

Discover the Star within you and Get Rewarded

Paper Code: 02

# CAREER POINT STAR

Scholastic Test for Analysis and Reward

**CLASS - 12<sup>th</sup> (PCB)**

**(Class 12<sup>th</sup> Studying Students)**

Duration: 2:00 hours

Maximum marks: 360

## Instructions to Candidates

- CP Star Test paper consists of total 90 questions and has been divided in three sections as follows:

a. Physics	25 Questions	Que. No. 01 to 25
b. Chemistry	25 Questions	Que. No. 26 to 50
c. Biology	40 Questions	Que. No. 51 to 90
- All questions are compulsory.
- All the answers will be encircled in OMR sheet which is being provided along with this paper.
- For every correct answer marked by you, **4** marks will be allotted.
- For every incorrect answer marked by you, **1** marks will be deducted.
- Use of calculator is not permitted in any case.
- Any kind of malpractice will expel you from exam immediately.
- For any confusion please talk to the invigilator in the examination hall.
- For any kind of suggestions or complaints send Email at [info@cpil.in](mailto:info@cpil.in)



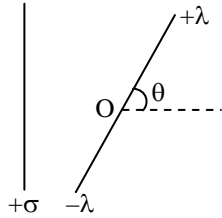
# CAREER POINT

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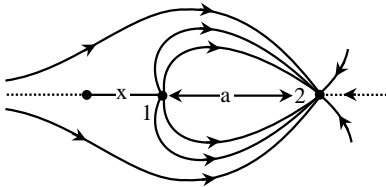
**SECTION-a [PHYSICS]**

**Q.1** A large sheet carries uniform surface charge density  $\sigma$ . A rod of length  $2\ell$  has a linear charge density  $\lambda$  on one half and  $-\lambda$  on the other half. The rod is hinged at mid-point O and makes angle  $\theta$  with the normal to the sheet. The torque experienced by the rod is (consider electric field due to sheet of charge as  $\frac{\sigma}{2\epsilon_0}$  perpendicular to the sheet)



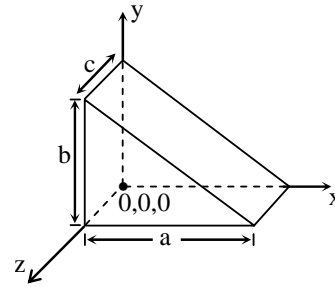
- (1)  $\frac{\sigma\lambda\ell^2}{2\epsilon_0} \cos \theta$       (2)  $\frac{\sigma\lambda\ell}{\epsilon_0} \cos^2 \theta$   
 (3)  $\frac{\sigma\lambda\ell^2}{2\epsilon_0} \sin \theta$       (4)  $\frac{\sigma\lambda\ell}{\epsilon_0} \sin^2 \theta$

**Q.2** The field pattern is shown due to two point charges 1 and 2. Then  $\frac{q_1}{q_2} =$



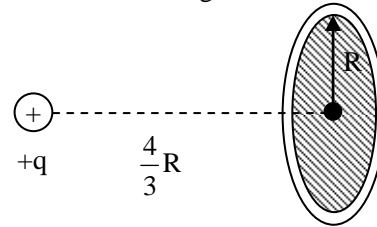
- (1)  $-\frac{1}{2}$       (2)  $-2$   
 (3)  $\frac{1}{2}$       (4) None of these

**Q.3** In the given electric field  $E = [(d + x) \hat{i} + E_0 \hat{j}]$  N/C a hypothetical closed surface is taken as shown in figure. The total charged enclosed within the close surface is -



- (1)  $\frac{abc \epsilon_0}{2}$     (2)  $\frac{acd \epsilon_0}{2}$     (3)  $\frac{abd \epsilon_0}{2}$     (4) None

**Q.4** Find the flux through the disc.



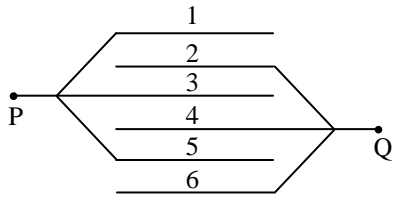
- (1)  $\frac{q}{10\epsilon_0}$     (2)  $\frac{q}{5\epsilon_0}$     (3)  $\frac{q}{6\epsilon_0}$     (4)  $\frac{q}{2\epsilon_0}$

**Q.5** Two parallel plate air filled capacitors each of capacitance C, are joined in series to a battery of emf V. The space between the plates of one of the capacitors is then completely filled up with a uniform dielectric having dielectric constant K. The quantity of charge which flows through the battery is -

