



FULL PAPER TEST -1

Total Marks : 720

Duration : 180

## Physics

- 1) The de-Broglie wavelength of electrons falling on the target in an X-ray tube is  $\lambda$ . The cut-off wavelength of the emitted X-ray is:

( $\lambda_0$ )

(1)  $\lambda_0 = \frac{(mc\lambda)^2}{h}$

(2)  $\lambda_0 = \frac{m^2c\lambda}{h^2}$

(3)  $\lambda_0 = \frac{2mc\lambda^2}{h}$

(4)  $\lambda_0 = \frac{mc\lambda^2}{h^2}$

- 2) At what temperature will the RMS speed of oxygen molecules become just sufficient for escaping from the Earth's atmosphere?

(mass of oxygen molecule ( $m$ ) =  $2.76 \times 10^{-26} \text{ kg}$ , Boltzmann's constant  $k_B = 1.38 \times 10^{-23} \text{ JK}^{-1}$ )

(1)  $5.016 \times 10^4 \text{ K}$

(2)  $8.360 \times 10^4 \text{ K}$

(3)  $2.508 \times 10^4 \text{ K}$

(4)  $1.254 \times 10^4 \text{ K}$

- 3) An electron and proton have the same de-Broglie wavelength. The kinetic energy of the electron is:

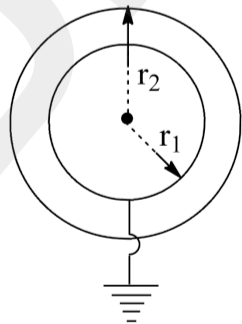
(1) Zero

(2) Infinity

(3) Equal to the kinetic energy of the proton

(4) Greater than the kinetic energy of the proton

- 4) Two concentric metallic shells are of radii  $r_1$  and  $r_2$  ( $r_2 > r_1$ ). If charge given to outer sphere is  $q$ , and the inner sphere is grounded. Then the charge on the inner sphere  $q^1$  is



(1) Zero

(2)  $-q$

(3)  $-\frac{r_1}{r_2}q$

(4)  $\frac{r_1}{r_2}q$

- 5) A photocell is illuminated by a small bright source placed 1 m away. When the same source of light is placed 0.5 m away, the number of electrons emitted by photocathode would:

(1) Decrease by a factor of 2

(2) Increase by a factor of 2

(3) Decrease by a factor of 4

(4) Increase by a factor of 4

- 6) The de Broglie wavelength of 0.08 eV neutron will be: (mass of neutron =  $1.67 \times 10^{-27} \text{ kg}$ )

(1)  $1.01 \times 10^{-16} \text{ m}$

(2)  $1.01 \times 10^{-6} \text{ m}$

(3)  $1.01 \times 10^{-10} \text{ m}$

(4)  $1.01 \times 10^{-12} \text{ m}$

- 7) The photoelectric threshold wavelength of silver is  $3250 \times 10^{-10} \text{ m}$ . The velocity of the electron ejected from a silver surface by ultraviolet light of wavelength  $2536 \times 10^{-10} \text{ m}$  is : (Given  $h = 4.14 \times 10^{-15} \text{ eVs}$  and  $c = 3 \times 10^8 \text{ ms}^{-1}$ )

(1)  $\approx 6 \times 10^6 \text{ ms}^{-5}$

(2)  $\approx 0.6 \times 10^6 \text{ ms}^{-1}$

(3)  $\approx 61 \times 10^3 \text{ ms}^{-1}$

(4)  $\approx 0.3 \times 10^6 \text{ ms}^{-6}$

- 8) In potentiometer experiment the balancing length is 600 cm when the cell is in open circuit and 400 cm when it is closed circuited with a resistance  $2 \Omega$ . The internal resistance of the cell is

(1)  $1 \Omega$

(2)  $2 \Omega$

(3)  $3 \Omega$

(4)  $4 \Omega$

- 9) The kinetic energy of a 300 K thermal neutron is

(1) 300 eV

(2) 300 ev

(3) 0.388 eV

(4) 0.026 Mev

- 10) When NPN transistor is used as an amplifier

(1) Electrons move from base to collector

(2) Holes move from emitter to base

(3) Electrons move from collector to base

(4) Holes move from base to emitter

- 11) The current amplification of the common base NPN transistor is 0.96. What is the current gain if it is used as common emitter amplifier?

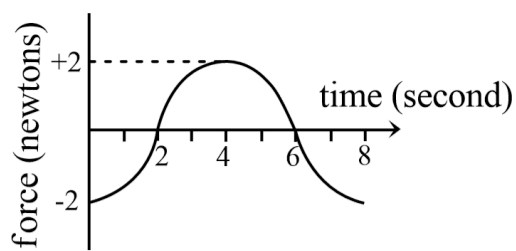
(1) 16

(2) 20

(3) 24

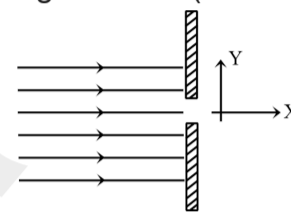
(4) 32

- 12) A force-time graph for a linear motion is shown in the figure where the segments are circular. The linear momentum gained between 0 s and 8 s is

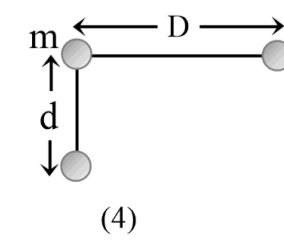
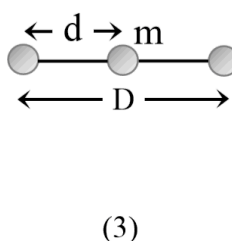
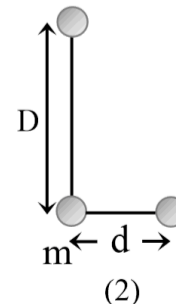
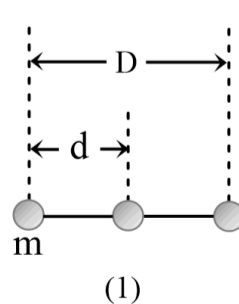


- (1)  $-2 \text{ newton} \times \text{second}$   
 (2)  $\text{zero newton} \times \text{second}$   
 (3)  $+4 \text{ newton} \times \text{second}$   
 (4)  $-6 \text{ newton} \times \text{second}$
- 13) A black hole is an object whose gravitational field is so strong that even light cannot escape from it. To what approximate radius would earth (mass =  $5.98 \times 10^{24} \text{ kg}$ ) have to be compressed to be a black hole?  
 (1)  $10^{-6} \text{ m}$   
 (2)  $10^{-2} \text{ m}$   
 (3)  $100 \text{ m}$   
 (4)  $10^{-9} \text{ m}$
- 14) The correct relation for  $\alpha$ ,  $\beta$  for a transistor is:  
 (1)  $\beta = \frac{1-\alpha}{\alpha}$   
 (2)  $\beta = \frac{\alpha}{1-\alpha}$   
 (3)  $\alpha = \frac{\beta-1}{\beta}$   
 (4)  $\alpha\beta = 1$
- 15) The de-Broglie wavelength of an electron moving with a velocity  $c/2$  ( $c$  = velocity of light in vacuum) is equal to the wavelength of a photon. The ratio of the kinetic energies of electrons and photon is  
 (1)  $1 : 4$   
 (2)  $1 : 2$   
 (3)  $1 : 1$   
 (4)  $2 : 1$
- 16) For a transistor, in a common emitter arrangement, the alternating current gain  $\beta$  is given by  
 (1)  $\beta = \left( \frac{\Delta I_C}{\Delta I_B} \right)_{V_C}$   
 (2)  $\beta = \left( \frac{\Delta I_B}{\Delta I_C} \right)_{V_C}$   
 (3)  $\beta = \left( \frac{\Delta I_C}{\Delta I_E} \right)_{V_C}$   
 (4)  $\beta = \left( \frac{\Delta I_E}{\Delta I_C} \right)_{V_C}$
- 17) The specific heat capacity of an ideal monoatomic gas in the process  $U = \alpha V$ , where  $\alpha$  is a positive constant, is (assume that internal energy vanishes at absolute zero)  
 (1)  $\frac{5}{2}R$   
 (2)  $R$   
 (3)  $\frac{3}{2}R$   
 (4)  $\frac{7}{2}R$

