Both C<sub>4</sub> and C<sub>3</sub> plants

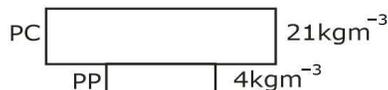
**143.** What is the type of ecological relationship that can involve either members of the same species or different species and in which both participants are harmed ?

- (1) Mutualism                            (2) Parasitism  
 (3) Competition                        (4) Amensalism

**144.** Current species extinction is known as:

- (1) Natural extinction                  (2) Mass extinction  
 (3) 6<sup>th</sup> mass extinction                (4) 6<sup>th</sup> mass extinction

**145.** What does the given ecological pyramid represent?



- (1) Inverted pyramid of number in pond  
 (2) Role of decomposers  
 (3) Inverted pyramid of biomass in pond  
 (4) Pyramid of biomass in a forest ecosystem

**146.** Match the Columns I and II, and choose the correct combination from the options given.

	Column I	Column II
a	When stamens united into more than two bundles	1 Epipetalous
b	When stamens are attached to the petals	2 Epiphyllous
c	When stamens are attached with perianth	3 Diadelphous
		4 Polyadelphous

- (1) a – 3, b – 1, c – 2 (2) a – 4, b – 1, c – 2  
 (3) a – 3, b – 2, c – 1 (4) a – 4, b – 2, c – 1

**147.** The cells of quiescent centre are characterised by:

- (1) Quick division  
 (2) Dead cells  
 (3) Having dense cytoplasm and prominent nuclei  
 (4) Less DNA, RNA

**148.** Which of the following cross produces 3 : 1 phenotypic ratio in F<sub>2</sub> - generation :-

- (1) AA × aa (2) Aa × aa  
 (3) Aa × Aa (4) Aa × AA

**149.** A mutational event which changes the codon UGG to UAG is known as :-

- (1) Mis-sense mutation (2) Same-sense mutation  
 (3) Non-sense mutation (4) None of these

**150.** Read the following four statements (A-D):

- (A) In transcription, adenine pairs with uracil.  
 (B) Regulation of lac operon by repressor is referred to as positive regulation.  
 (C) The human genome has approximately 50,000 genes.  
 (D) Haemophilia is a sex-linked recessive disease.  
 How many of the above statements are right?

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

### Zoology -Section A

Section A Shall Consist Of 35 (Thirty-five) Questions In Each Subject .All Questions Are Compulsory.

**151.** The book 'origin of species' was published in :-

- (1) 1809 (2) 1859  
 (3) 1858 (4) 1956

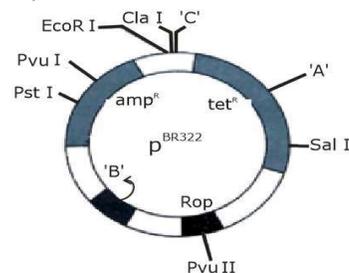
**152.** Which of the following is closest relative of human:-

- (1) Lemur (2) Loris  
 (3) Gibbon (4) Gorilla

**153.** Which one possesses striated muscles ?

- (1) Gall Bladder (2) Leg muscles  
 (3) Bronchial wall (4) Lungs.

**154.** In the following figure of vector P<sup>BR322</sup> identify A, B and C :



- (1) A – Hind III,  
 B – rop site,  
 C – BamH I  
 (2) A – BamH I,  
 B – rop site,  
 C – Hind III  
 (3) A – BamH I,  
 B – Ori,  
 C – Hind II  
 (4) A – BamH I,  
 B – Ori,  
 C – Hind III

**155.**The conditions under which amino acid molecules might have become bounded together to form the first protein molecules was suggested by :-

- (1) Stanley Miller           (2) Sydney Fox  
(3) Harold Urey           (4) A.I. Oparin

**156.**Dinosaurs are :

- (1) Primitive amphibians (2) Extinct reptiles  
(3) Giant mammals       (4) Primitive mammals

**157.**Selective breeding, progeny testing and improvement are taking place in

- (1) Cattle                   (2) Buffalo  
(3) Sheep                   (4) Annual food crops

**158.**Digestion of Carbohydrate is affected by -

- (1) Amylopsin           (2) Lipase  
(3) Erepsin               (4) Pepsin

**159.**The pancreatic juice contains various enzymes except-

- (1) Pepsinogen           (2) Trypsinogen  
(3) Chymotrypsinogen   (4) Procarboxypeptidases

**160.**Which of the following is regarded as the source of instant energy ?

- (1) Fats                    (2) Carbohydrates  
(3) Protein               (4) Mineral and Vitamins

**161.**Which sugar occurs only in mammals?

- (1) Trehalose           (2) Galactose  
(3) Lactose               (4) Mannose

**162.**Read the following statements (A–D) :

- (A) Electrical synapse are bidirectional.  
(B) Transmission of an impulse across electrical synapse is very similar to impulse conduction alone a single axon.  
(C) In electrical synapse, axon terminal contain vesicles filled with neurotransmitters.  
(D) Electric current can flow directly from one neuron to another neuron in electrical synapse.  
How many of the above statements are not wrong?

