

# SHIKSHA CLASSES, BHANDARA

## TEST-7

CHEMISTRY , PHYSICS, BIOLOGY

Max. Marks:- 720

Time : - 3 Hours

Date : .....

### INSTRUCTIONS :

1. The test is of 3 hours duration.
2. The Test Booklet consists of 180 questions. The maximum marks are 720.
3. There are three parts in the question paper A, B, C consisting of Chemistry, Physics having 45 questions each and Biology having 90 questions of equal weightage. Each question is allotted 4 (four) marks for each correct response.  $\frac{1}{4}$  (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
4. There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly.

### SYLLABUS

**CHEMISTRY :** GENERAL PRINCIPLES AND PROCESSES OF ISOLATION OF METALS, p- BLOCK ELEMENTS - GROUP 15, 16, 17 AND GROUP 18, d- AND f-BLOCK ELEMENTS, CO-ORDINATION COMPOUNDS.

**PHYSICS :** MAGNETIC EFFECTS OF CURRENT AND MAGNETISM, ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS, ELECTROMAGNETIC WAVES.

**BIOLOGY :** GENETICS AND EVOLUTION : PRINCIPLES OF INHERITANCE AND VARIATION, MOLECULAR BASIS OF INHERITANCE, EVOLUTION.

Name : .....

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## PART A – CHEMISTRY

**Q.1** How many EDTA molecules are required to make an octahedral complex with a  $\text{Ca}^{2+}$  ion?

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

**Q.2** Which complex is most stable ?

- (1)  $[\text{Cu}(\text{CN})_2]^-$ ;  $k_d = 1 \times 10^{-16}$   
(2)  $[\text{Fe}(\text{CN})_6]^{-4}$ ;  $k_d = 1 \times 10^{-37}$   
(3)  $[\text{Fe}(\text{CN})_6]^{-3}$ ;  $k_d = 1 \times 10^{-44}$   
(4)  $[\text{Ag}(\text{CN})_2]^-$ ;  $k_d = 1 \times 10^{-20}$

Where  $k_d$  = Dissociation constant

**Q.3** The total no. of chelate rings in  $[\text{Ni}(\text{dmg})_2]$  are:

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

**Q.4** In which of the following increasing order of splitting energy correct ?

- (1)  $[\text{CrCl}_6]^{-4} < [\text{Cr}(\text{H}_2\text{O})_6]^{+2} < [\text{Cr}(\text{NH}_3)_6]^{+2} < [\text{Cr}(\text{CN})_6]^{-4}$   
(2)  $[\text{CrCl}_6]^{-4} > [\text{Cr}(\text{H}_2\text{O})_6]^{+2} > [\text{Cr}(\text{NH}_3)_6]^{+2} > [\text{Cr}(\text{CN})_6]^{-4}$   
(3)  $[\text{Cr}(\text{H}_2\text{O})_6]^{+2} > [\text{CrCl}_6]^{-4} > [\text{Cr}(\text{NH}_3)_6]^{+2} > [\text{Cr}(\text{CN})_6]^{-4}$   
(4) None of these

**Q.5** Which of the following statement is not true for hydrolysis of  $\text{XeF}_6$ ?

- (1)  $\text{XeOF}_4$  is formed. (2)  $\text{XeO}_2\text{F}_2$  is formed.  
(3) It is a redox reaction. (4)  $\text{XeO}_3$  is formed.

**Q.6** Value of CFSE, in tetrahedral complex having  $3d^4$  configuration of metal ion, surrounded by weak field ligands, will be :

- (1)  $(-2/5) \Delta_t$  (2)  $(+2/5) \Delta_t$   
(3)  $(-4/5) \Delta_t$  (4)  $(+3/5) \Delta_t$

**Q.7** The IUPAC name for the complex  $[\text{Co}(\text{NH}_3)_5(\text{NO}_2)]\text{Cl}_2$  is :

- (1) Nitrito-N-pentaammine cobalt (III) chloride  
(2) Nitrito-N-pentaammine cobalt (II) chloride  
(3) Pentaammine nitrito-N-cobalt (II) chloride  
(4) Pentaammine nitrito-N-cobalt (III) chloride

**Q.8** When excess of ammonia is added to copper sulphate solution, the deep blue coloured complex is formed. The complex is

- (1) tetrahedral and paramagnetic  
(2) tetrahedral and diamagnetic  
(3) square planar and diamagnetic  
(4) square planar and paramagnetic

**Q.9** The oxidation number and co-ordination number of cobalt in  $\text{K}[\text{Co}(\text{CO})_4]$  is :-

- (1) +1, 4 (2) 0, 4  
(3) -1, 8 (4) -1, 4

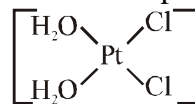
**Q.10** The crystal field stabilisation energy of  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  is :-

- (1)  $-7.2 \Delta_0$  (2)  $-0.4 \Delta_0$   
(3)  $-2.4 \Delta_0$  (4)  $-3.6 \Delta_0$

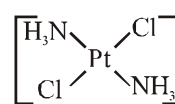
**Q.11** The overall complex dissociation equilibrium constant for the complex  $[\text{Cu}(\text{NH}_3)_4]^{2+}$  ion will be ( $\beta_4$  for this complex is  $2.1 \times 10^{13}$ )  $\beta_4 =$  association constant

- (1)  $4.7 \times 10^{-14}$  (2)  $2.1 \times 10^{13}$   
(3)  $11.9 \times 10^{-2}$  (4)  $2.1 \times 10^{-13}$

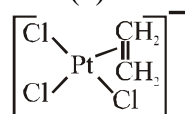
**Q.12** Which of the following considered to be an anticancer species ?



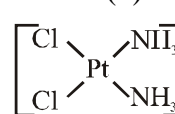
(1)



(2)



(3)



(4)

**Q.13** In the concentration of PbS containing ZnS as impurity the depressant used is—

- (1) NaCN (2)  $\text{ZnSO}_4$   
(3)  $\text{PbSO}_4$  (4) aniline

**Q.14** Dry bleaching is done by :-

- (1)  $\text{Cl}_2$  (2)  $\text{SO}_2$   
(3)  $\text{O}_3$  (4)  $\text{H}_2\text{O}_2$