- 18) A load of  $1 \text{ kg}$  weight is attached to one end of a steel wire of cross sectional area  $3 \text{ mm}^2$  and Young's modulus  $10^{11} \text{ N/m}^2$ . The other end is suspended vertically from a hook on a wall, then the load is pulled horizontally and released. When the load passes through its lowest position the fractional change in length is ( $g = 10 \text{ m/s}^2$ )  
 (1)  $10^{-4}$   
 (2)  $10^{-3}$   
 (3)  $10^3$   
 (4)  $10^4$
- 19) A parallel beam of electrons travelling in x-direction falls on a slit of width  $d$  (see figure). If after passing the slit, an electron acquires momentum  $p_y$  in the y-direction then for a majority of electrons passing through the slit: ( $h$  is Planck's constant)

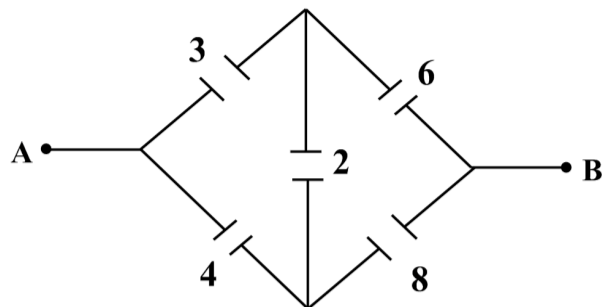


- (1)  $|p_y| d \simeq h$   
 (2)  $|p_y| d > h$   
 (3)  $|p_y| d < h$   
 (4)  $|p_y| d \gg h$
- 20) The work function for a certain metal is  $3.2 \times 10^{-19} \text{ J}$  and it is illuminated with light of frequency  $8 \times 10^{14} \text{ Hz}$ . The maximum kinetic energy of the photo-electrons would be: ( $h = 6.63 \times 10^{-34} \text{ Js}$ )  
 (1)  $2.1 \times 10^{-19} \text{ J}$   
 (2)  $8.5 \times 10^{-19} \text{ J}$   
 (3)  $5.3 \times 10^{-19} \text{ J}$   
 (4)  $3.2 \times 10^{-19} \text{ J}$
- 21) A satellite is revolving around a planet of mass ' $m$ ' in an elliptical orbit of semi major axis ' $a$ '. The orbital velocity of the satellite at a distance ' $r$ ' from the focus will be  
 (1)  $\sqrt{GM \left( \frac{2}{r} - \frac{1}{a} \right)}$   
 (2)  $\sqrt{GM \left( \frac{1}{r} - \frac{2}{a} \right)}$   
 (3)  $\sqrt{GM \left( \frac{2}{r^2} - \frac{1}{a^2} \right)}$   
 (4)  $\sqrt{GM \left( \frac{1}{r^2} - \frac{2}{a^2} \right)}$
- 22) The figure shows four arrangements of three particles of equal masses. Rank the arrangement according to the magnitude of the gravitational force on the particle  $m$ , greatest first.



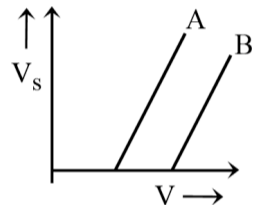
- (1) 1, tie of 2 and 4, then 3
- (2) 1, 4, 3, 2
- (3) 2, 3, 4, 1
- (4) 4, 3, 1, 2

23) Effective capacitance between A and B in the figure shown is (all capacitance are in  $\mu\text{F}$ )



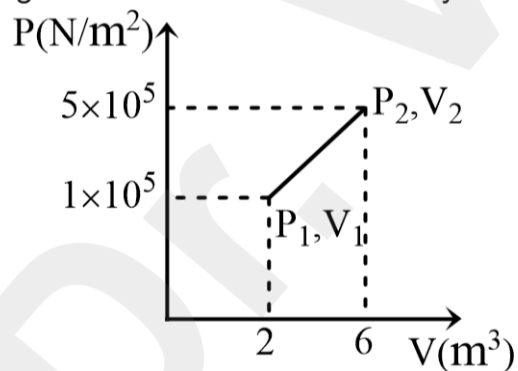
- (1)  $21 \mu\text{F}$
- (2)  $23 \mu\text{F}$
- (3)  $\frac{3}{14} \mu\text{F}$
- (4)  $\frac{14}{3} \mu\text{F}$

24) The stopping potential as a function of the frequency of incident radiation is plotted for two different photoelectric surfaces A and B. The graph shows that the work function of A is



- (1) Greater than that of B
- (2) Smaller than that of B
- (3) Same as that of B
- (4) Such that no comparison can be done from given graphs

25) A system changes from the state  $(P_1, V_1)$  to  $(P_2, V_2)$  as shown in the figure. What is the work done by the system?



- (1)  $7.5 \times 10^5 \text{ J}$
- (2)  $7.5 \times 10^5 \text{ erg}$
- (3)  $12 \times 10^5 \text{ J}$
- (4)  $6 \times 10^5 \text{ J}$

26) For a transistor,  $\alpha_{dc}$  and  $\beta_{dc}$  are the current ratios, then the value of  $\frac{\beta_{dc} - \alpha_{dc}}{\alpha_{dc} \cdot \beta_{dc}}$  is

- (1) 1
- (2) 1.5
- (3) 2
- (4) 2.5

27) A cathode emits  $1.8 \times 10^{14}$  electrons per second, when heated. When 400 V is applied to anode, all the emitted electrons reach the anode. The charge on electron is  $1.6 \times 10^{-19}$  C. The maximum anode current is:

- (1)  $2.7 \mu\text{A}$
- (2)  $29 \mu\text{A}$

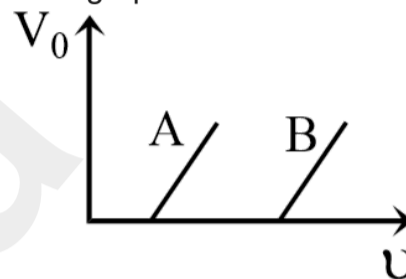
(3)  $72 \mu\text{A}$

(4) 29 mA

28) The molar specific heats of an ideal gas at constant pressure and volume are denoted by  $C_p$  and  $C_v$  respectively. If  $\gamma = \frac{C_p}{C_v}$  and R is the universal gas constant, then  $C_v$  is equal to

- (1)  $\frac{1+\gamma}{1-\gamma}$
- (2)  $\frac{R}{(\gamma-1)}$
- (3)  $\frac{(\gamma-1)}{R}$
- (4)  $\gamma R$

29) The stopping potential as a function of the frequency of the incident radiation is plotted for two different photoelectric surfaces A and B. The graphs show that work function of A is



- (1) Greater than that of B
- (2) Smaller than that of B
- (3) Equal to that of B
- (4) No inference can be drawn about their work functions from the given graphs

30) In case of NPN-transistors the collector current is always less than the emitter current because

- (1) Collector side is reverse biased and emitter side is forward biased
- (2) After electrons are lost in the base and only remaining ones reach the collector
- (3) Collector side is forward biased and emitter side is reverse biased
- (4) Collector being reverse biased attracts less electrons

31) What will be the ratio of de-Broglie wavelengths of proton and  $\alpha$ -particle of the same energy?