- (1)  $\frac{CV}{2} \left( \frac{K-1}{K+1} \right)$       (2)  $\frac{CV}{2} \left( \frac{K+1}{K-1} \right)$   
 (3)  $CV \left( \frac{K-1}{K+1} \right)$       (4)  $CV \left( \frac{K+1}{K-1} \right)$

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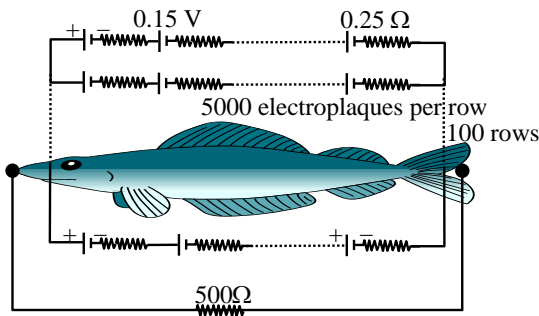
**Q.6** Six metallic plates each with a surface area of one side  $A$ , are placed at a distance  $d$  from each other. The alternate plates are connected to points  $P$  and  $Q$  as shown in figure :



The capacitance of the system is :

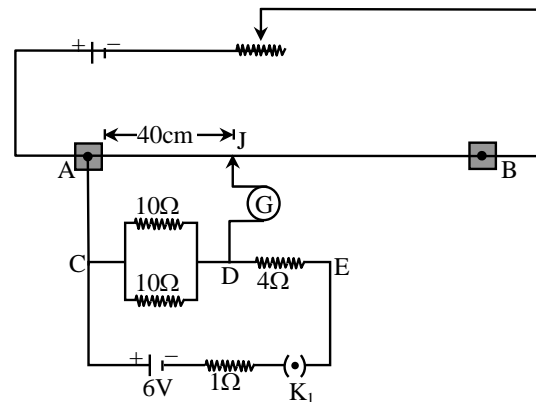
- (1)  $\epsilon_0 A/d$                       (2)  $5\epsilon_0 A/d$   
 (3)  $6\epsilon_0 A/d$                       (4)  $\epsilon_0 A/5d$

**Q.7** Eels are able to generate current with biological cells called electroplaques. The electroplaques in an eel are arranged in 100 rows, each row stretching horizontally along the body of the fish containing 5000 electroplaques. The arrangement is suggestively shown below. Each electroplaque has an emf of  $0.15\text{ V}$  and internal resistance of  $0.25\Omega$ . The water surrounding the eel completes a circuit between the head and its tail. If the water surrounding it has a resistance of  $500\Omega$ , the current an eel can produce in water is about



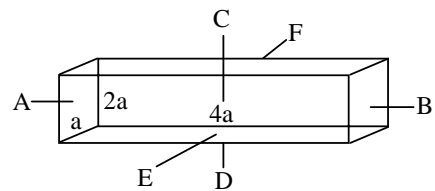
- (1)  $1.5\text{ A}$     (2)  $3.0\text{ A}$     (3)  $15\text{ A}$     (4)  $30\text{ A}$

**Q.8** In the circuit shown in figure the potential difference between the points  $C$  and  $D$  is balanced against  $40\text{ cm}$  length of potentiometer wire of total length  $100\text{ cm}$ . In order to balance the potential difference between the points  $D$  and  $E$ , where should jockey be pressed on potentiometer wire i.e. balance length is-



- (1)  $16\text{ cm}$                               (2)  $32\text{ cm}$   
 (3)  $56\text{ cm}$                               (4)  $80\text{ cm}$

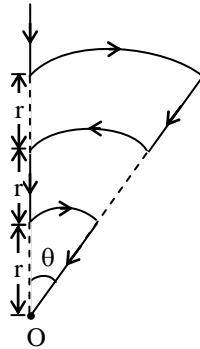
**Q.9** A conductor with rectangular cross-section has dimensions  $(a \times 2a \times 4a)$  as shown in figure. Resistance across  $AB$  is  $R_1$ , across  $CD$  is  $R_2$  and across  $EF$  is  $R_3$ . Then



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

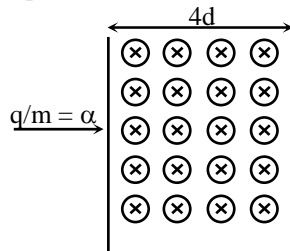
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**Q.10** Shown in the figure is a conductor carrying a current  $I$ . The magnetic field intensity at the point  $O$  (common centre of all the three arcs) is-



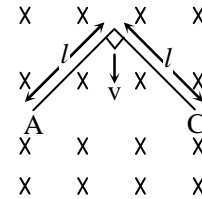
- (1)  $\frac{5\mu_0 I\theta}{24\pi r}$  (2)  $\frac{\mu_0 I\theta}{24\pi r}$  (3)  $\frac{11\mu_0 I\theta}{24\pi r}$  (4) zero