**Q.15** The ore that contains both iron and copper is:

- (1) malachite (2) dolomite  
(3) azurite (4) copper pyrites

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- Q.16** Good reducing nature of  $\text{H}_3\text{PO}_2$  attributed to the presence of:  
 (1) One P-OH bond (2) One P-H bond  
 (3) Two P-H bonds (4) Two P-OH bonds
- Q.17** Two complexes  $[\text{Cr}(\text{H}_2\text{O}_6)\text{Cl}_3]$  (a) and  $[\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$  (b) are violet and yellow coloured, respectively. The incorrect statement regarding them is :  
 (1)  $\Delta_0$  value of (a) is less than that of (b).  
 (2)  $\Delta_0$  value of (a) & (b) are calculated from the energies of violet and yellow light, respectively  
 (3) Both absorb energies corresponding to their complementary colours.  
 (4) Both are paramagnetic with three unpaired electrons.
- Q.18** The highest value of the calculated spin only magnetic moment (in BM) among all the transition metal complex is :  
 (1) 5.92 (2) 3.87  
 (3) 6.93 (4) 4.90
- Q.19** The oxide of nitrogen formed by thermal decomposition of  $\text{NH}_4\text{NO}_3$  is –  
 (1) NO (2)  $\text{N}_2\text{O}$   
 (3)  $\text{N}_2\text{O}_5$  (4)  $\text{NO}_2$
- Q.20** The chemical reaction that involves roasting process is  
 (1)  $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$   
 (2)  $2\text{Al} + \text{Fe}_2\text{O}_3 \rightarrow 2\text{Fe} + \text{Al}_2\text{O}_3$   
 (3)  $2\text{ZnS} + 3\text{O}_2 \rightarrow 2\text{ZnO} + 3\text{SO}_2$   
 (4)  $\text{FeO} + \text{SiO}_2 \rightarrow \text{FeSiO}_3$
- Q.21**  $\text{PCl}_3$  on hydrolysis gives fumes of  
 (1)  $\text{H}_3\text{PO}_3 + \text{HCl}$  (2)  $\text{H}_3\text{PO}_4 + \text{HCl}$   
 (3)  $\text{H}_3\text{PO}_2$  and  $\text{H}_3\text{PO}_3$  (4)  $\text{H}_3\text{PO}_2 + \text{HCl}$
- Q.22** Which acid has P – P linkage?  
 (1) Hypophosphoric acid  
 (2) Pyrophosphoric acid  
 (3) Metaphosphoric acid  
 (4) Orthophosphoric acid.
- Q.23** During the manufacture of cast iron, the slag ( $\text{CaSiO}_3$ ) is formed in –  
 (1) zone of reduction only  
 (2) zone of fusion only  
 (3) zone of reduction and zone of fusion  
 (4) zone of heat absorption
- Q.24** Observe the following statements,  
 1. Lanthanides actively participate in chemical reactions.  
 2. The basic nature of hydroxides of lanthanides increases from  $\text{La}(\text{OH})_3$  to  $\text{Lu}(\text{OH})_3$ .  
 3. Lanthanides do not form coordinate compounds as readily as d-block metals.  
 The correct statements are  
 (1) 2 and 3 (2) 1, 2 and 3  
 (3) 1 and 3 (4) 1 and 2
- Q.25** Observe the following statements,  
 1. The solubility of group V hydrides in water decreases from  $\text{NH}_3$  to  $\text{BiH}_3$ .  
 2. Phosphorous does not exhibit allotropy.  
 3. The stability of group V hydrides decreases from  $\text{NH}_3$  to  $\text{BiH}_3$ .  
 The correct statement(s) are  
 (1) 1 and 3 (2) 2  
 (3) 1 and 2 (4) 1, 2 and 3
- Q.26** The number of lone pairs of electrons on Xe in  $\text{XeF}_2$ ,  $\text{XeF}_4$  and  $\text{XeF}_6$  are respectively  
 (1) 3, 2, 0 (2) 2, 3, 1  
 (3) 4, 3, 2 (4) 3, 2, 1
- Q.27** Which of these ions is expected to be coloured in aqueous solution ? I.  $\text{Fe}^{3+}$ , II.  $\text{Ni}^{2+}$ , III.  $\text{Al}^{3+}$   
 (1) I and II (2) II and III  
 (3) I and III (4) I, II and III
- Q.28**  $\text{FeCr}_2\text{O}_4 + \text{Na}_2\text{CO}_3 + \text{O}_2$   

$$\xrightarrow{\text{Fusion}} [\text{X}] \xrightarrow[\text{H}_2\text{O}]{\text{H}^+} [\text{Y}] \xrightarrow[\text{H}_2\text{O}_2]{\text{H}^+} [\text{Z}]$$
  
 Which of the following statement is true for the compounds [X], [Y] and [Z] ?  
 (1) In all three compounds, the chromium is in + 6 oxidation state.

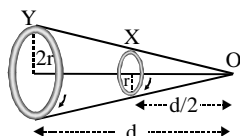
- (2) [Z] is a deep blue-violet coloured compound which decomposes rapidly in aqueous solution into  $\text{Cr}^{3+}$  and dioxygen.
- (3) Saturated solution of [Y] gives bright orange compound, chromic anhydride, with concentrated  $\text{H}_2\text{SO}_4$ .
- (4) All of these
- Q.29** Identify the correct order of wavelength of light absorbed for the following complex ions.  
 I.  $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ ;    II.  $[\text{Co}(\text{CN})_6]^{3-}$   
 III.  $[\text{Co}(\text{F})_6]^{3-}$     IV.  $[\text{Co}(\text{en})_3]^{3+}$   
 (1) III > I > IV > II    (2) II > IV > I > III  
 (3) III > I > II > IV    (4) I > III > IV > II
- Q.30** Total number of stereoisomers (i.e. geometrical as well as optical isomers) for the complex  $[\text{Pt}(\text{NH}_3)_2(\text{NO}_3)_2\text{ClBr}]$  is:  
 (1) 2    (2) 4  
 (3) 6    (4) 8
- Q.31** The slag obtained during the extraction of copper from copper pyrites is composed mainly of –  
 (1)  $\text{CaSiO}_3$     (2)  $\text{FeSiO}_3$   
 (3)  $\text{CuSiO}_3$     (4)  $\text{SiO}_2$
- Q.32** The reaction  $2\text{ZnS} + 3\text{O}_2 \rightarrow 2\text{ZnO} + 2\text{SO}_2$  in the metallurgical process of zinc is called –  
 (1) Calcination    (2) Cupellation  
 (3) Smelting    (4) Roasting
- Q.33** Electronic configuration of a transition element X in +3 oxidation state is  $[\text{Ar}]3d^5$ . What is its atomic number ?  
 (1) 25    (2) 26  
 (3) 27    (4) 24
- Q.34** Which of the following statements is not correct?  
 (1) Copper liberates hydrogen from acids.  
 (2) In higher oxidation states, manganese forms stable compounds with oxygen and fluorine.  
 (3)  $\text{Mn}^{3+}$  and  $\text{Co}^{3+}$  are oxidising agents in aqueous solution.  
 (4)  $\text{Ti}^{2+}$  and  $\text{Cr}^{2+}$  are reducing agents in aqueous solution.
- Q.35** Generally transition elements form coloured salts due to the presence of unpaired electrons. Which of the following compounds will be coloured in solid state ?  
 (1)  $\text{Ag}_2\text{SO}_4$     (2)  $\text{CuF}_2$   
 (3)  $\text{ZnF}_2$     (4)  $\text{Cu}_2\text{Cl}_2$
- Q.36** The basic character of the transition metal monoxides follows the order.  
 (Atomic numbers Ti = 22, V = 23, Cr = 24, Fe = 26)  
 (1)  $\text{VO} > \text{CrO} > \text{TiO} > \text{FeO}$   
 (2)  $\text{CrO} > \text{VO} > \text{FeO} > \text{TiO}$   
 (3)  $\text{TiO} > \text{FeO} > \text{VO} > \text{CrO}$   
 (4)  $\text{TiO} > \text{VO} > \text{CrO} > \text{FeO}$
- Q.37** Which is paramagnetic ?  
 (1)  $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$     (2)  $[\text{Fe}(\text{CN})_6]^{4-}$   
 (3)  $[\text{Ni}(\text{CO})_4]$     (4)  $[\text{Ni}(\text{CN})_4]^{2-}$
- Q.38** A chelating agent has two or more than two donor atoms to bind to a single metal ion. Which of the following is not a chelating agent?  
 (1) Thiosulphato    (2) Oxalato  
 (3) Glycinato    (4) Ethane-1, 2-diamine
- Q.39** Electronic configuration of  $[\text{Cu}(\text{NH}_3)_6]^{2+}$  on the basis of crystal field splitting theory is  
 (1)  $t^4_{2g} e^5_g$     (2)  $t^6_{2g} e^3_g$   
 (3)  $t^9_{2g} e^0_g$     (4)  $t^5_{2g} e^4_g$
- Q.40** In the silver plating of copper,  $\text{K}[\text{Ag}(\text{CN})_2]$  is used instead of  $\text{AgNO}_3$ . The reason is  
 (1) A thin layer of Ag is formed on Cu.  
 (2) More voltage is required.  
 (3)  $\text{Ag}^+$  ions are completely removed from solution.  
 (4) Less availability of  $\text{Ag}^+$  ions, as Cu cannot displace Ag from  $[\text{Ag}(\text{CN})_2]^-$  ion.