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

32) The de-Broglie wavelength associated with a hydrogen molecule moving with a thermal velocity of 3 km/s will be:

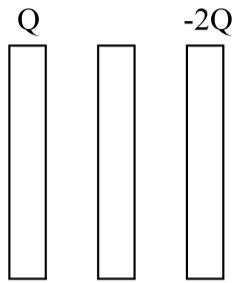
- (1)  $1 \text{ \AA}$
- (2)  $0.66 \text{ \AA}$
- (3)  $6.6 \text{ \AA}$
- (4)  $66 \text{ \AA}$

33) In a PNP transistor the base is the N-region. Its width relative to the P-region is

- (1) Smaller
- (2) Larger
- (3) Same

(4) Not related

- 34) Three identical metal plates with large surface area are kept parallel to each other as shown in the figure. The leftmost plate is given a charge  $Q$ , the rightmost a charge  $-2Q$  and the middle one remains neutral. The charge appearing on the outer surface of the rightmost plate is:



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

- 35) If the work function of a metal is  $\Phi$  and the frequency of the incident light is  $\nu$ , there is no emission of photoelectrons if:

- (1)  $\nu < \frac{\phi}{h}$   
 (2)  $\nu = \frac{\phi}{h}$   
 (3)  $\nu > \frac{\phi}{h}$   
 (4)  $\nu \geq \frac{\phi}{h}$

- 36) Three particles each of mass  $m$  are kept at the vertices of an equilateral triangle of side  $L$ . The gravitational field at centre due to these particles is:

- (1) Zero  
 (2)  $\frac{3GM}{L^2}$   
 (3)  $\frac{9GM}{L^2}$   
 (4)  $\frac{12}{\sqrt{3}} \frac{GM}{L^2}$

- 37) A photon collides with a stationary hydrogen atom in ground state inelastically. Energy of the colliding photon is 10.2 eV. After a time interval of the order of microsecond, another photon collides with the same hydrogen atom inelastically with an energy of 15 eV. What will be observed by the detector?

- (1) 2 photon of energy 10.2 eV  
 (2) 2 photon of energy of 1.4 eV  
 (3) One photon of energy 10.2 eV and an electron of energy 1.4 eV  
 (4) One photon of energy 10.2 eV and another photon of 1.4 eV

- 38) The relation between wavelength of photon and electron of the same energy is:

- (1)  $\lambda_{ph} > \lambda_e$   
 (2)  $\lambda_{ph} < \lambda_e$   
 (3)  $\lambda_{ph} = \lambda_e$

(4)  $\frac{\lambda_e}{\lambda_{ph}} = \text{constant}$

- 39) The angle between two vectors given by  $6\vec{i} + 6\vec{j} - 3\vec{k}$  and  $7\vec{i} + 4\vec{j} + 4\vec{k}$  is

- (1)  $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$   
 (2)  $\cos^{-1}\left(\frac{5}{\sqrt{3}}\right)$   
 (3)  $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$   
 (4)  $\sin^{-1}\left(\frac{\sqrt{5}}{3}\right)$

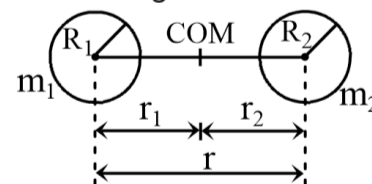
- 40) A, B, C and D are four different physical quantities having different dimensions. None of them is dimension less. But we know that the equation  $AD = C \ln(BD)$  holds true. Then, which of the combination is not a meaningful quantity?

- (1)  $\frac{C}{BD} - \frac{AD^2}{C}$   
 (2)  $A^2 - B^2C^2$   
 (3)  $\frac{A}{B} - C$   
 (4)  $\frac{A - C}{D}$

- 41) When a monochromatic light of frequency  $\nu$  is incident on a metal, stopping potential is  $V_0$ . Frequency of the incident light for which stopping potential becomes double is

- (1)  $\nu$   
 (2)  $\nu + \frac{eV_0}{h}$   
 (3)  $2\nu - \frac{eV_0}{h}$   
 (4)  $\nu - \frac{eV_0}{h}$

- 42) Binary stars of comparable masses rotate under the influence of each other's gravity at a distance  $\left[\frac{8G}{\omega^2}\right]^{1/3}$  where  $\omega$  is the angular velocity of each of the systems. The difference between the masses of the two stars is 6 units. Find the ratio of the masses of the small to the big star.



- (1) 4:10  
 (2) 1:7  
 (3) 2:8  
 (4) 3:9

- 43) A P-n-p transistor is said to be in active region of operation, When

- (1) Both emitter junction and collector junction are forward biased  
 (2) Both emitter junction and collector junction are reverse biased  
 (3) Emitter junction is forward biased and collector junction is reverse biased

(4) Emitter junction is reverse biased and collector junction is forward biased

44) The part of a transistor which is most heavily doped to produce large number of majority carriers is

- (1) Emitter
- (2) Base
- (3) Collector
- (4) Can be any of the above three

45) The slope of the stopping potential versus frequency graph for photoelectric effect is equal to :

- (1)  $h$
- (2)  $he$
- (3)  $h/e$
- (4)  $e$

## Chemistry.

46) Which part of the protein molecule is responsible for function and activity of the proteins

- (1) Secondary structure
- (2) Peptide bond
- (3) Primary structure
- (4) Binding sites

47) Beryllium compounds are largely covalent because

- (1) Electronegativity of beryllium is very high
- (2) polarising power of  $Be^{2+}$  is very high
- (3) Beryllium atom is very large
- (4) Beryllium is a metal

48) For the equilibrium  $2NO_2(g) \rightleftharpoons N_2O_4(g) + 14.6 \text{ kcal}$  the increase in temperature would

- (1) Favour the formation of  $N_2O_4$
- (2) Favour the decomposition of  $N_2O_4$
- (3) Not alter the equilibrium
- (4) Stop the reaction

49) For a reactions  $A + B \rightarrow \text{product}$ , it was found that rate of reaction increases four times if concentration of 'A' is doubled, but the rate of reaction remains unaffected. If concentration of 'B' is doubled. Hence, the rate law for the reaction is

- (1)  $\text{rate} = k[A][B]$
- (2)  $\text{rate} = k[A]^2$
- (3)  $\text{rate} = k[A]^2[B]^1$
- (4)  $\text{rate} = k[A]^2[B]^2$

50) Which of the following facts about electrolytic conduction is correct?

- (1)  $\Lambda_m$  decreases with  $\sqrt{C}$  due to increase in interionic attraction between ions
- (2) For weak electrolytes, there is rapid increase in the degree of ionisation with dilution hence, interionic attraction decreases and  $\Lambda_m$  or  $\Lambda_{eq}$  increases rapidly in lower concentration range
- (3)  $\Lambda_m^\infty$  can be obtained by extrapolation to  $\sqrt{C} = 0$

(4) All of the above

51) Element with a giant molecular structure

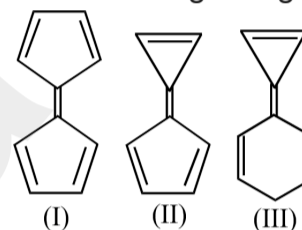
- (1) B
- (2) Al
- (3) Ga
- (4) Tl

52) Which one is not a conductor of electricity

- (1) NaCl (aqueous)
- (2) NaCl (solid)
- (3) NaCl (molten)
- (4) Ag metal

53) Consider the following structures

Choose the correct statement regarding the above structures



- (1) Dipole moment varies as  $II > III > I$
- (2) II is more stable than I
- (3) I is the most reactive among three
- (4) All of the above

54) Atoms have a mass of the order

- (1)  $10^{-26} \text{ kg}$
- (2)  $10^{-15} \text{ kg}$
- (3)  $10^{-26} \text{ g}$
- (4)  $10^{-15} \text{ g}$

55) Methyl-tert-butyl ether can be prepared by using

- (1)  $(C_2H_5)_3CONa + CH_3Cl$
- (2)  $CH_3ONa + (C_2H_5)_3CCl$
- (3)  $(CH_3)_3CONa + CH_3Cl$
- (4)  $CH_3ONa + (CH_3)_3CCl$

56) How many EDTA molecules are required to make an octahedral complex with a  $Ca^{2+}$  ion?