**Q.11** If a charged particle of charge to mass ratio  $\frac{q}{m} = \alpha$  enters in a magnetic field of strength  $B$  at a speed  $v = (2\alpha d)(B)$ , then -



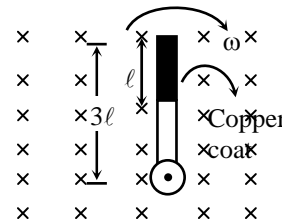
- (1) angle subtended by the path of charged particle in magnetic field at the center of circular path is  $2\pi$   
 (2) the charge will move on a circular path and then will come out from magnetic field at some distance from the point of insertion  
 (3) the time for which particle will be in the magnetic field is  $\frac{2\pi}{\alpha B}$   
 (4) angle subtended by the path of charged particle in magnetic field at the center of circular path is  $\pi/2$

**Q.12** A rigid conducting wire bent as shaped in the figure, is released to fall freely in a horizontal magnetic field which is perpendicular to the plane of the conductor. If the magnetic field strength is  $B$ , then the emf induced across the points  $A$  and  $C$  when it has fallen through a distance  $h$  will be -



- (1)  $B l \sqrt{2gh}$  (2)  $B l \sqrt{gh}$   
 (3)  $2B l \sqrt{gh}$  (4)  $2B l \sqrt{2gh}$

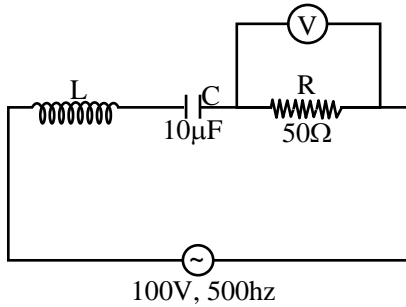
**Q.13** A wooden stick of length  $3\ell$  is rotated about an end with constant angular velocity  $\omega$  in a uniform magnetic field  $B$  perpendicular to the plane of motion. If the upper one-third of its length is coated with copper, the potential difference across the whole length of the stick is



- (1)  $\frac{9B\omega\ell^2}{2}$  (2)  $\frac{4B\omega\ell^2}{2}$   
 (3)  $\frac{5B\omega\ell^2}{2}$  (4)  $\frac{B\omega\ell^2}{2}$

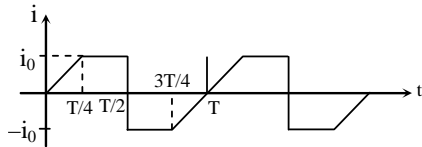
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**Q.14** In the circuit shown, voltmeter reads 100V. Then L is



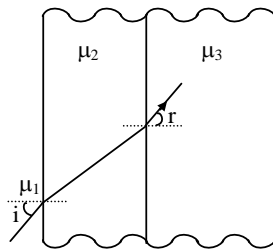
- (1) 0.1 H                      (2) 0.2 H  
 (3) 0.02 H                    (4) 0.01 H

**Q.15** Mean value of the given alternating current (A.C.) for half cycle (0 to T/2), is -



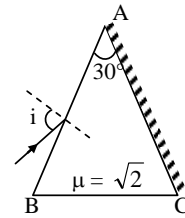
- (1)  $\frac{i_0}{2}$                       (2)  $\frac{i_0}{4}$                       (3)  $\frac{3i_0}{4}$                       (4) Zero

**Q.16** In the figure shown  $\frac{\sin i}{\sin r}$  is equal to :



- (1)  $\frac{\mu_2^2}{\mu_3 \mu_1}$                       (2)  $\frac{\mu_3}{\mu_1}$   
 (3)  $\frac{\mu_3 \mu_1}{\mu_2^2}$                       (4) None of the above

**Q.17** Calculate value of i for which light ray will retrace its original path-

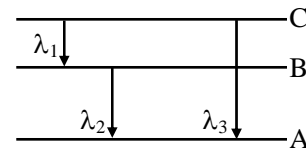


- (1) 90°                      (2) 60°                      (3) 45°                      (4) 30°

**Q.18** A ray of light is incident on a plane mirror along a vector  $\hat{i} + \hat{j} - \hat{k}$ . The normal on incidence point is along  $\hat{i} + \hat{j}$ . Then unit vector along the reflected ray is -

- (1)  $\frac{1}{\sqrt{3}} (\hat{i} + \hat{j} + \hat{k})$                       (2)  $-\frac{1}{\sqrt{3}} (\hat{i} + \hat{j} + \hat{k})$   
 (3)  $\frac{1}{\sqrt{3}} (-\hat{i} - \hat{j} + \hat{k})$                       (4) None of these

**Q.19** Energy levels A, B, C of a certain atom corresponds to increasing values of energy, i.e.,  $E_A < E_B < E_C$ . If  $\lambda_1$ ,  $\lambda_2$  and  $\lambda_3$  are the wavelengths of radiations corresponding to the transitions, C to B, B to A and C to A respectively, which of the following statement is correct ?