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- Q.41** IUPAC name of  $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NO}_2)]$  is  
 (1) Platinum diaminechloronitrite  
 (2) Chloronitrito-N-ammineplatinum(II)  
 (3) Diamminechloridonitrito-N-platinum(II)  
 (4) Diamminechloronitrito-N-platinate(II).
- Q.42** Which of the following compounds would exhibit coordination isomerism ?  
 (1)  $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_2$  (2)  $[\text{Cr}(\text{NH}_3)_6][\text{Co}(\text{CN})_6]$   
 (3)  $[\text{Cr}(\text{en})_2]\text{NO}_2$  (4)  $[\text{Ni}(\text{NH}_3)_6][\text{BF}_4]_2$
- Q.43** Which of the following statements is wrong?  
 (1) Single N–N bond is stronger than the single P–P bond.  
 (2)  $\text{PH}_3$  can act as a ligand in the formation of coordination compound with transition elements.  
 (3)  $\text{NO}_2$  is paramagnetic in nature.  
 (4) Covalency of nitrogen in  $\text{N}_2\text{O}_5$  is four.
- Q.44** A brown ring is formed in the ring test for  $\text{NO}_3^-$  ion. It is due to the formation of –  
 (1)  $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]^{2+}$  (2)  $\text{FeSO}_4 \cdot \text{NO}_2$   
 (3)  $[\text{Fe}(\text{H}_2\text{O})_4(\text{NO})_2]^{2+}$  (4)  $\text{FeSO}_4 \cdot \text{HNO}_3$
- Q.45** The reduction of calcined phosphate rock with coke and sand in an electric arc furnace at 1773 K gives a number of products including  
 (1) Phosphorus (2) Silicon  
 (3) Calcium hydride (4) Calcium oxide

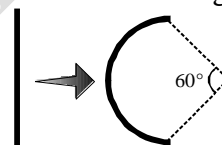
### PART B – PHYSICS

- Q.46** Two circular coils X and Y, having equal number of turns, carry equal currents in the same sense and subtend same solid angle at point O. If the smaller coil X is midway between O and Y, and if we represent the magnetic induction due to bigger coil Y at O as  $B_Y$  and that due to smaller coil X at O as  $B_X$ , then :



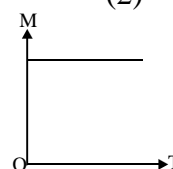
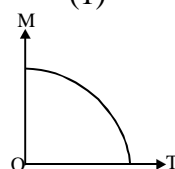
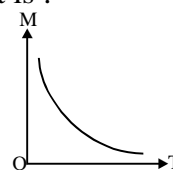
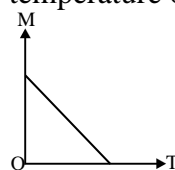
- (1)  $\frac{B_Y}{B_X} = 1$  (2)  $\frac{B_Y}{B_X} = 2$   
 (3)  $\frac{B_Y}{B_X} = \frac{1}{2}$  (4)  $\frac{B_Y}{B_X} = \frac{1}{4}$

- Q.47** A cylindrical conductor of radius 'R' carries a current 'i'. The value of magnetic field at a point which is R/4 distance inside from the surface is 10T. Find the value of magnetic field at point which is 4R distance outside from the surface :-  
 (1)  $4T/3$  (2)  $(8/3) T$   
 (3)  $(40/3) T$  (4)  $(80/3) T$
- Q.48** A magnetised wire of moment M is bent into an arc of a circle subtending an angle of  $60^\circ$  at the centre; then the new magnetic moment is :-



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

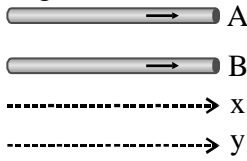
- Q.49** A curve between magnetic moment and temperature of magnet is :-



- Q.50** The angle of dip at a certain place on earth is  $60^\circ$  and the magnitude of earth's horizontal component of magnetic field is 0.26 G. The magnetic field at the place on earth is :-  
 (1) 0.13 G (2) 0.26 G  
 (3) 0.52 G (4) 0.65 G

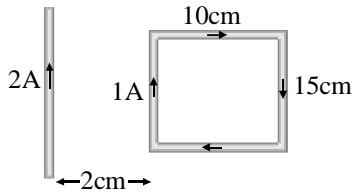
SPACE FOR ROUGH WORK

**Q.51** A and B are two conductors carrying a current  $i$  in the same direction.  $x$  and  $y$  are two electron beams moving in the same direction :-



- (1) There will be repulsion between A and B attraction between  $x$  and  $y$ .
- (2) There will be attraction between A and B, repulsion between  $x$  and  $y$ .
- (3) There will be repulsion between A and B and also  $x$  and  $y$ .
- (4) There will be attraction between A and B and also  $x$  and  $y$ .

**Q.52** What is the net force on the rectangular coil :-



- (1)  $25 \times 10^{-7}$  N towards wire
- (2)  $25 \times 10^{-7}$  N away from wire
- (3)  $35 \times 10^{-7}$  N towards wire
- (4)  $35 \times 10^{-7}$  N away from wire

**Q.53** A particle of mass ' $m$ ' and carrying a charge ' $q$ ' enters with a velocity ' $v$ ' perpendicular to a uniform magnetic field. The time period of rotation of the particle :-

- (1) Decreases with increase of velocity  $v$ .
- (2) Increases with increase of radius of the orbit.
- (3) Depends only on magnetic field.
- (4) Depends on magnetic field and  $(q/m)$  of the particle.