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

57) Gadolinium belongs to 4f series. It's atomic number is 64. Which of the following is the correct electronic configuration of gadolinium ?

- (1)  $[Xe]4f^75d^16s^2$
- (2)  $[Xe]4f^65d^26s^2$
- (3)  $[Xe]4f^86d^2$
- (4)  $[Xe]4f^95s^1$

58) The EMF of the cell  $2Ag^+ + H_2 \rightarrow 2Ag + 2H^+$  is 0.80 V. The standard oxidation potential of silver electrode is

- (1) 0.8 V
- (2) -0.8 V

- (3) 0.4 V  
(4) - 0.2 V

59) The dissociation equilibrium of a gas  $AB_2$  can be represented as



The degree of dissociation is 'x' and is small compared to 1.

The expression

relating the degree of dissociation (x) with equilibrium constant

$K_P$

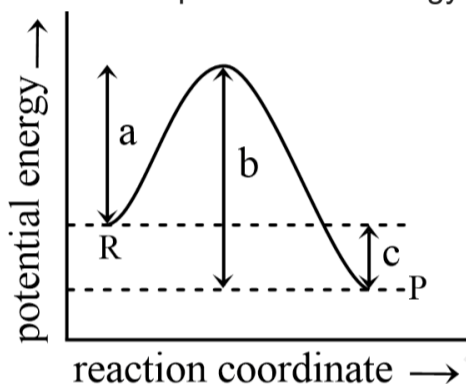
and total

pressure p is

- (1)  $(2K_p/p)$   
(2)  $(2K_p/p)^{1/3}$   
(3)  $(2K_p/p)^{1/2}$   
(4)  $(K_p/p)$

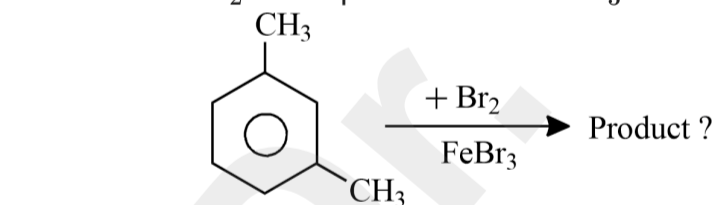
60) The potential energy diagram for the reaction  $R \rightarrow P$  is given below

$\Delta H^0$  of the reaction corresponds to the energy



- (1) a  
(2) b  
(3) c  
(4) a+b

61) What products are formed when the following compound is treated with  $Br_2$  in the presence of  $FeBr_3$ ?



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

62) Which of the following compounds cannot give yellow precipitate on heating with alkaline solution of iodine?

- (1)  $CH_3OH$   
(2)  $CH_3 - CH_2 - OH$   
(3)  $CH_3 - CH(OH)CH_3$   
(4)  $CH_3 - CH_2CH(OH)CH_3$

63) The correct IUPAC name of  $[Co(en)_3]_2(SO_4)_3$  is

- (1) bis [Tris (ethane -1, 2- diamine cobalt (III))] trisulphate  
(2) tris (ethane -1, 2- diamine) cobalt (III) trisulphate  
(3) tris (ethane -1, 2- diamine) cobalt (III) sulphate  
(4) tris (ethane -1, 2- diamine) cobalt (II) sulphate

64) Which carbohydrate is used in silvering of mirrors?

- (1) Sucrose  
(2) Starch  
(3) Glucose  
(4) Cellulose

65) Which of the following is environmental friendly reaction

- (1)  $A + B \rightarrow C$  (wanted)  
(2)  $HOCl_{(g)} \xrightarrow{h\nu} \dot{O}H + \dot{Cl}_{(g)}$   
(3)  $CF_2Cl_{2(g)} \xrightarrow{h\nu} \dot{C}l_{(g)} + \dot{C}F_2 - Cl_{(g)}$   
(4)  $NO + O_3 \xrightarrow{\text{strato sphere}} NO_2 + O_2$

66) Hydrolysis of phenyl isocyanide gives

- (1)  $CH_3COOH$   
(2)  $HCOOH$   
(3)  $C_6H_5COOH$   
(4) None

67) Which one among the following is a thermosetting plastic

- (1) PVC  
(2) PVA  
(3) Bakelite  
(4) Perspex

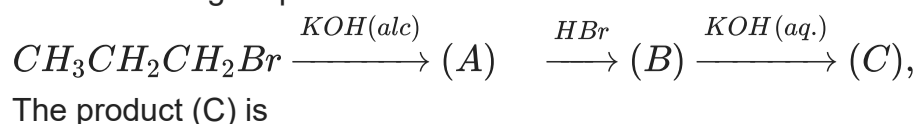
68) In a reversible reaction, two substances are in equilibrium. If the concentration of each one is doubled, the equilibrium constant will be

- (1) Reduced to half of, its original value  
(2) Becomes (original)/4  
(3) Doubled  
(4) Constant

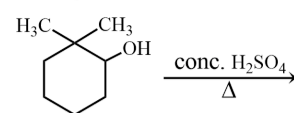
69) Reduction of carboxylic acids gives

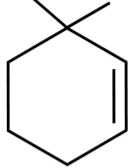
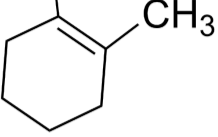
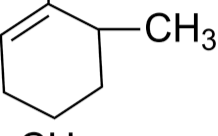
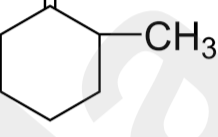
- (1) Alcohol with hydrogen in presence of palladium  
(2) Alcohol with  $LiAlH_4$   
(3) Aldehyde with  $LiAlH_4$   
(4) Alcohol with  $2HI(P)$

70) In the following sequence of reactions

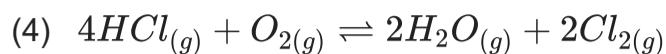
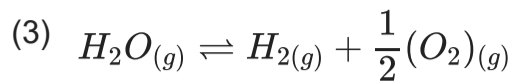
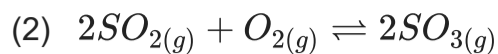
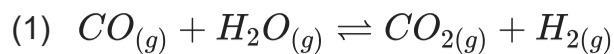


- (1) Propan - 2 - ol  
 (2) Propan - 1 - ol  
 (3) Propyne  
 (4) Propene
- 71) Ligand is  
 (1)  $NH_3$   
 (2)  $CN^-$   
 (3)  $F^-$   
 (4) All
- 72) Name of some compounds are given. Which one is not correct IUPAC system?  
 (1)  $CH_3-CH_2-CH_2-\underset{\substack{| \\ CH_2CH_3}}{CH}-\overset{\substack{| \\ CH_3}}{CH}-CH_2CH_3$   
 3-methyl-4-ethyl heptane  
 (2)  $CH_3-\underset{\substack{| \\ OH}}{CH}-\underset{\substack{| \\ CH_3}}{CH}-CH_3$   
 3-methyl-2-butanol  
 (3)  $CH_3-CH_2-\underset{\substack{|| \\ CH_2CH_3}}{C}-\underset{\substack{| \\ CH_3}}{CH}-CH_3$   
 2-ethyl-3-methyl but-1-ene  
 (4)  $CH_3-C\equiv C-CH(CH_3)_2$   
 4-methyl pent -2 - yne
- 73) For a reaction  $aA \rightarrow bB$  when  $[A] = 2.2mM$ , the rate was found to be  $2.4mM s^{-1}$ . On reducing concentration of  $[A]$  to half, the rate changes to  $0.6mM s^{-1}$ . The order of reaction with respect to A is:  
 (1) 1.5  
 (2) 2.0  
 (3) 2.5  
 (4) 3.0
- 74) The maximum percentage of available volume that can be filled in a face centred cubic system by an atom is  
 (1) 74%  
 (2) 68%  
 (3) 34%  
 (4) 26%
- 75) pH of  $0.01M (NH_4)_2SO_4$  and  $0.02M NH_4OH$  buffer ( $pK_a$  of  $NH_4^+ = 9.26$ ) is  
 (1)  $4.74 + \log 2$   
 (2)  $4.74 - \log 2$   
 (3)  $4.74 + \log 1$   
 (4)  $9.56 + \log 1$
- 76) The reagent involved in wolff kishner reduction of carbonyl compounds  
 (1)  $H_2N - NH_2, KOH$   
 (2)  $Zn - Hg/HCl$   
 (3)  $NH_3$   
 (4)  $NH_2 - OH$
- 77) Consider the reaction