- (1)  $\lambda_3 = \lambda_1 + \lambda_2$                       (2)  $\lambda_3 = \frac{\lambda_2 \lambda_1}{\lambda_1 + \lambda_2}$   
 (3)  $\lambda_1 + \lambda_2 + \lambda_3 = 0$                       (4)  $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$

*Space for rough work*

**Q.20** The radius of the  $n$ th Bohr orbit of hydrogen like atom of atomic number  $Z$  is given by :

(where  $k = \frac{1}{4\pi\epsilon_0}$ )

- (1)  $\frac{n^2 h^2}{4\pi^2 k Z m e^2}$       (2)  $\frac{k \pi h}{4\pi^2 Z m e^2}$   
 (3)  $\frac{n^2 h^2}{2\pi^2 k Z m e^2}$       (4)  $\frac{nh}{2\pi^2 k Z m e^2}$

**Q.21** A sample of radioactive material decays simultaneously by two processes A and B with half-lives  $\frac{1}{2}$  hr and  $\frac{1}{4}$  hr, respectively.

For first half hour it decays with the process A, next one hour with the process B, and for further half an hour with both A and B. If originally there were  $N_0$  nuclei, find the number of nuclei after 2h of such decay.

- (1)  $\frac{N_0}{(2)^8}$     (2)  $\frac{N_0}{(2)^4}$     (3)  $\frac{N_0}{(2)^6}$     (4)  $\frac{N_0}{(2)^5}$

**Q.22** During mean life of a radioactive element, the fraction that disintegrates is -

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

**Q.23** Photon and electron are given same energy ( $10^{-20}$  J). Wavelength associated with photon and electron are  $\lambda_{ph}$  and  $\lambda_{el}$ , then correct statement will be -

- (1)  $\lambda_{ph} > \lambda_{el}$       (2)  $\lambda_{ph} < \lambda_{el}$   
 (3)  $\lambda_{ph} = \lambda_{el}$       (4)  $\frac{\lambda_{el}}{\lambda_{ph}} = C$

**Q.24** If potential of 20 kV is applied across coolidge tube then wavelength that can not emitted from coolidge tube is

- (1)  $0.5 \text{ \AA}$     (2)  $0.8 \text{ \AA}$     (3)  $1 \text{ \AA}$     (4)  $100 \text{ \AA}$

**Q.25** Light described at a place by the equation

$$E = (100 \text{ V/m}) [\sin (5 \times 10^{15} \text{ s}^{-1}) t + \sin (8 \times 10^{15} \text{ s}^{-1}) t]$$

falls on a metal surface having work function 2eV.

Calculate the max. K.E. of the photo electron.

- (1) 5.27 eV      (2) 1.71 eV  
 (3) 3.27 eV      (4) 0.854 eV

### SECTION-b [CHEMISTRY]

**Q.26** Which of the following statements is incorrect ?

- (1) When NaCl reacts with acidified dichromate, it forms  $\text{CrO}_2\text{Cl}_2$  which forms yellow precipitate with NaOH  
 (2)  $\text{K}_2\text{Cr}_2\text{O}_7$  form deep blue solution of  $\text{CrO}_5$  with  $\text{H}_2\text{O}_2$  in acidic medium  
 (3)  $\text{KMnO}_4$  is prepared from pyrolusite ore ( $\text{MnO}_2$ )  
 (4) Both  $\text{KMnO}_4$  and  $\text{K}_2\text{Cr}_2\text{O}_7$  are coloured due to charge transfer spectra

**Q.27** The rate law of the reaction,



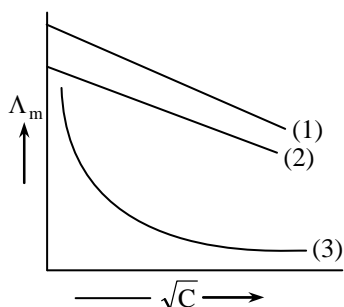
Product is given by  $\frac{d[P]}{dt} = K[A]^2.[B]$ . If A is

taken in large excess, the order of the reaction will be :