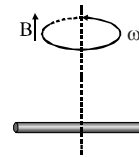
**Q.54** A circular coil of 30 turns and radius 8.0 cm carrying a current of 6.0 A is suspended vertically in a uniform horizontal magnetic field of magnitude 1.0T. The field lines make an angle of  $60^\circ$  with the normal of the coil. Calculate the magnitude of the counter torque that must be applied to prevent the coil from turning :-

- (1) 4 Nm
- (2) 6 Nm
- (3) 3.1 Nm
- (4) 2.8 Nm

**Q.55** In a cyclotron, a charged particle :-

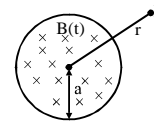
- (1) Undergoes acceleration all the time
- (2) Speeds up between the dees because of the magnetic field
- (3) Speeds up in a dee
- (4) Slows down within a dee and speeds up between dees

**Q.56** A conducting rod of length  $2\ell$  is rotating with constant angular speed  $\omega$  about its perpendicular bisector. A uniform magnetic field  $\vec{B}$  exists parallel to the axis of rotation. The e.m.f. induced between two ends of the rod is :-



- (1)  $B \omega \ell^2$
- (2)  $\frac{1}{2} B \omega \ell^2$
- (3)  $\frac{1}{8} B \omega \ell^2$
- (4) Zero

**Q.57** A uniform but time-varying magnetic field  $B(t)$  exists in a circular region of radius  $a$  and is directed into the plane of the paper, as shown. The magnitude of the induced electric field at point P at a distance  $r$  from the centre of the circular region :-



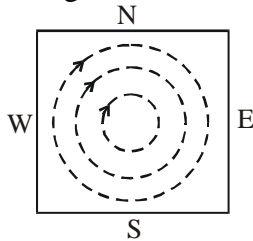
- (1) Is zero
- (2) Decreases as  $1/r$
- (3) Increases as  $r$
- (4) Decreases as  $1/r^2$

**Q.58** A vertical rod of length  $\ell$  is moved with constant velocity  $v$  towards east if vertical component of earth's magnetic field is  $B$  and angle of dip is  $\theta$  then induced emf in rod

- (1)  $B\ell v \cot \theta$
- (2)  $B\ell v \sin \theta$
- (3)  $B\ell v \tan \theta$
- (4)  $B\ell v \cos \theta$

SPACE FOR ROUGH WORK

**Q.59** A metal sheet placed in magnetic field, which changes from zero to maximum. If figure shows direction of eddy currents then direction of magnetic field is :-

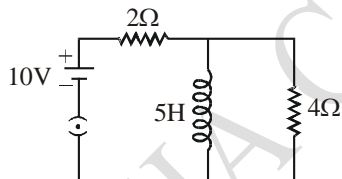


- (1) Perpendicular to the plane of the paper & inwards
- (2) Perpendicular to the plane of the paper & outwards
- (3) From West to East
- (4) From North to South

**Q.60** Self inductance of solenoid is 'L' which is made by a wire of length ' $\ell_w$ ' then length of solenoid is:-

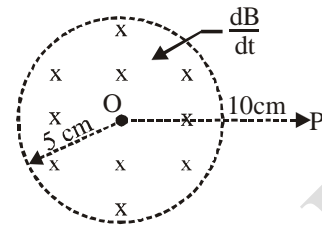
- (1)  $\frac{\mu_0 \ell_w^2}{4\pi^2 L}$
- (2)  $\sqrt{\frac{4\pi L \ell_w}{\mu_0}}$
- (3)  $\pi \sqrt{\frac{4L \ell_w}{\mu_0}}$
- (4)  $\frac{\mu_0 \ell_w^2}{4\pi L}$

**Q.61** Current in  $2\Omega$  resistance shown in figure is :-



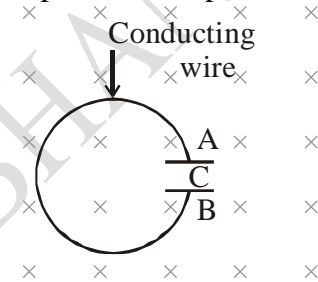
- (a) Just after the closing of the key
  - (b) Some time after the closing of the key
- (1) 5A, (5/3) A
  - (2) (10/6) A, Zero
  - (3) (5/3) A, 5A
  - (4) Zero, 5A

**Q.62** Magnetic field changing at the rate of 4T/sec in a circular region of 5 cm radius. The value of induced electric field at a point 'P', which is 10 cm distance away from the centre 'O' of region is :-



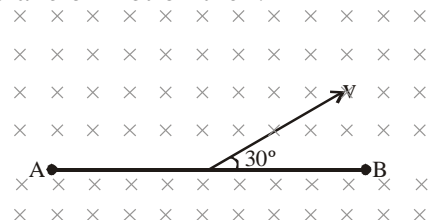
- (1) 0.05 V/m
- (2) 0.2 V/m
- (3) 0.5 V/m
- (4) 2V/m

**Q.63** If  $B = \frac{\alpha}{t^2}$  where  $\alpha$  is constant then nature of charge on plate A of capacitor is :-



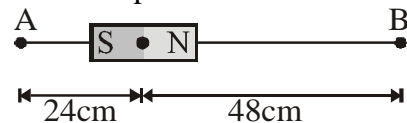
- (1) +ve
- (2) -ve
- (3) No charge
- (4) First -ve then +ve

**Q.64** A conducting rod AB of length  $\ell = 1\text{M}$  is moving at a velocity  $v = 4\text{ m/sec}$ . Making an angle  $30^\circ$  with its length A uniform magnetic field  $B = 2\text{T}$  exists in a direction perpendicular to plane of motion then:-



- (1)  $V_A - V_B = 8\text{V}$
- (2)  $V_A - V_B = 4\text{V}$
- (3)  $V_B - V_A = 8\text{V}$
- (4)  $V_B - V_A = 4\text{V}$

**Q.65** A bar magnet of length 3 cm has points A and B along its axis at distances of 24 cm and 48 cm on the opposite sides. Ratio of magnetic fields at these points will be :-



SPACE FOR ROUGH WORK





**Q.76** The r.m.s. current in an ac circuit is 2 A. If the wattless current be  $\sqrt{3}A$ . The power factor is :-

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

**Q.77** A choke coil is connected to an ac source of frequency  $(50/\pi)$  Hz. If resistance of coil is  $1\Omega$  and inductance is 10 mH then what would be value of power factor :

- (1) 1 (2)  $1/\sqrt{2}$   
 (3) 0 (4)  $1/\sqrt{3}$

**Q.78** Power delivered by the ac source of the circuit becomes maximum when :

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

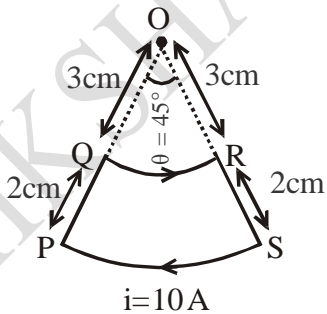
**Q.79** In non-resonant circuit what will be the nature of the circuit for frequencies higher than the resonance frequency :

- (1) Resistive (2) Capacitive  
 (3) Inductive (4) None of the above

**Q.80** The current in a circuit varies with time as  $I = 2\sqrt{t}$ . The rms value of the current for the interval  $t = 2$  to  $t = 4$  sec is

- (1)  $\sqrt{3}A$  (2)  $2\sqrt{3}A$   
 (3)  $\sqrt{3}/2A$  (4)  $(4 - 2\sqrt{2}) A$

**Q.81** A current loop, having two circular arcs joined by two radial lines is shown in the figure. It carries a current of 10 A. The magnetic field at point O will be close to :