- (1)  $CH_3$   $CH_3$   

- (2)  $CH_3$   $CH_3$   

- (3)  $CH_3$   $CH_3$   

- (4)  $CH_2$   $CH_3$   

- 78) Find A in the following reaction  
 $CH_3 - CH = CH - CH_2 - CH_2 - CN \xrightarrow[(ii) H_2O]{(i) DIBAL-H} A$   
 (1)  $CH_3 - CH = CHCH_2CH_2COOH$   
 (2)  $CH_3 - CH_2 - CH_2CH_2CH_2CHO$   
 (3)  $CH_3 - CH = CHCH_2CH_2CHO$   
 (4)  $CH_3 - CH(OH) - CH_2CH_2CH_2CHO$
- 79) Which of the following is an emulsifier  
 (1) Soap  
 (2) Water  
 (3) Oil  
 (4) NaCl
- 80) The correct order of increasing  $[H_3O^+]$  in the following aqueous so  
 (1)  $0.01M H_2S < 0.01M H_2SO_4 < 0.01M NaCl < 0.01M$   
 (2)  $0.01M NaCl < 0.01M NaNO_2 < 0.01M H_2S < 0.01M$   
 (3)  $0.01M NaNO_2 < 0.01M NaCl < 0.01M H_2S < 0.01M$   
 (4)  $0.01M H_2S < 0.01M NaNO_2 < 0.01M NaCl < 0.01M$
- 81) In a galvanic cell, the electrons flow from  
 (1) Anode to cathode through the solution  
 (2) Cathode to anode through the solution  
 (3) Anode to cathode through the external circuit  
 (4) Cathode to anode through the external circuit
- 82) The weakest acid among the following is  
 (1)  $CH_3COOH$   
 (2)  $CH_3CH_2COOH$   
 (3)  $(CH_3)_2CHCOOH$   
 (4)  $(CH_3)_3CCOOH$
- 83) pH of human blood is 7.4. Then  $H^+$  concentration will be  
 (1)  $4 \times 10^{-8}$   
 (2)  $2 \times 10^{-8}$   
 (3)  $4 \times 10^{-4}$   
 (4)  $2 \times 10^{-4}$

84) Which of the following equilibrium will shift to right side on increasing the temperature



85) Acetaldehyde reacts with hydroxylamine to give

(1) Acetone oxime

(2) Acetalamine

(3) Acetaldoxime

(4) Aminoacetal

86) Amylopectin is

(1) Water soluble

(2) Water insoluble

(3) Forms colloidal solution with water

(4) Both (2) and (3)

87) Solubility of  $Ca(OH)_2$  is  $\text{mol } L^{-1}$ . The solubility product ( $K_{sp}$ ) under the same condition is

(1)  $4s^3$

(2)  $3s^4$

(3)  $4s^2$

(4)  $s^3$

88) Identify the wrong statement regarding alizarin

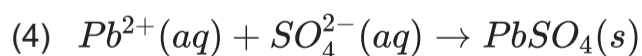
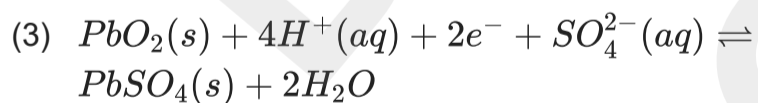
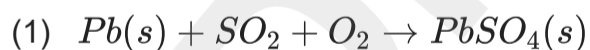
(1) Alizarin was extracted from the roots of the madder plant

(2) It's chemical name is 1, 2-dihydroxy anthraquinone

(3) It is fixed to fabrics by using mordants like aluminium sulphate giving fast red colour

(4) It has red crystal soluble in alkalies and the solution imparts red colour to fabrics

89) The anode half-reaction occurring during the discharge of a lead storage battery is



90) If  $CoCl_3 \cdot xNH_3$  exhibit facial meridional geometrical isomerism then 'x' value is

(1) 6

(2) 5

(3) 4

(4) 3

## Biology.

91) Match the following.

Column I	Column II
a) Chlamydomonas	i) Moss
b) Cycas	ii) pteridophyte
c) Selaginella	iii) alga
d) Sphagnum	iv) gymnosperm

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

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

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

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

92) Gull's disease is related to the deficient working of

(1) Thyroid

(2) Parathyroid

(3) Adrenal cortex

(4) Gonads

93) Common feature of Insects is

(1) Jointed appendages

(2) Two pair of wings

(3) Three pairs of jointed legs

(4) Biting and chewing type of mouth part

94) Select the two correct statements out of the four (I-IV) given below about Lac operon.

I. Glucose or galactose may bind with the repressor and inactivate it.

II. In the absence of lactose, the repressor binds with the operator region.

III. The z-gene codes for permease.

IV. This was elucidated by Francois Jacob and Jacques Monod

The correct statements are

(1) II and III

(2) I and III

(3) II and IV

(4) I and II

95) Hardy-Weinberg principle cannot operate if

(1) Population is large

(2) Free interbreeding among all members

(3) Frequent mutations occur in population

(4) Population does not interact with other population

96) Maximum energy is produced by oxidation of

(1) Carbohydrates

(2) Mineral

(3) Protein

(4) Fat

97) Egg is liberated from ovary in

(1) Secondary oocyte stage

(2) Primary oocyte stage

(3) Oogonial stage

(4) Mature ovum stage

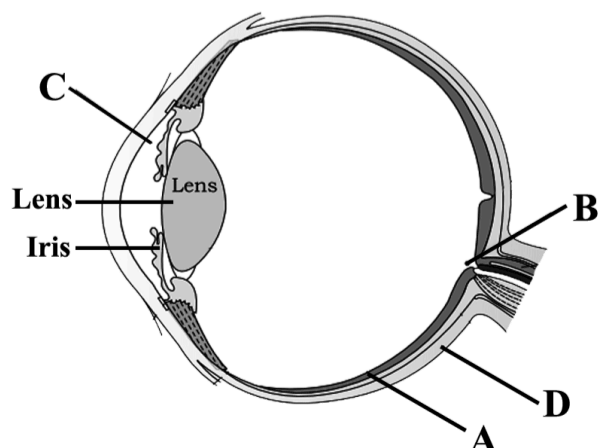


- 98) Transposons are sequences of
- (1) DNA
  - (2) mRNA
  - (3) rRNA
  - (4) tRNA
- 99) I. Disorder where abnormal frequency of bowel movement and increased liquidity of faecal discharge.  
II. Disorder where faeces are retained within the colon with irregular bowel movement. Identify I and II.
- (1) I—Dysentery, II—Diarrhoea
  - (2) I—Jaundice, II—Vomiting
  - (3) I—Constipation, II—Indigestion
  - (4) I—Diarrhoea, II—Constipation
- 100) A perfect partition between the osmotically active system and pure water in physical conditions can be formed by a
- (1) Semipermeable membrane
  - (2) Selective permeable membrane
  - (3) Impermeable membrane
  - (4) Freely permeable membrane
- 101) Development of female gametophyte directly from megaspore mother cell without meiosis is called
- (1) Apogamy
  - (2) Apospory
  - (3) Syngamy
  - (4) Parthenospore

102) Match the following.