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

*Space for rough work*

- Q.28** Molar conductance  $\Lambda_m$  is plotted against  $\sqrt{C}$  ( $\text{mol litre}^{-1}$ ) for three electrolytes (NaCl, HCl,  $\text{NH}_4\text{OH}$ )



which of the following is correct

- |                            |      |                        |   |
|----------------------------|------|------------------------|---|
|                            | 1    | 2                      | 3 |
| (1) NaCl                   | HCl  | $\text{NH}_4\text{OH}$ |   |
| (2) HCl                    | NaCl | $\text{NH}_4\text{OH}$ |   |
| (3) $\text{NH}_4\text{OH}$ | NaCl | HCl                    |   |
| (4) $\text{NH}_4\text{OH}$ | HCl  | NaCl                   |   |
- Q.29** A body centered cubic lattice is made up of hollow spheres of B. Spheres of solid A are present in hollow spheres of B. Radius A is half of radius of B. What is the ratio of total volume of spheres of B unoccupied by A in a unit cell and volume of unit cell ?
- (1)  $\frac{7\sqrt{3}\pi}{64}$  (2)  $\frac{7\sqrt{3}}{128}$  (3)  $\frac{7\pi}{24}$  (4)  $\frac{7\pi}{64\sqrt{3}}$
- Q.30** Assuming complete ionization, the solution having maximum freezing point will be -
- (1) 1 M  $\text{CaF}_2$  (2) 1.5 M  $\text{Al}_2(\text{SO}_4)_3$   
 (3) 2 M NaCl (4) 1 M  $\text{AgNO}_3$

- Q.31** Consider the following complexes -



Their electrical conductances in aq. solutions are-

- (1) 256, 0, 97, 404 (2) 404, 0, 97, 256  
 (3) 256, 97, 0, 404 (4) 404, 97, 256, 0

- Q.32** On heating a mixture of  $\text{Cu}_2\text{O}$  and  $\text{Cu}_2\text{S}$ , we get :

- (1)  $\text{Cu} + \text{SO}_2$  (2)  $\text{Cu} + \text{SO}_3$   
 (3)  $\text{CuO} + \text{CuS}$  (4)  $\text{Cu}_2\text{SO}_3$

- Q.33** For a gas reaction at T(K) the rate is given

by  $-\frac{dp_A}{dt} = k' p_A^2 \text{ atm/hr}$ . If the rate equation

is expressed as  $-\dot{r}_A = -\frac{1}{V} \frac{dn_A}{dt} = kC_A^2$ ,

mol/(litre-hr), the rate constant k is given by-

- (1)  $k = k'$  (2)  $k = k' RT$   
 (3)  $k = k'/RT$  (4)  $k = k' (RT)^2$

where R = ideal gas law constant, cal/g mol. K

- Q.34** Effective atomic number of  $\text{Co}(\text{CO})_4$  is 35, hence it is less stable. It attains stability by -

- (1) Oxidation of Co  
 (2) Reduction of Co  
 (3) Dimerization  
 (4) Both (2) and (3)

*Space for rough work*

- Q.35** Two solutions (A) containing  $\text{FeCl}_3(\text{aq.})$  and (B) containing  $\text{K}_4[\text{Fe}(\text{CN})_6]$  are separated by semi permeable membrane as shown below -

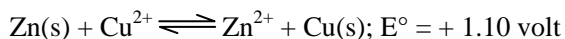
(A)	(B)
$\text{FeCl}_3$	$\text{K}_4[\text{Fe}(\text{CN})_6]$

5 SPM

If  $\text{FeCl}_3$  on reaction with  $\text{K}_4[\text{Fe}(\text{CN})_6]$  produces blue colour of  $\text{Fe}_4[\text{Fe}(\text{CN})_6]$ , the blue colour will be noticed in -

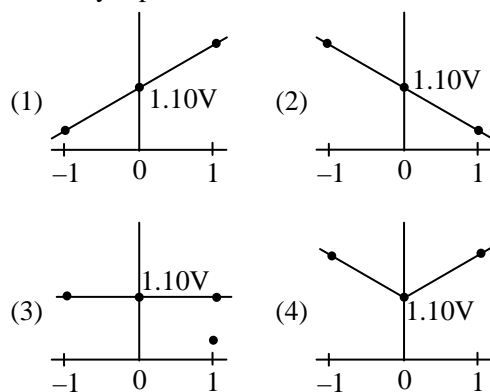
- (1) (A)
- (2) (B)
- (3) In both (A) and (B)
- (4) Neither in (A) nor in (B)

- Q.36** The overall cell reaction of Daniell cell is :



$$Q = \frac{[\text{Zn}^{2+}]}{[\text{Cu}^{2+}]}$$

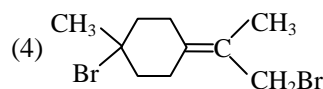
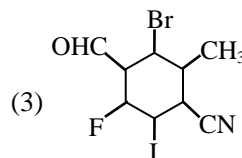
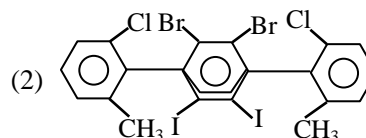
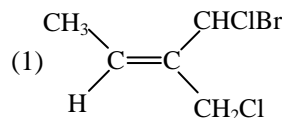
When  $\log_{10}Q$  is plotted on X-axis and  $E_{\text{cell}}$  on Y-axis, then which of the following will correctly represent the variation ?