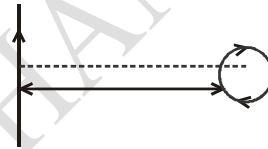


- (1)  $1.0 \times 10^{-5} T$  (2)  $1.5 \times 10^{-5} T$   
 (3)  $1.0 \times 10^{-7} T$  (4)  $1.0 \times 10^{-7} T$

**Q.82** A bar magnet is demagnetized by inserting it inside a solenoid of length 0.2 m, 100 turns, and carrying a current of 5.2 A. The coercivity of the bar magnet is :

- (1) 1200 A/m (2) 2600 A/m  
 (3) 520 A/m (4) 285 A/m

**Q.83** An infinitely long current carrying wire and a small current carrying loop are in the plane of the paper as shown. The radius of the loop is a and distance of its centre from the wire is d ( $d \gg a$ ). If the loop applies a force F on the wire then :



- (1)  $F \propto (a^2 / d^3)$  (2)  $F \propto (a / d)$   
 (3)  $F \propto (a / d)^2$  (4)  $F = 0$

**Q.84** A conducting circular loop made of a thin wire, has area  $3.5 \times 10^{-3} m^2$  and resistance  $10\Omega$ . It is placed perpendicular to a time dependent magnetic field  $B(t) = (0.4T) \sin(50\pi t)$ . The field is uniform in space. Then the net charge flowing through the loop during  $t = 0$  s and  $t = 10$  ms is close to:

- (1) 0.14 mC (2) 21 mC  
 (3) 6 mC (4) 7 mC

**Q.85** A plane electromagnetic wave of frequency 50 MHz travels in free space along the positive x-direction. At a particular point in space and time,  $\vec{E} = 6.3 \hat{j} V/m$ . The corresponding magnetic field  $\vec{B}$ , at that point will be :

- (1)  $18.9 \times 10^{-8} \hat{k} T$  (2)  $6.3 \times 10^{-8} \hat{k} T$   
 (3)  $2.1 \times 10^{-8} \hat{k} T$  (4)  $18.9 \times 10^8 \hat{k} T$

**Q.86** A series AC circuit containing an inductor (20 mH), a capacitor (120  $\mu F$ ) and a resistor (60 $\Omega$ ) is driven by an AC source of 24V (50 Hz). The energy dissipated in the circuit in 60 s is :

- (1)  $2.26 \times 10^3 J$  (2)  $3.39 \times 10^3 J$   
 (3)  $5.65 \times 10^2 J$  (4)  $5.17 \times 10^2 J$

SPACE FOR ROUGH WORK

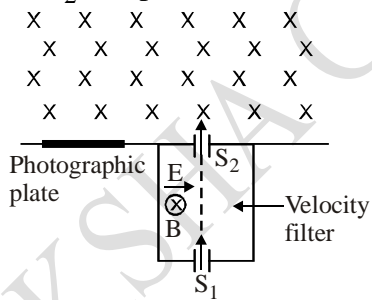
**Q.87** A long straight wire along the Z-axis carries I in the negative Z-direction. The induced magnetic field B at a point having coordinate (x, y) is –

- (1)  $\frac{\mu_0 I}{2} \frac{(x\hat{i} - y\hat{j})}{(x^2 + y^2)}$       (2)  $\frac{\mu_0 I}{2} \frac{(x\hat{j} - y\hat{i})}{(x^2 + y^2)}$   
 (3)  $\frac{\mu_0 I}{2} \frac{(x\hat{i} + y\hat{j})}{(x^2 + y^2)}$       (4)  $\frac{\mu_0 I}{2} \frac{(y\hat{i} - x\hat{j})}{(x^2 + y^2)}$

**Q.88** An electromagnetic wave propagating along north lies its electric field vertically upward. The magnetic field vector points towards –

- (1) downward      (2) east  
 (3) north      (4) south

**Q.89** Charge particles having various velocities are sent through slit  $S_1$ . They enter in a velocity filter where uniform magnetic field of 0.1 T and uniform electric field 100 V/m exists, which are perpendicular to each other. Only a few particles emerge from the thin slit  $S_2$  which is exactly in front of  $S_1$ . Now they enter in a region where only uniform magnetic field of 0.1T, pointing inwards exists, and electric field is absent. If the particles strike the photographic plate at a distance of 0.42 mm from slit  $S_2$ , the particle should be :



- (1)  $\alpha$ -particle  
 (2) proton ( $\frac{q}{m} = 9.6 \times 10^7 \text{ C/kg}$ )  
 (3) Lithium ion ( $\text{Li}^{+1}$ )  
 (4) sodium ion ( $\text{Na}^{+}$ )

**Q.90** For a LCR series circuit with an A.C. source of angular frequency  $\omega$ .

- (1) circuit will be capacitive if  $\omega > \frac{1}{\sqrt{LC}}$   
 (2) circuit will be inductive if  $\omega = \frac{1}{\sqrt{LC}}$   
 (3) power factor of circuit will be unity if capacitive reactance equals inductive reactance  
 (4) current will be leading voltage if  $\omega > \frac{1}{\sqrt{LC}}$

### PART C – BIOLOGY

**Q.91** Man of blood group 'A' marries with a woman of blood group 'B', and have sufficiently large number of children, these children could be classified as A, B, AB and O blood group in ratio 1 : 1 : 1 : 1. The presence of AB blood group individual is due to :-

- (1) Incomplete dominance  
 (2) Codominance  
 (3) Complete dominance  
 (4) Partial dominance

**Q.92** The klinefelter's syndrome in human being is due to :-

- (1) The presence of an additional copy of X-chromosome at 23<sup>rd</sup> chromosome number of male.  
 (2) The presence of an addition copy of X-chromosome at 23<sup>rd</sup> chromosome number of female.  
 (3) The absence of the X-chromosome at 23<sup>rd</sup> chromosome number of female.  
 (4) The absence of the X-chromosome at 23<sup>rd</sup> chromosome number of male.

**Q.93** When a tall plant with round seed (TTRR) is crossed with a dwarf plant with wrinkled seed (ttrr),  $F_1$  generation consist of tall plant with rounded seed. How many plants are dwarf in  $F_2$  generation

- (1) 12      (2) 4  
 (3) 6      (4) 1

SPACE FOR ROUGH WORK

**Q.94** Choose the correct statement about colour blindness :-

- (1) It is Y linked recessive disorder. It is due to mutation in certain genes present in the Y-chromosome.
- (2) Defect occurs in either red or green cone of eye resulting in failure to discriminate between red and green colour.
- (3) Normally son will be colourblind if father is colourblind.
- (4) All sons of a normal woman are colourblind if she marries with colourblind man.

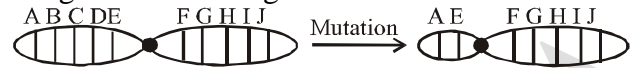
**Q.95** All of the following statements are **excluded** from linkage phenomenon **except** :-

- (1) The two genes in a dihybrid cross are situated on the same chromosome, the proportion of parental gene combinations are much lower than non-parental combination.
- (2) The two genes in a dihybrid cross are situated on the two different chromosomes and the proportion of parental gene combinations are much higher than the non-parental combination.
- (3) In case of complete linkage, the ratio of dihybrid test cross is 1 : 1 : 1 : 1.
- (4) Alfred Sturtevant used the frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes and mapped their position on the chromosome.