Column - I	Column - II
A) Cardiac glands	1) Castle's intrinsic factor
B) Pyloric glands	2) Gastrin
C) Peptic cells	3) Mucus for protein
D) Parietal cells	4) Pepsinogen

- (1) A-3, B-2, C-4, D-1
  - (2) A-3, B-2, C-1, D-4
  - (3) A-3, B-1, C-2, D-4
  - (4) A-1, B-4, C-2, D-5
- 103) Parts of the human eye are shown in the diagram. Select the option which gives correct identification along with its functions/characteristics.



- (1) A - Retina - contains photo receptors - rods and cones
- (2) B - Blind spot - has only a few rods and cones

- (3) C - Aqueous chamber - reflects the light which does not pass through the lens
- (4) D - Choroid - its anterior part form ciliary body

- 104) Xylem translocates
- (1) Water only
  - (2) Water and mineral salts only
  - (3) Water, mineral salts and some organic nitrogen only
  - (4) Water, mineral salts, some organic nitrogen and hormones
- 105) How does a bird sing?
- (1) Operation of the voice box (syrinx)
  - (2) Larynx
  - (3) Bird need to communicate with its mate during breeding season
  - (4) Both 1 and 2
- 106) A single cell containing a large number of nuclei is called
- (1) syncytium
  - (2) cell plate
  - (3) monad
  - (4) bivalent
- 107) Read the following statements.
- A. Reabsorption in the this segment is minimum.
  - B. The descending limb is permeable to water and almost impermeable to electrolytes.
  - C. The ascending limb is impermeable to water.
  - D. In the ascending limb, NaCl diffuses out actively in the thin segment and passively in the thick segment.
- Which of the above are true about Henle's loop?
- (1) A,C and D only
  - (2) A,B and D only
  - (3) A,B and C only
  - (4) B,C and D only
- 108) In which of the following case the  $F_1$  generation resembles either one of the parents?
- (1) Co-dominance
  - (2) Incomplete dominance
  - (3) Dominance
  - (4) Both (2) and (3)
- 109) In one nucleosome, which one of the following histone molecule is NOT double?
- (1)  $H_4$
  - (2)  $H_3$
  - (3)  $H_2$
  - (4)  $H_1$
- 110) A woman with two genes, one for haemophilia and one for colour blindness on one of her X-chromosomes, marries a normal man. The progeny will be
- (1) All sons haemophilic and colour blind
  - (2) 50% haemophilic and colour blind sons and 50% normal sons

- (3) All daughters haemophilic and colour blind  
 (4) 50% haemophilic daughters and 50% colour blind daughters

- 111) How many of the following statements are incorrect?  
 (A) No virus contain both DNA and RNA  
 (B) Virus is a nucleoprotein and the genetic material is infectious  
 (C) Viruses that infects animals can have only single-stranded RNA  
 (D) In general, viruses that infects plants have either single or double-stranded RNA or double-stranded DNA  
 (E) Bacteriophages usually have ds DNA
- (1) 1  
 (2) 3  
 (3) 4  
 (4) 2

- 112) Which statement is incorrect about given diagram.  
 (a) Filariasis  
 (b) Caused by *Wuchereria bancrofti* & *W. Malayi*  
 (c) Slowly developing chronic inflammation usually of blood vessel of upper limb  
 (d) Genital organ also affected, resulting in gross deformities  
 (e) Vector is female mosquito



Disease Vector

- (1) a, d, f  
 (2) 'c' only  
 (3) 'a' only  
 (4) All are correct

- 113) Polyadelphous condition is found in  
 (1) Pea  
 (2) Chinarose  
 (3) Lilly  
 (4) Citrus

- 114) Consider the following four statements (i)-(iv) about certain desert animals such as kangaroo-rat.  
 (i) They have dark colour and high rate of reproduction and excrete solid urine  
 (ii) They do not drink water, breathe at a slow rate to conserve water and have their body covered with thick hairs  
 (iii) They feed on dry seeds and do not require drinking water  
 (iv) They excrete very concentrated urine and do not use water to regulate body temperature.

Out of these four, which two are correct

- (1) (iii) and (i)  
 (2) (i) and (ii)  
 (3) (iii) and (iv)  
 (4) (ii) and (iii)
- 115) Secondary sexual characters in males develop under the influence of  
 (1) Estrogen  
 (2) Testosterone  
 (3) GH  
 (4) FSH

- 116) Hydathodes are also called  
 (1) Water stomata  
 (2) Sunken stomata  
 (3) Guard cells  
 (4) Subsidiary cells

- 117) The biggest spin-off in biological knowledge was the recognition of the sharing of similarities among living organisms both horizontally and vertically." Here what is the meaning of horizontal similarities among living organisms  
 (1) All present day living organism are related to each other  
 (2) Similarities between different members of different taxonomic ranks  
 (3) Similarities between different species and genera of same families  
 (4) Similarities between classes and divisions of plantae kingdom.

- 118) Match the following.

Column I	Column II
a. Sponges	1. Gills
b. Flatworms	2. Lungs
c. Earthworms	3. Entire body surface
d. Insects	4. Moist cuticle
e. Aquatic arthropods	5. Tracheal tubes

- (1) a-3, b-1, c-4, d-5, e-2  
 (2) a-1, b-3, c-1, d-4, e-2  
 (3) a-3, b-3, c-4, d-5, e-1  
 (4) a-3, b-2, c-4, d-5, e-1
- 119) Tribe is a Taxonomic rank occupies the position.  
 (1) Phylum and class  
 (2) Family and Genus  
 (3) Species and Sub-species

- (4) All the above
- 120) Which one of the following statements about human sperm is correct?
- (1) Acrosome has a conical pointed structure used for piercing and penetrating the egg resulting in fertilization
  - (2) The sperm lysins in the acrosome dissolve the egg envelope facilitating fertilisation
  - (3) Acrosome serves as a sensory structure leading the sperm towards the ovum
  - (4) Acrosome serves no particular function

121) Match the following.

Table - I	Table - II
A) Renal pyramids	1) Cup like structures
B) Renal column	2) Cone shaped structures
C) Pelvis	3) Funnel shaped structures
D) Calyces	4) Cortex projections
	5) Medulla projections

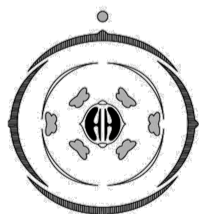
- (1) A-2, B-5, C-3, D-1
  - (2) A-2, B-4, C-3, D-1
  - (3) A-2, B-4, C-1, D-3
  - (4) A-5, B-4, C-2, D-3
- 122) Element essential for uptake and utilization of  $Ca^{2+}$  and membrane function is
- (1) Boron
  - (2) Copper
  - (3) Manganese
  - (4) Molybdenum
- 123) How many equational divisions are required in a cell of the human cheek to form 256 cells?
- (1) 128
  - (2) 7
  - (3) 8
  - (4) 255
- 124) Development of poisonous cardiac glycosides in calotropis is a
- (1) Physical defence
  - (2) chemical defence
  - (3) morphological defence
  - (4) All
- 125) In India, we find mangoes with different flavours, colours, fibre content, sugar content and even shelf life. The large variation is an account of
- (1) species diversity
  - (2) induced mutations
  - (3) genetic diversity
  - (4) hybridisation