- Q.37** Half-life of reaction is halved as the initial concentration of the reactant is doubled. The order of reaction is -  
 (1) 0.5    (2) 1    (3) 2    (4) 0

- Q.38**  $\text{CrO}_4^{2-}$  (yellow)-changes to  $\text{Cr}_2\text{O}_7^{2-}$  (orange) in  $\text{pH} = x$  and vice-versa in  $\text{pH} = y$ ,  $x$  and  $y$  can be-  
 (1) 6, 5    (2) 6, 8    (3) 8, 9    (4) 7, 7

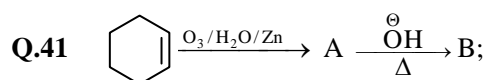
- Q.39** Which of the following compounds is optically inactive ?



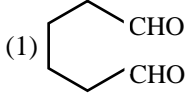
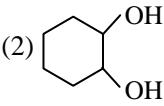
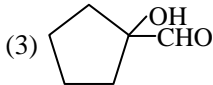
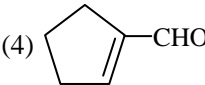
- Q.40** Formaldehyde forms an addition product with  $\text{CH}_3\text{MgI}$  which on hydrolysis gives :  
 (1) ethyl iodide    (2) ethyl alcohol  
 (3) methyl alcohol    (4) methyl iodide

*Space for rough work*





In the given sequence 'B' is :-

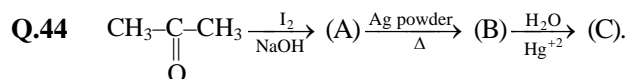
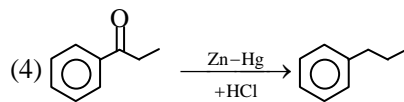
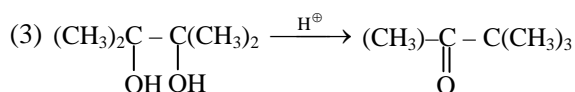
- (1)  (2)   
 (3)  (4) 

Q.42 In which reaction product formation takes place by Saytzeff rule ?

- (1)  $CH_3-CH_2-\overset{\text{Br}}{\underset{|}{\text{C}}}-CH_3 \xrightarrow{(CH_3)_3COK/\Delta}$   
 (2)  $CH_3-CH_2-\overset{\text{OAc}}{\underset{|}{\text{C}}}-CH_3 \xrightarrow{\Delta}$   
 (3)  $CH_3-CH_2-\overset{\oplus}{\underset{|}{\text{C}}}-\overset{\ominus}{\text{N}}(\text{CH}_3)_2 \xrightarrow{\Delta}$   
 (4)  $CH_3-CH_2-\overset{\text{Br}}{\underset{|}{\text{C}}}-CH_3 \xrightarrow{CH_3ONa/\Delta}$

Q.43 In which reaction product is wrong


- (1)  $CH_3-\underset{\text{CH}_3}{\underset{|}{\text{C}}}-\underset{\text{Br}}{\underset{|}{\text{C}}}-CH_3 \xrightarrow{(CH_3)_3CONa}$   
 $CH_3-\overset{\text{C}}{\underset{\text{CH}_3}{|}}=CH-CH_3$   
 (2)  $CH_3-Cl + (CH_3)_3CONa \rightarrow CH_3-O-C(CH_3)_3$



Product A, B & C are -

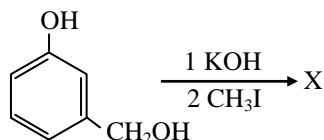
- (1) Iodoform, Acetylene & Acetaldehyde  
 (2) Triiodomethane, Ethyne & Acetone  
 (3) Iodoform, Ethene & Ethylene glycol  
 (4) Ethene, iodoform & Ethylhydrogen sulphate

Q.45 When of the following gives do not aldol reaction

- (1)  $CH_3-\overset{\text{O}}{\underset{\text{O}}{\parallel}}\text{C}-H$   
 (2) -CH<sub>2</sub>- $\overset{\text{O}}{\underset{\text{O}}{\parallel}}\text{C}-H$   
 (3)  $CH_3-\overset{\text{O}}{\underset{\text{O}}{\parallel}}\text{C}-CH_3$   
 (4)  $H-\overset{\text{O}}{\underset{\text{O}}{\parallel}}\text{C}-H$