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

**163.**Fill up the blanks.

- I. Ethanol is produced by .....A.....  
II. Large scale production of beverages in industries is done in very large vessels called .....B.....  
III. Penicillin is discovered by .....C.....  
IV. LAB checks disease causing microbes in .....D.....

- (1) A-virus, B-fermentors, C-Alexander Fleming, D-intestine  
(2) A-yeast, B-Fermentors, C-Alexander Fleming, D-stomach  
(3) A-bacteria, B-fermentors, C-S Waksman, D-Chest  
(4) A-bacteria, B-Fermentors, C-S Waksman, D-liver

**164.**What is insertional inactivation?

- (1) Inactivation of the host cell  
(2) Inactivation of plasmid  
(3) Inactivation of the gene for the synthesis of the enzyme  
(4) Inactivation of ori site

**165.**Significance of heat shock method in bacterial transformation is to facilitate

- (1) Binding of DNA to the cell wall  
(2) Uptake of DNA through membrane transport proteins.  
(3) Uptake of DNA through transient pores in the bacterial cell wall  
(4) Expression of antibiotic resistance gene.

166. Tobacco plants resistant to nematodes have been developed by introduction of DNA that produces :

- (1) Both sense and antisense RNA
- (2) An antifeedent
- (3) A toxic protein
- (4) A particular hormone

167. Which of the following statements is incorrect about gene therapy in ADA deficiency?

- (1) Lymphocytes from patient's blood are taken out and cultured.
- (2) A functional ADA, cDNA is introduced into these lymphocytes
- (3) Lymphocytes are then introduced in the body of patient.
- (4) Patient does not require periodic infusion of genetically engineered lymphocytes.

168. Which of the following is true for cell wall of higher plants?

- (1) It may possess protein
- (2) Primary wall is formed inner to the secondary wall
- (3) Galactans, mannans and  $\text{CaCO}_3$  are present in abundance
- (4) It is rarely traversed by plasmodesmata

169. Which of the following is associated with detoxification of drugs and muscle contraction by the release and uptake of  $\text{Ca}^{2+}$  ions ?

- (1) Golgi complex
- (2) RER
- (3) SER
- (4) Free ribosomes

170. Which of the following statements is correct about chloroplast?

- (1) They are single membranous structures
- (2) They contain ds circular DNA
- (3) The ribosomes in stroma of chloroplast are 80S
- (4) Inner membrane is relatively more permeable

171.  $G_2$  phase is not associated with :-

- (1) Synthesis of some non-histone proteins
- (2) Synthesis of tubulin proteins for spindle fibres
- (3) DNA synthesis
- (4) Some organelles synthesis

172. In which of the following stage chromosomes are arranged at equatorial plate-

- (1) Anaphase
- (2) Metaphase
- (3) Prophase
- (4) Telophase

173. The steroid hormone responsible for balance of water and electrolytes in our body is

- (1) Thyroid hormone
- (2) ADH
- (3) Cortisol hormone
- (4) Aldosterone hormone

174. Joint between centrum of adjacent vertebrae in vertebral column is \_\_\_\_\_ and it permits limited movement.

Choose the correct option for blank given above:

- (1) Fibrous joint
- (2) Synovial joint
- (3) Diarthrosis
- (4) Cartilagenous joint

175. Sliding filament theory can be best explained as-

- (1) Actin and myosin filaments do not shorten but rather slide pass each other.
- (2) When myofilaments slide pass each other, myosin filaments shorten while actin filaments do not shorten.
- (3) When myofilaments slide pass each other actin filaments shorten while myosin filament do not shorten.
- (4) Actin and myosin filaments shorten and slide pass each other.

176. Under normal physiological condition every 100 ml of deoxygenated blood delivers ..... $\text{CO}_2$  to the alveoli :

- (1) 20 ml
- (2) 15 ml
- (3) 4 ml
- (4) 5 ml

177. Which of the following options correctly represents the lung conditions in asthma and emphysema, respectively ?

- (1) Inflammation of bronchioles; Decreased respiratory surface
- (2) Increased number of bronchioles; Increased respiratory surface
- (3) Increased respiratory surface; Inflammation of bronchioles
- (4) Decreased respiratory surface; Inflammation of bronchioles

178. Find out the **correct** statements regarding cyclostomes:

- (i) Sucking and circular mouth without jaws
- (ii) Body is devoid of scales and paired fins.
- (iii) Cranium and vertebral column are cartilaginous.
- (iv) Their larvae after metamorphosis, return to the fresh water.
- (v) Open circulation.