- 126) Which of the following glucose transporters is insulin-dependent?
- (1) GLUT I
  - (2) GLUT II
  - (3) GLUT III
  - (4) GLUT IV
- 127) A plant in your garden avoids photorespiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilisation. In which of the following physiological groups would you assign this plant ?
- (1) Nitrogen fixer
  - (2)  $C_3$
  - (3)  $C_4$
  - (4) CAM
- 128) Fill in the blanks:
- a. Zygote divides to form ...1... which is implanted in the uterus.
  - b. The structure which provides vascular connection between foetus and uterus is called ..2...
  - c. Inner cell mass contains certain cells called ...3... which have the potency to give rise to all the tissues and organs.
  - d. By the end of ...4..., most of the major organ systems are formed, for example, the limbs and external genital organs are well-developed.
  - e. Immediately after implantation, the ...5... differentiates into an outer layer called Trophoblast and an inner layer called Inner cell mass.
- (1) 1 morula, 2—umbilical cord, 3—trophoblast, 4— second trimester, 5—stem cells
  - (2) 1—blastocyst, 2—placenta, 3 stem cells, 4—first trimester, 5 trophoblast
  - (3) 1—blastocyst, 2—umbilical cord, 3—stem cells, 4— second trimesters, 5 —inner cell mass
  - (4) 1—blastocyst, 2—placenta, 3—stem cells, 4—first trimester, 5—inner cell mass.
- 129) Flame cells and Malpighian tubules are the analogous organs in
- (1) Insects and arthropods respectively
  - (2) Arthropods and echinodermites respectively
  - (3) Helminthes and arthropods with other insect respectively
  - (4) Arthropods and other insect with helminths respectively
- 130) Food chain is
- (1) Number of human beings forming a chain for food
  - (2) Animals near a source of food
  - (3) Transfer of food energy from producers to consumers
  - (4) None of the above
- 131) Oral contraceptive pills have to be taken daily for a period of ...a... starting preferably within the first ...b... of menstrual cycle. After a gap of ...c... days (during which menstruation occurs) it has to be repeated in the same pattern till the female desires to prevent conception.
- (1) a—28 days, b—7 days, c—5 days
  - (2) a—21 days, b—7 days, c—7 days

- (3) a—21 days, b- 5 days, c—7 days  
 (4) a—14 days, b—5 days, c—7 days

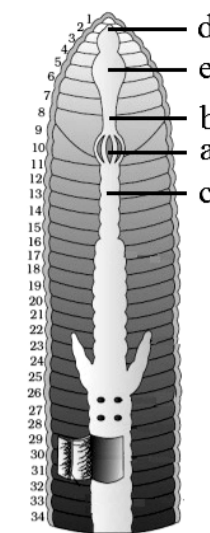
- 132) Hypothetical plant hormones are  
 (1) Florigen  
 (2) Vernalin  
 (3) Florigen and vernalin  
 (4) auxin
- 133) Which group of drugs contains all hallucinogenic drugs?  
 (1) Atropa, Barbiturates, Heroin, Charas, Ganja, datura  
 (2) LSD, Ganja, Marijuana, Larger dose of Cocaine, Bhang  
 (3) LSD, Cannabis, Datura, Amphetamines, Cocaine  
 (4) Charas, ganja, LSD, Tobacco, Bhang, Atropa
- 134) In-plant succession, the net productivity of the climax community  
 (1) Continues to increase  
 (2) Becomes stable  
 (3) Become halved  
 (4) Reduced to 10%
- 135) Mineral available to plant is mainly obtained from  
 (1) decay of other plants  
 (2) decay of other animals  
 (3) weathering of rocks  
 (4) All the above
- 136) Salamander is a  
 (1) Bird  
 (2) Mollusc  
 (3) Reptile  
 (4) Amphibian
- 137) The fibres of the following muscles are fusiform and do not show striations  
 (1) Skeletal muscles  
 (2) Cardiac muscles  
 (3) Both 1 & 2  
 (4) Smooth muscles

- 138) The following floral diagram belongs to the plant

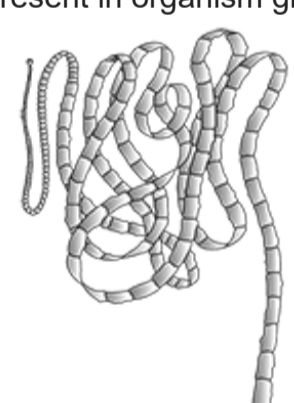


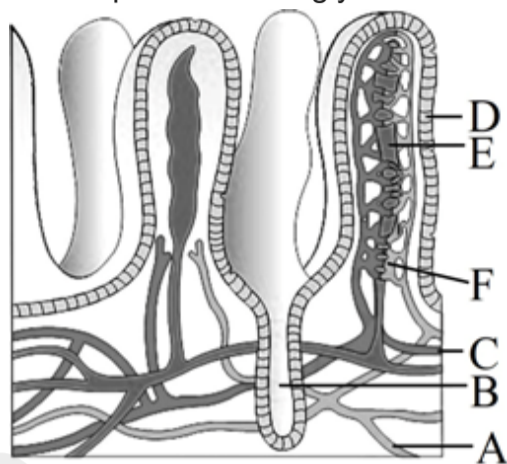
- (1) Brassica  
 (2) Allium  
 (3) Solanum  
 (4) Beans

- 139) Identify the correct matching.



- (1) a – stomach, c – mouth, d – oesophagus, e – gizzard, b – pharynx  
 (2) d – stomach, b – mouth, e – oesophagus, c – izzard, a – pharynx  
 (3) c – stomach, d – mouth, b – oesophagus, a – gizzard, e – pharynx  
 (4) b – stomach, a – mouth, e – oesophagus, c – gizzard, d – pharynx
- 140) If a stock has  $2n = 48$  and scion microspore mother cell has  $2n = 24$ ; then root cell and the microspores will have ..... chromosomes respectively.  
 (1) 12, 48  
 (2) 48, 12  
 (3) 24, 12  
 (4) 24, 96
- 141) DNA fingerprinting is based on the principle of  
 (1) Double helical structure of DNA  
 (2) Coding sequence are identical in all individuals.  
 (3) Polymorphism in non-coding sequences  
 (4) Semi-conservative mode of replication
- 142) Find the sequence of binding of the following aminoacyl t-RNA complexes during translation to mRNA transcribed by a DNA segment having the base sequences  $3'TACATGGGTCCG5'$ . Choose the answer showing the correct order of alphabets.
- |     |     |     |     |
|-----|-----|-----|-----|
| aa  | aa  | aa  | aa  |
|     |     |     |     |
| AUG | UAC | CCG | GGU |
| A   | B   | C   | D   |
- (1) A, B, D, C  
 (2) B, A, D, C  
 (3) C, D, B, A  
 (4) D, C, A, B
- 143) The mode of nutrition in Animalia is  
 (1) Heterotrophic  
 (2) Holozoic  
 (3) Saprophytic  
 (4) All the above
- 144) The success of reptiles as true land animals was due to  
 (1) Development of internal fertilization