Space for rough work

**Q.46** The product X is



- (1) Oc1ccc(COC)cc1      (2) COc1ccc(CO)cc1  
 (3) Cc1ccc(CO)cc1      (4) COc1ccc(COC)cc1

**Q.47** Which of the following acid on heating do not form anhydride

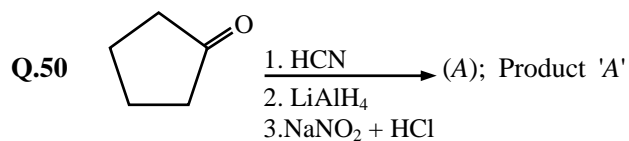
- (1) Succinic acid      (2) phthalic acid  
 (3) Maleic acid      (4) Malonic acid

**Q.48** Which of the following compounds will react with  $\text{Br}_2$  and aqueous  $\text{KOH}$  to give a primary amine,  $\text{RNH}_2$  ?

- (1)  $\text{RCONHCH}_3$       (2)  $\text{RCOONH}_4$   
 (3)  $\text{RCONH}_2$       (4)  $\text{RCONHOH}$

**Q.49** Which is not true about acetophenone ?

- (1) Reacts to form 2, 4-dinitrophenyl hydrazine  
 (2) Reacts with Tollen's reagent to form silver mirror  
 (3) Reacts with  $\text{I}_2/\text{NaOH}$  to form iodoform  
 (4) On oxidation with alkaline  $\text{KMnO}_4$  followed by hydrolysis gives benzoic acid



will be

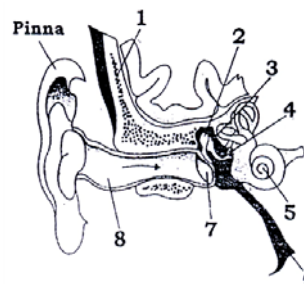
- (1) O=C1CCCCC1      (2) O=C1C=CCCC1  
 (3) O=C1CCCCC1      (4) None of these

### SECTION-c [BIOLOGY]

**Q.51** What is the concentration of sodium & potassium when neuron is at resting potential-

- (1) High  $\text{K}^+$  and high  $\text{Na}^+$  outside the neuron  
 (2) High  $\text{K}^+$  and low  $\text{Na}^+$  outside the neuron  
 (3) Low  $\text{K}^+$  and low  $\text{Na}^+$  outside the neuron  
 (4) Low  $\text{K}^+$  and high  $\text{Na}^+$  outside the neuron

**Q.52** Observe the above diagram. Identify 1 to 8 –



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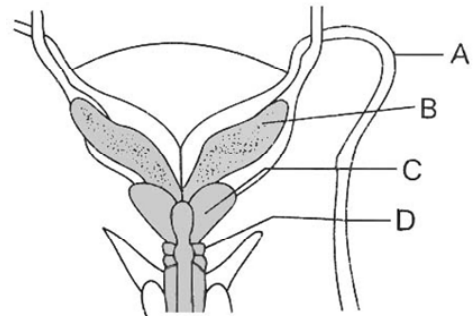
- (1) 1 – Temporal bone, 2 – Malleus, 3 – Incus, 4 – Stapes, 5 – Cochlea, 6 – Eustachian tube, 7 – tympanic membrane, 8 – External auditory canal
- (2) 1 – Tympanic membrane, 2 – Malleus, 3 – Incus, 4 – Stapes, 5 – Cochlea, 6 – Eustachian tube, 7 – Temporal bone, 8 – External auditory canal
- (3) 1 – Temporal bone, 2 – Incus, 3 – Malleus, 4 – Stapes, 5 – Cochlea, 6 – Eustachian tube, 7 – Tympanic membrane, 8 – External auditory canal
- (4) 1 – Temporal bone, 2 – Malleus, 3 – Incus, 4 – Cochlea, 5 – Stapes, 6 – Eustachian tube, 7 – tympanic membrane, 8 – External auditory canal

- (1) A-Pharynx, B-Parathyroid, C-Thyroid, D-Trachea
- (2) A-Pharynx, B-Thyroid, C-Parathyroid, D-Trachea
- (3) A-Trachea, B-Parathyroid, C-Thyroid, D-Pharynx
- (4) A-Pharynx, B-Trachea, C-Parathyroid, D-Thyroid

**Q.56** Mark the series with odd -

- (1) Spermatoocyte, Prostate, Spermatoid, Acrosome
- (2) Endometrium, Graafian follicle, Polar body
- (3) Vas deferens, Fallopian tube, Epididymis, Cowper's gland
- (4) Ovaries, Vagina, Bartholin's gland, Corpus luteum