**Q.96** Why did T.H. Morgan selected the tiny fruit flies (*Drosophila Melanogaster*) in his experiment :-

- (1) They could be grown on fresh fruit in the laboratory.
- (2) They complete their life cycle in about two years.
- (3) They have many types of variations that can be seen with low power microscope.
- (4) They do not have any linked genes, hence they show of independent assortment.

**Q.97** Identify the chromosomal aberration from the given below diagram :-



- (1) Translocation
- (2) Intercalary deletion
- (3) Inversion
- (4) Duplication

**Q.98** Which of the following statement is **not incorrect** about haemophilia :-

- (1) This is a sex-linked recessive disease, which shows its transmission from unaffected carrier female to all of the male progeny.
- (2) The family pedigree of Queen Victoria shows a number of haemophilic descendents because queen was also haemophilic.
- (3) In this disease the possibility of a male becoming a haemophilic is extremely rare.
- (4) In this disease, a single protein that is a part of the cascade of proteins involved in the clotting of blood is affected.

**Q.99** Thalassemia differs from sickle-cell anaemia

- (1) It is qualitative problem of synthesising an incorrectly functioning globin
- (2) It is a quantitative problem of synthesising too few globin molecules
- (3) It is a X-linked recessive disease
- (4) It is a Y-linked dominant disease

**Q.100** Which of the following human syndrome occurs due to monosomy:-

- (1) Down syndrome
- (2) Turner's syndrome
- (3) Klinefelter's syndrome
- (4) Jacob's syndrome

**Q.101** Which of the following pair is wrongly matched ?

- (1) Pleiotropy → A single gene can exhibit multiple phenotypic expression.
- (2) Polygenic trait → Controlled by two or more genes.
- (3) Multiple allele → Found only when population studies are made.

(4) Codominance → The phenotype of  $F_1$  is in between both parents.

**Q.102** A phenomenon which results in alternation of DNA sequences and consequently results in change in the genotype and phenotype of an organism :-

- (1) Mutation (2) Evolution  
(3) Totipotency (4) Eutrophication

**Q.103** Which law of Mendel is followed in given below statement.

"When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters" :-

- (1) Law of Segregation  
(2) Law of Dominance  
(3) Law of Independent assortment  
(4) Law of Codominance

**Q.104** Genes which code for a pair of contrasting traits are known as :-

- (1) Allele (2) Factors  
(3) Linkage (4) X-body

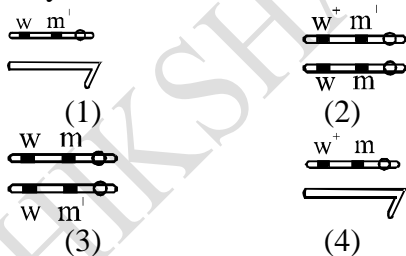
**Q.105** Select test cross representation :-

- (1)  $AaBb \times AABB$  (2)  $TtRr \times TtRr$   
(3)  $AAbb \times BBaa$  (4)  $Aabb \times aabb$

**Q.106** Who gave the chromosomal theory of inheritance?

- (1) Hershey and chase (2) Sutton & Boveri  
(3) Meselson & Stahl (4) Bateson & Sturtevant

**Q.107** Which of the following is a parental type of progeny obtained by Morgan, while carrying out dihybrid cross ?



**Q.108** How many different kinds of gametes will be produced by a plant having the genotype  $aaBbcc$ ?

- (1) Four (2) Two  
(3) Nine (4) Sixteen

**Q.109** Which of the following is best order of packaging of DNA helix ?

- (1) Chromatin → DNA → nucleosome → chromosome  
(2) DNA → nucleosome → chromatin → chromosome  
(3) Nucleosome → DNA → chromatid → chromosome  
(4) DNA → nucleosome → chromatid → chromatin

**Q.110** Polymerization of DNA nucleotides during the synthesis of lagging strand occurs in :-

- (1) 3' → 5' direction (2) 5' → 3' direction  
(3) Any direction  
(4) Promoter to terminator direction

**Q.111** Which of the following is not related to higher stability of DNA in comparison of RNA ?

- (1) Deoxyribose sugar  
(2) Thymine in place of uracil  
(3) Ability to act enzyme  
(4) Ability to repair

**Q.112** In Griffith's experiment :-

- (1) The protein coat from pathogenic cells was able to transform non-pathogenic cells  
(2) Heat killed pathogenic cells caused pneumonia  
(3) Some substance from pathogenic cells was transferred to non-pathogenic cells and causes transformation  
(4) The polysaccharide coat of bacteria caused pneumonia

**Q.113** Transcription begins when one of the following enzyme binds to a promoter site :-

- (1) Helicase (2) RNA polymerase  
(3) Gyrase (4) DNA polymerase

**Q.114** In Neurospora, which RNA polymerase is responsible for formation of 5s r-RNA ?

- (1) RNA polymerase-I (2) RNA polymerase-II  
(3) RNA polymerase-III (4) Primase

**Q.115** Which component of RNA polymerase catalyse elongation process of transcription ?

- (1)  $\sigma$  factor (2) core enzyme  
(3)  $\rho$ -factor (4) All of these

SPACE FOR ROUGH WORK

**Q.116** If base sequence in coding strand of DNA is 5' ATGCTACTA 3' then what will be sequence of m-RNA, which form by this DNA ?

- (1) 5'ATGCTACTA3' (2) 5'AUGCUACUA3'  
(3) 3'TACGATGAT5' (4) 3'AUGCUACUA 5'

**Q.117** Which of the following codon perform dual function at time of translation :-

- (1) UAA (2) UAG  
(3) AUG (4) UGA

**Q.118** Which of the following enzyme is nucleic acid?

- (1) Polymerase  
(2) Ligase  
(3) Ribozyme  
(4) Aminoacyl t-RNA synthetase

**Q.119** In *E.coli* translation occurs at :-

- (1) Cytoplasm  
(2) Mitochondria  
(3) Rough endoplasmic reticulum  
(4) Chloroplast

**Q.120** In *E.coli*, the regulation of gene expression could be occurs at :-

- (1) Translation initiation  
(2) Transcription initiation  
(3) RNA processing  
(4) Both (1) and (2)

**Q.121** DNA sequence that provides binding site for RNA polymerase :-

- (1) Promoter (2) Operator  
(3) Regulator (4) Repressor

**Q.122** Gene regulation governing lactose operon of *E.coli* that involves the lac Z gene product is :-

- (1) Aporepressor (2) Repressor protein  
(3)  $\beta$ -galactosidase (4) Permease

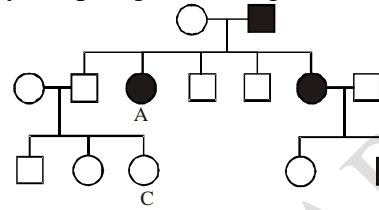
**Q.123** The sensitivity of the DNA fingerprinting technique has been increased by :-

- (1) Hybridization  
(2) Polymerase chain reaction  
(3) Electrophoresis  
(4) Autoradiography

**Q.124** In Trp operon, regulator gene codes for :-

- (1) Repressor (2) Co-repressor  
(3) Apo-repressor (4) Trptophan

**Q.125** Study the pedigree chart given below :-



What is the genotype of A, B and C respectively.