- (2) Presence of amnion, embryonic membrane which encloses the embryo and provides watery environment for development
- (3) Respiration only through lungs, which is improved by the development of ribs
- (4) All of these
- 145) Which of the following is not present in *Periplaneta Americana*?
- (1) Indeterminate and radial cleavage during embryonic development
- (2) Schizocoelom as body cavity
- (3) Metamerically segmented body
- (4) Exoskeleton composed of N-acetylglucosamine
- 146) Replacement of which one of the following nucleotides in the coding strand is the  $Hb^A$  gene causes sickle cell anemia?
- (1) A to T
- (2) T to A
- (3) U to A
- (4) C to G
- 147) The excess of nutrients which are not used immediately are converted into fats and stored in
- (1) Areolar tissue
- (2) Adipose tissue
- (3) Dense regular connective tissue
- (4) Dense irregular connective tissue
- 148) The first clinical gene therapy was given for treating
- (1) Breast cancer
- (2) ADA deficiency
- (3) Meningitis
- (4) Chickenpox
- 149) Giant squid is the common name of
- (1) *Loligo*
- (2) *Sepia*
- (3) *Octopus*
- (4) *Architeuthis*
- 150) An irregular mode of reproduction resulting in the development of an embryo without fertilization is called
- I. parthenogenesis
- II. apogamy
- III. sporophytic budding
- Select the correct answer using the code given below.
- (1) Only I
- (2) Only II
- (3) II and III
- (4) I, II and III
- 151) In protoplasm, the content of water is
- (1) 25 %
- (2) 85 %
- (3) 50 %
- (4) 30 %
- 152) Body is divided into proboscis, collar and trunk in
- (1) *Asterias*
- (2) Roundworm
- (3) *Balanoglossus*
- (4) *Tachyglossus*
- 153) Interphase is also called resting stage because
- (1) cell has stopped differentiation
- (2) cell is metabolically inactive
- (3) no visible changes occur in the nucleus
- (4) cell does not grow.
- 154) Which of the following options are CORRECT ?
1. Heroin – Stimulant
2. Marijuana – Cardiovascular
3. Cocaine – Hallucinations
4. Morphine – Sedative
- (1) 1, 2 and 3
- (2) 1, 3 and 4
- (3) 2, 3 and 4
- (4) 1, 2 and 4
- 155) Sole members of the kingdom monera are
- (1) Bacteria
- (2) Fungi
- (3) BGA
- (4) Eubacteria
- 156) When a host is exposed to antigens which may be in the form of living or dead microbes or other proteins, antibodies are produced in the host body. This type of immunity is called
- (1) Active immunity
- (2) Passive immunity
- (3) Auto immunity
- (4) Allergy
- 157) Excretory organ present in organism given in the figure is
- 
- (1) Renette cells
- (2) Protonephridia or flame cells
- (3) Malpighian tubules
- (4) Kidney
- 158) Which of the following is a day-neutral plant?
- (1) *Helianthus annuus*
- (2) *Euphorbia pulcherrima*
- (3) *Avena sativa*
- (4) *Beta vulgaris*
- 159) The Leydig cells are present in the

- (1) Seminiferous tubules  
 (2) Intertubular space  
 (3) Interstitial space  
 (4) Both 2 and 3
- 160) How many types of gametes would be formed by the selfing of AaBbCc.  
 (1) 2  
 (2) 4  
 (3) 8  
 (4) 16
- 161) Oxidative phosphorylation is  
 (1) Addition of phosphate group to ATP  
 (2) Formation of ATP energy released from electrons removed during substrate oxidation  
 (3) Formation of ATP by transfer of phosphate group from substrate to ADP  
 (4) Oxidation of phosphate group in ATP
- 162) One of the following is asexual means of reproduction in porifers.  
 (1) Reduction bodies  
 (2) Gemmules  
 (3) External buds  
 (4) All above
- 163) Identify the elements whose deficiency causes both necrosis and chlorosis  
 (1) Mg, k  
 (2) Mo, Ca  
 (3) Fe, Mn  
 (4) Cu, Co
- 164) Expression of emotional reactions and libido are regulated by  
 (1) Pons Varolii and adrenal medulla  
 (2) Cerebral cortex and colliculi  
 (3) Limbic system and hypothalamus  
 (4) Thermostat of the body and corpus callosum
- 165) Defaecation is carried out by mass peristaltic movement and is a  
 (1) Involuntary process  
 (2) Voluntary process  
 (3) Initially involuntary process then voluntary process  
 (4) Partly voluntary and partly involuntary process
- 166) The significance of the 'heat shock' in bacteria transformation is to facilitate  
 (1) Expression of the antibiotic resistance gene in the vector  
 (2) Ligation of DNA to the cell membrane  
 (3) Uptake of DNA through membrane transport protein  
 (4) Uptake of DNA through pores in the bacterial cell wall
- 167) The drugs, which are commonly abused are opioids, cannabinoids, and coca alkaloids. The majority of these are obtained from ..... while some are obtained from .....
- (1) Fungi, non-flowering plants  
 (2) Flowering plants, fungi  
 (3) Fungi, flowering plants  
 (4) Non flowering plants, fungi
- 168) Label the given diagram of a transverse section of the mucosa of small intestine showing small finger-like projections. Choose the correct option accordingly
- 
- (1) A - Vein, B - Crypt, C - Artery, D - Villi, E - Lacteal, F - Capillaries  
 (2) A - Artery, B - Crypt, C - Vein, D - Villi, E - Capillaries, F - Lacteal  
 (3) A - Vein, B - Artery, C - Crypt, D - Villi, E - Capillaries, F - Lacteal  
 (4) A - Villi, B - Lacteal, C - Capillaries, D - Artery, E - Crypt, F - Vein
- 169) *Bacillus thuringiensis* (Bt) strains have been used for designing novel  
 (1) Bioinsecticidal plants  
 (2) Biomineralization processes  
 (3) Biofertilizers  
 (4) Biometallurgical techniques
- 170) Dorsal root of spinal nerve contains  
 (1) Sensory neurons only  
 (2) Relay and sensory neurons  
 (3) Sensory and motor neurons  
 (4) Motor and relay neurons
- 171) These food crops are produced by micro-propagation:  
 a) Tomato    b) Banana    c) Apple  
 The correct choice is  
 (1) a & b only  
 (2) b & c only  
 (3) a, b & c  
 (4) a & c only
- 172) Excretion by protonephridia with solenocyte is a characteristic of  
 (1) *Branchiostoma*  
 (2) *Amphioxus*  
 (3) Lancelet  
 (4) All of these
- 173) Aerobic respiratory pathway is appropriately termed  
 (1) Anabolic  
 (2) Catabolic

(3) Amphibolic

(4) Parabolic

174) Axoplasm have (polarized)

(1) High  $K^+$  ion(2) Low  $Na^+$  ion

(3) Negatively charge proteins

(4) All

175) An example of divergent evolution is

(1) Sweet potato and potato

(2) Eye of octopus and eye of human being

(3) Fore Limbs of bat and forelimbs of cheetah

(4) Wings of butterfly, wings of pigeon

176) Which of the following amino acids is not optically active?

(1) Glycine

(2) Valine

(3) Leucine

(4) Isoleucine

177) Which of the following match is correct?

Column - I	Column - II
A) Cyathium	I) Labiatae
B) Verticillaster	II) Asteraceae
C) Synandrous	III) Euphorbiaceae
D) Syngenesious	IV) Cucurbitaceae

(1) A-I, B-II, C-III, D-IV

(2) A-III, B-I, C-IV, D-II

(3) A-III, B-I, C-II, D-IV

(4) A-III, B-II, C-I, D-IV

178) Read the following five features (a - e):

(a) Notochord is present in any stage of the life cycle

(b) Central nerve cord is present at mid ventral surface which is solid and double in animals

(c) Gill slits are present in any stage of the life cycle

(d) A "post-anal tail" is present in chordates

(e) Dorsal heart is present in the body of chordates.

From the above features which are not suitable features for chordate animal?

(1) 'b' and 'e'

(2) 'b', 'c' and 'e'

(3) Only 'b'

(4) 'c' and 'd'

179) Match the following.

	Column I		Column II		Column III
a.	Exocoetus	1.	Fighting fish		
b.	Clarias	2.	Flying fish	G.	Fresh water
c.	Pterophyllum	3.	Rohu	H.	Marine water
d.	Betta	4.	Sea horse	I.	Aquarium
e.	Hippocampus	5.	Magur		
f.	Labeo	6.	Angel fish		

(1) a-2-H, b-5-G, c-6-I, d-1-I, e-4-H, f-3-G

(2) a-1-I, b-5-H, c-6-I, d-2-M, e-4-G, f-3-H

(3) a-2-G, b-3-G, c-1-I, d-6-M, e-5-H, f-4-G

(4) a-2-I, b-5-I, c-6-G, d-1-M, e-4-H, f-3-G

180) Which one of the following is the correct sequence if carbohydrates in the order of increasing complexity of chemical structure?

(1) Sucrose, Starch, Oligosaccharide, Maltose, Triose

(2) Triose, Maltose, Sucrose, Oligosaccharide, Starch

(3) Triose, Glucose, Maltose, Oligosaccharide, Starch

(4) Oligosaccharide, Triose, Starch, Sucrose, Maltose

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