- (1) i, ii, iv                      (2) i, iii, v  
(3) i, ii, iii                      (4) ii, iv, v

179. Which of the following **STD** is not completely curable?

- (1) Gonorrhoea                      (2) Genital warts  
(3) Genital herpes                      (4) Chlamydia

180. The partial pressure of oxygen in the alveoli of the lungs is :

- (1) Less than that in the blood  
(2) Less than that of carbon dioxide  
(3) Equal to that in the blood  
(4) More than that in the blood

181. In majority of humans, the loop of Henle is :

- (1) Too short and extends only very little into the cortex.  
(2) Too long and extends very deep into the cortex.  
(3) Too short and extends only very little into the medulla.  
(4) Too long and extends very deep into the medulla.

182. GnRH, a hypothalamic hormone, needed in reproduction, acts on:

- (1) anterior pituitary gland and stimulates secretion of LH and FSH  
(2) posterior pituitary gland and stimulates secretion of oxytocin and FSH  
(3) posterior pituitary gland and stimulates secretion of LH and relaxin.  
(4) anterior pituitary gland and stimulates secretion of LH and oxytocin

183. Consider the following four statements (a-d) and select the option which includes all the **correct**,

- (a) Henle's loop plays a significant role in the maintenance of high osmolarity of medullary interstitial fluid  
(b) Collecting duct plays a role in the maintenance of pH and ionic balance of blood by the selective secretion of  $H^+$  and  $K^+$  ions. :  
(c) Conditional reabsorption of  $Na^+$  and water takes place in DCT  
(d) Nearly all of the essential nutrients and 70-80 percent of electrolytes and water are reabsorbed by DCT.

- (1) Statements (a), (b), (c)                      (2) Statements (a), (c), (d)  
(3) Statements (b), (c)                      (4) Statements (c), (d)

184. Which of the following bone is not a part of **Appendicular skeleton**?

- (1) Humerus                      (2) Tibia  
(3) Scaphoid                      (4) Sternum

185. For delaying pregnancy or spacing children, the ideal contraceptive is :

- (1) Vasectomy                      (2) Tubectomy  
(3) IUD                      (4) Oral contraceptive

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### Zoology -Section B

Section B Shall Consist Of 15 (Fifteen) Questions In Each Subject. Candidate Needs To Attempt Any 10 (Ten) Questions Out Of 15 (Fifteen) In Each Subject.

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**186.** Different types of excretory structures and animals are given below. Match them appropriately and mark the **correct** answer from among those given below :

	Excretory structure/organ		Animals
(A)	Protonephridia	(i)	Prawn
(B)	Nephridia	(ii)	Cockroach
(C)	Malpighian tubules	(iii)	Earthworm
(D)	Green gland or Antennal gland	(iv)	Flatworms

- (1) A - (iv), B - (iii), C - (ii), D - (i)  
(2) A - (iv), B - (ii), C - (iii), D - (i)  
(3) A - (iii), B - (iv), C - (ii), D - (i)  
(4) A - (iv), B - (iii), C - (i), D - (ii)

**187.** How many cranial and spinal nerves respectively present in human beings?

- (1) 10 and 31                      (2) 12 and 31  
(3) 20 and 62                      (4) 24 and 62

**188.** Number of carnial nerves in mammals are :

- (1) 10 pairs                      (2) 8 pairs  
(3) 12 pairs                      (4) 16 pairs

**189.** The membranes enclosing the brain and spinal cord are known as

- (1) Meninges                      (2) Meningitis  
(3) Nephron                      (4) Axon

**190.** ECG is a measure of -

- (1) Rate of heart beat  
(2) Difference in electric potential  
(3) Volume of blood pumped  
(4) Ventricular contraction

**191.** The enzyme recombinase is required at which stage of meiosis?

- (1) Pachytene                      (2) Zygotene  
(3) Diplotene                      (4) Diakinesis

**192.** A chromosome having centromere at the middle is?

- (1) Metacentric                      (2) Acrocentric  
(3) Telocentric                      (4) Dicentric

**193.** Stickness of the sticky ends of the DNA facilitates the :

- (1) Action of DNA polymerase and these ends joined together laterally  
(2) Action of DNA ligase and these ends joined together end-to-end  
(3) Action of Taq polymerase  
(4) Action of restriction enzyme