- (1) Bb, BB, bb (2)  $X^A X^A$ ,  $XY^A$ , XX  
(3)  $X^A X^a$ ,  $X^A Y$ ,  $X^a X^a$  (4) BB, Bb, Bb

**Q.126** Match the items given in column I with those in column II and select the correct option given

**Column I**

- a. XX-XO type  
b. XX-XY type  
c. ZW-ZZ type  
d. Genic balance theory

**Column II**

- i. *Drosophila*  
ii. Human  
iii. Cockroach  
iv. Birds  
(1) a-iii,b-ii,c-iv,d-i (2) a-ii,b-iii,c-i,d-iv  
(3) a-iii,b-i,c-iv,d-ii (4) a-i,b-ii,c-iii,d-iv

**Q.127** All of the following are X-linked recessive trait except :-

- (1) Haemophilia  
(2) Duchenne muscular dystrophy  
(3) Myotonic dystrophy  
(4) Colourblindness

**Q.128** Which of the following contrasting trait of pea is express only in homozygous :-

- (1) Green pod (2) Axial flower  
(3) Short stem (4) Violet flower

**Q.129** Monosomy occur in :-

- (1) Edward's syndrome  
(2) Turner's syndrome  
(3) Klinefelter's syndrome  
(4) Down's syndrome

**Q.130** DNA is polymer of nucleotides which are linked to each other by 3'-5' phosphodiester bond. To prevent polymerization of nucleotides, which of the following modification would you choose ?

- (1) Replace purine with pyrimidine  
(2) Remove 3' OH group in deoxyribose  
(3) Remove 2' OH group in ribose  
(4) Both (2) and (3)

SPACE FOR ROUGH WORK

**Q.131** Which of the following is not a part of operon ?

- (1) an operator (2) structural genes  
(3) an enhancer (4) a promoter

**Q.132** In Lac operon, Allolactose act as :-

- (1) repressor (2) Co-repressor  
(3) Co-enzyme (4) Inducer

**Q.133** 'Descent with modification' term is associated with

- (1) Organic evolution (2) Inorganic evolution  
(3) Chemical evolution (4) Abiogenesis

**Q.134** Which one of the following is not true regarding homologous organs :-

- (1) Homologous organs are result of convergent evolution.  
(2) Homology indicates common ancestry  
(3) Vertebrate brains are example of homologous organs.  
(4) Study of homologous organs helps to understand organic evolution

**Q.135** Golden age of amphibia was :-

- (1) Permian period (2) Silurian period  
(3) Devonian period (4) Carboniferous period

**Q.136** Key concept of Darwinian theory of evolution is:-

- (1) Natural selection  
(2) Large and directionless variations  
(3) Inheritance  
(4) Adaptation

**Q.137** How many statements are correct about evolution of Darwin's finches :-

- (a) They evolve through adaptive radiation  
(b) All varieties evolved were homologous  
(c) Adaptive radiation is also shown by Australian marsupials  
(d) When more than one adaptive radiation appeared to have occurred in isolated geographical area is known as convergent evolution

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

**Q.138** Mark the maximum number of combination that shows divergent evolution from the following :-

- (a) Mole (b) Bobcat  
(c) Numbat (d) Tasmanian tiger cat  
(e) Lemur (f) Wolf  
(g) Spotted cuscus (h) Tasmanian wolf  
(1) 4 (2) 6  
(3) 8 (4) 12

**Q.139** According to Hugo de Vries, causes of evolution are

- (1) Minor variation which are heritable  
(2) Major variations which are not heritable  
(3) Mutation  
(4) All of the above

**Q.140** How many statements are correct according to Hardy Weinberg principle :-

- (a) Frequency of allele in a population remain fixed  
(b) Frequency of allele remain constant  
(c) Gene pool remain constant  
(d) Sum total of allelic frequency is 1  
(e) Frequency of dominant allele is same as recessive allele  
(f) Frequency of dominant allele is always more than recessive allele

- (1) 2 (2) 3  
(3) 4 (4) 5

**Q.141** Mark the incorrect statement :-

- (1) About 15 mya non-primates like Dryopithecus & Ramapithecus were existing  
(2) Dryopithecus were more ape like  
(3) Brain capacity of Homo erectus is more than Homosapiens  
(4) (1) & (3) both

**Q.142** Match the following :-

- (a) Homo habilis (i) First to walk upright  
(b) Homo erectus (ii) First to ate meat  
(c) Homo sapien (iii) Started cave art  
(d) Australo pithecus (iv) First human like being  
(1) a - iii, b - ii, c - i, d - iv  
(2) a - iv, b - ii, c - iii, d - i  
(3) a - ii, b - iii, c - iv, d - i  
(4) a - i, b - iii, c - ii, d - iv

SPACE FOR ROUGH WORK

- Q.143** Mark the correct statement :-  
 (1) Homo erectus has a brain size of 900 cc  
 (2) Homo erectus appeared 2 bya  
 (3) Homo erectus were first to hunt  
 (4) All are correct
- Q.144** Hardy Weinbergs law fails when there is .....  
 (1) Stablising selection(2) Directional selection  
 (3) Disruptive selection(4) All of the above
- Q.145** Mark the correct statement :-  
 (a) Hugo de varies work on evening primerose and give the idea of variation due to recombination.  
 (b) Saltation is kind of mutation  
 (c) Mutation are directional  
 (d)According to Hardy Weinberg the frequency of allele is supposed to remain fixed & even remain same through generation  
 (1) a, b, c (2) b, d  
 (3) a, b (4) Only b
- Q.146** Synapsids were derived from early reptiles. These synapsids gave rise to :  
 (1) Pelycosaur, therapsids and mammals  
 (2) Dinosaurs, thecodonts, crocodile  
 (3) Modern reptile and bird  
 (4) Modern reptile, dinosaurs and bird
- Q.147** Jaw less fish probably evolved around :  
 (1) 320 mya (2) 500 mya  
 (3) 350 mya (4) 200 mya
- Q.148** During biological evolution which one of the following formed first :  
 (1) Protocell (2) Eiobiont  
 (3) Chemoautotrophs (4) Protobiont
- Q.149** Which of the following was not explained by Darwin?  
 (1) Arrival of fittest (2) Natural selection  
 (3)Struggle for existance (4) Over reproduction
- Q.150** Sugar glider does not show adaptive radiation with  
 (1) Kangaroo (2) Tiger cat  
 (3) Flying squirrel (4) (1) and (2) both
- Q.151** Hardy Weinberg Principle fails when :-  
 (a)  $(p + q) \neq 1$   
 (b)  $(p + q)^2 \neq 1$   
 (c) Gene pool  $\neq$  constant.  
 (d) Gene migration occur in a population.  
 (e) Natural selection occur in a population.  
 (f) Dominant allele frequency  $\neq$  Recessive allele frequency  
 (1) a, c, d, e, f (2) a, c, d, e  
 (3) a, b, c, d, e (4) a, b, c, d, e, f
- Q.152** Mark the incorrect, about their origin :-  
 (1) *Dryopithecus* (a) 15 mya  
 (2) *Homo erectus* (b) in 1891  
 (3) *Homo sapiens* (c) 75000 years ago  
 (4) *Australopithecus* (d) 2 mya
- Q.153** Sickle cell anaemia is a \_\_\_\_\_ disease.  
 (1) hereditary (2) physiological  
 (3) pathogenic (4) deficiency
- Q.154** Humans contain \_\_\_\_\_ of chromosomes.  
 (1) 23 number (2) 23 pairs  
 (3) 22 number (4) 22 pairs
- Q.155** Number of autosomes in human sex cells is  
 (1) 22 (2) 12  
 (3) 44 (4) 23
- Q.156** Antiparallel strands of a DNA molecule means that  
 (1) one strand turns clockwise.  
 (2) one strand turns anti-clockwise.  
 (3) the phosphate groups of two DNA strands, at their ends, share the same position.  
 (4) the phosphate groups at the start of two DNA strands are in opposite pole.
- Q.157** An organism with two identical alleles is called  
 (1) dominant (2) hybrid  
 (3) heterozygous (4) homozygous
- Q.158** Which of the following is suitable for experiment on linkage?  
 (1) aaBB  $\times$  aaBB (2) AABB  $\times$  aabb  
 (3) AaBb  $\times$  AaBb (4) AAbb  $\times$  AaBB
- Q.159** A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F<sub>1</sub> plants were selfed the resulting genotypes were in the ratio of  
 (1)1:2:1:: Tall homozygous : Tall heterozygous : Dwarf

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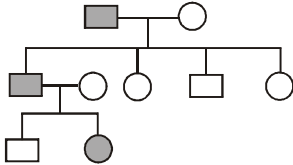
- (2) 1 : 2 : 1 :: Tall heterozygous : Tall homozygous: Dwarf  
 (3) 3 : 1 :: Tall : Dwarf  
 (4) 3 : 1 :: Dwarf : Tall

**Q.160** Sweet potato and potato are an example of  
 (1) analogous structure (2) homologous structure  
 (3) vestigial structure (4) both (1) and (3)

**Q.161** How many organisms with dominant are obtained, when  $AaBbCc \times AaBbCc$  are crossed:  
 (1)  $9/64$  (2)  $3/64$   
 (3)  $27/64$  (4)  $1/8$

**Q.162** A specific factor binds to the stop codon, terminating translation and releasing the complete polypeptide from the ribosome, these specific factor are known as:  
 (1) Initiation factor (2) rho factor  
 (3) Sigma factor (4) Releasing factor

**Q.163** Which of the following inheritance is not possible in given pedigree:

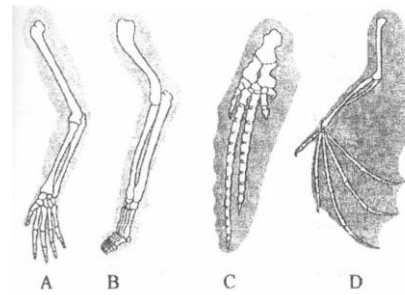


- (1) Autosomal recessive  
 (2) Autosomal dominant  
 (3) X-linked dominant  
 (4) X-linked recessive

**Q.164** According to genic balance theory of Bridge, which is correct for  $AAA + XXY$  condition of *Drosophila*  
 (1) Supermale (2) Superfemale  
 (3) Intersex (4) Male

**Q.165** What will be genotypic ratio in case of dominant epistasis:  
 (1) 12 : 3 : 1  
 (2) 9 : 7  
 (3) 9 : 3 : 4  
 (4) 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1

**Q.166** In the given figure structures A, B, C and D are forelimbs of Man, Cheetah, Whale and Bat respectively. Choose the correct option about them:



Options:

- (1) Structure A & B are analogous to each other  
 (2) Structure C & D are analogous to each other  
 (3) Structure A and B are homologous but Structure A and C are analogous  
 (4) All the structure are homologous

**Q.167** Read following statements:

- (a) Dominance is not an autonomous features of a gene.  
 (b) In case of co-dominance the  $F_1$  generation resembled either of the two parents.  
 (c) Due to dominance alleles do not shown any blending.  
 (d) In ABO blood type four types of phenotype are formed.

The correct statement are

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

**Q.168** The point mutation A to G, C to T, C to G, T to A in DNA are :

- (1) Transversion, transition, translocation, frame shift respectively  
 (2) Transition, transition, transversion, transversion respectively  
 (3) Transition only  
 (4) Transversion only

**Q.169** A true-breeding line is one that:

- (1) Have undergone continuous self-pollination  
 (2) Have undergone continuous cross-pollination  
 (3) Shows stable trait inheritance & expression for several generations  
 (4) (1) and (3) both

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**Q.170** In a certain plant red colour flower is incomplete dominance over white colour flower. When heterozygous Rr plant is crossed with heterozygous Rr plant then 400 offspring are obtained. The number of white offspring are:

- (1) 160 (2) 125  
(3) 500 (4) 100

**Q.171** Gene which code for a pair of contrasting traits are known as –

- (1) Allele (2) Non allele  
(3) Pseudo allele (4) Iso allele

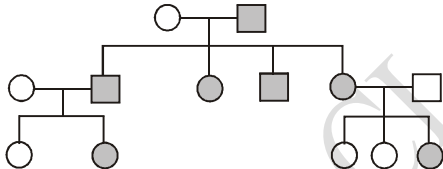
**Q.172** The synthesis phase marks the period during which DNA replication takes place. If the initial amount of DNA is denoted as 2C then it increases to .....

- (1) 2C (2) 4C  
(3) 8C (4) 16C

**Q.173** Which of the following codon has dual function ?

- (1) AUG (2) ACC  
(3) UAC (4) VAA

**Q.174** In the given pedigree, shaded symbols indicate dominant or recessive allele –



- (1) Dominant (2) Recessive  
(3) Codominant (4) None of the above

**Q.175** Epistasis differs from dominance, because –

- (1) In epistasis one gene pair mask the expression of another pair of genes.  
(2) Epistasis is an allelic interaction  
(3) Many genes collectively control a particular phenotype  
(4) One gene pair independently controls a particular phenotype

**Q.176** In transcription unit, the promoter is said to be located towards (with reference of coding strand)

- (1) 5' end of structural gene  
(2) 3' end of structural gene  
(3) 3' end of coding strand  
(4) All the above

**Q.177** When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed –

- (1) Convergent evolution (2) Divergent evolution  
(3) Microevolution (4) Co-evolution

**Q.178** One gene - one enzyme relationship was established for the first time in –

- (1) *Diplococcus pneumoniae*  
(2) *Neurospora crassa*  
(3) *Salmonella typhimurium*  
(4) *Escherichia Coli*

**Q.179** At the time of translation, r-RNA plays –

- (1) Only structural role  
(2) Only catalytic role  
(3) Structural and catalytic role  
(4) Adapter

**Q.180** The genotype of a plant showing the dominant phenotype can be determined by –

- (1) Back cross (2) Test cross  
(3) Dihybrid cross (4) Pedigree analysis

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