**194.** Which of the following is a mismatch regarding the transgenic plant and its application :

- (1) Golden rice → Vitamin A enriched rice  
(2) Flavr savr tomato → Delay ripening  
(3) Tobacco → herbicide resistant  
(4) Bt corn → Resistant to nematode

**195.** Read the following four statements (A–D). Find out the true (T) and false (F) statements:

- (A) Catecholamines stimulate the breakdown of glycogen, resulting in an increased concentration of glucose in blood.  
(B) Thymosin play a major role in the differentiation of T-lymphocytes which provide cell mediated immunity.  
(C) Aldosterone stimulates the reabsorption of  $K^+$  and phosphate ions and excretion of  $Na^+$  and water.  
(D) Insulin is a peptide hormone, which reduces the cellular glucose uptake and utilisation.

- (1) (A)-T, (B)-F, (C)-T, (D)- F  
(2) (A)-T, (B)-T, (C)-F, (D)- F  
(3) (A)-F, (B)-T, (C)-F, (D)- T  
(4) (A)-T, (B)-T, (C)-T, (D)- F



**196.** Which is **not** included in the female accessory ducts ?

- (1) Fallopian tubes
- (2) Clitoris
- (3) Uterus
- (4) Vagina

**197.** Which of the following is pseudo coelomate animal-

- (1) Hook-worm
- (2) Sand-worm
- (3) Flat - worm
- (4) Tape worm

**198.** In which disease does mosquito transmitted pathogen cause chronic inflammation of lymphatic vessels?

- (1) Ringworm disease
- (2) Ascariasis
- (3) Elephantiasis
- (4) Amoebiasis

**199.** Select the correct statements regarding the characteristics of acquired immunity-

- (a) Cell- mediated immunity is responsible for rejection of Graft.
- (b) Primary immune response is slow and of low intensity
- (c) Active and passive immunity are types of acquired immunity.
- (d) Polymorphonuclear leucocytes and natural killer cells are involved in acquired immunity.

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

**200.** Which of the following immune responses is responsible for rejection of kidney graft?

- (1) Inflammatory immune response
- (2) Cell-mediated immune response
- (3) Auto-immune response
- (4) Humoral immune response

# STEPS TO APPEAR FOR THE TEST & GET RESULTS



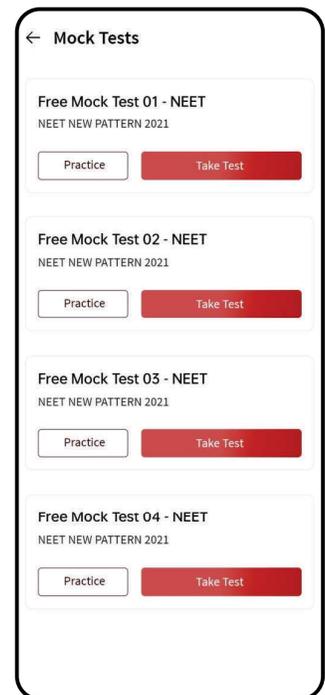
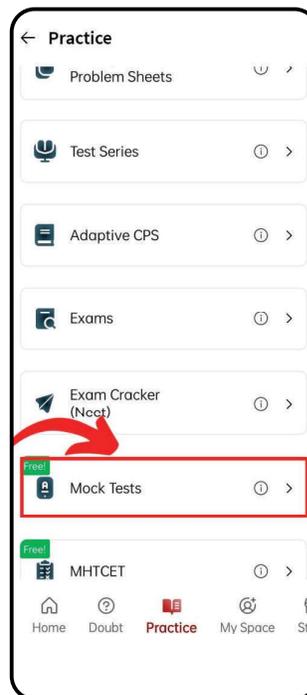
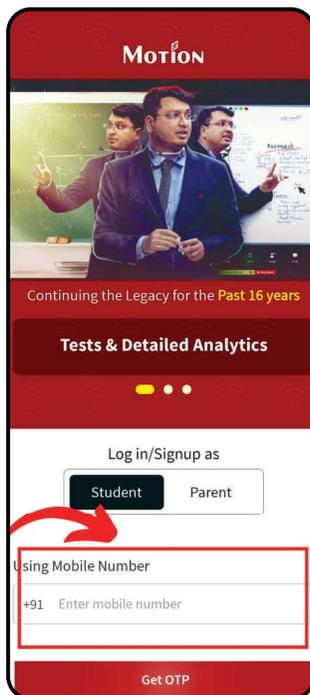
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