**Q.57** Given below is a diagrammatic sketch of a portion of human male reproductive system. Select the correct set of the names of the parts labelled A, B, C, D -

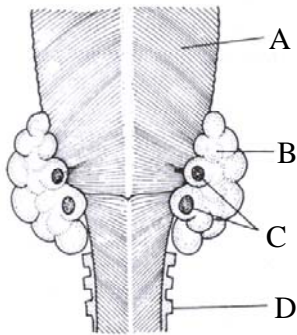


- | A                | B               | C                   | D                   |
|------------------|-----------------|---------------------|---------------------|
| (1) Vas deferens | Seminal vesicle | Bulbourethral gland | Prostate            |
| (2) Ureter       | Seminal vesicle | Prostate            | Bulbourethral gland |
| (3) Ureter       | Prostate        | Seminal vesicle     | Bulbourethral gland |
| (4) Vas Deferens | Seminal vesicle | Prostate            | Bulbourethral gland |

**Q.53** Carotid artery supplies -  
(1) Brain (2) Skin (3) Lung (4) Limbs

**Q.54** Blood calcium level can be increased by the administration of -  
(1) glucagon (2) parathormone  
(3) thyroxine (4) calcitonin

**Q.55** Identify the parts in given diagram -



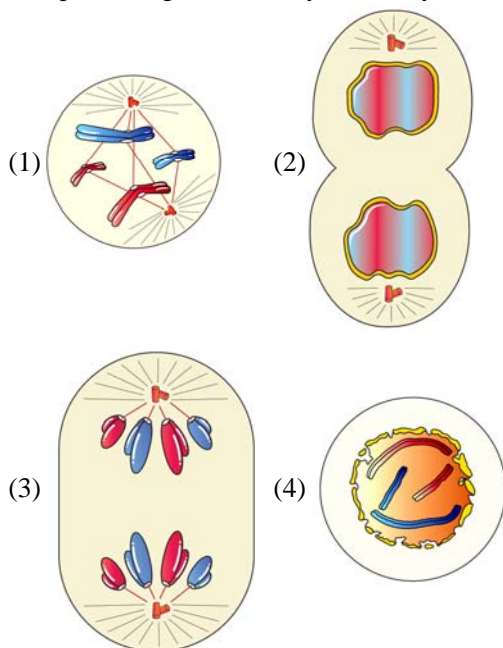
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- Q.58** ZIFT is  
 (1) Embryo implantation in vivo fertilization  
 (2) Egg implantation for in vivo fertilization  
 (3) Embryo implantation after in-vitro fertilization  
 (4) Egg implantation after in vitro fertilization

- Q.59** T-lymphocyte is produced in -  
 (1) Bone marrow (2) Spleen  
 (3) Pancreas (4) Thymus

- Q.60** Which one of the following is a correct match?  
 (1) Filariasis – *Taenia solium*  
 (2) Syphilis – *Treponema pallidum*  
 (3) Malaria – *Phlebotomus sp.*  
 (4) Kala-azar – *Anopheles stephensi*

- Q.61** Telophase stage is correctly shown by -



- Q.62** One chromosome contain two DNA molecule during -  
 A. G<sub>1</sub> phase B. Metaphase  
 C. Anaphase D. Telophase  
 E. Prophase  
 (1) B, C & E (2) A, B, C, D & E  
 (3) B & E (4) B, C, D & E

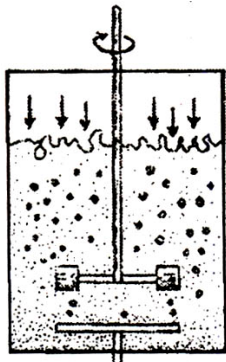
- Q.63** Reciprocal exchange of genetic material between non sister chromatid of homologous chromosome is known as .....**A**..... and it occur during .....**B**.....  
 (1) Crossing over and Pachytene  
 (2) Chiasma & Pachytene  
 (3) Crossing over and diplotene  
 (4) Synapsis and Zygotene

- Q.64** The *Bt* toxin is not toxic to human beings because -  
 (1) The pro *Bt* toxin activation requires temperature above human body temperature  
 (2) The *Bt* toxin recognizes only insect-specific targets  
 (3) The *Bt* toxin formation from pre *Bt* toxin requires pH lower than that present in human stomach  
 (4) Conversion of pro *Bt* toxin to *Bt* toxin takes place only in highly alkaline conditions

- Q.65** Humulin is  
 (1) antibiotic  
 (2) human insulin  
 (3) digestive enzyme  
 (4) a form of chitin

*Space for rough work*

**Q.66** Identify the correct match for the given apparatus



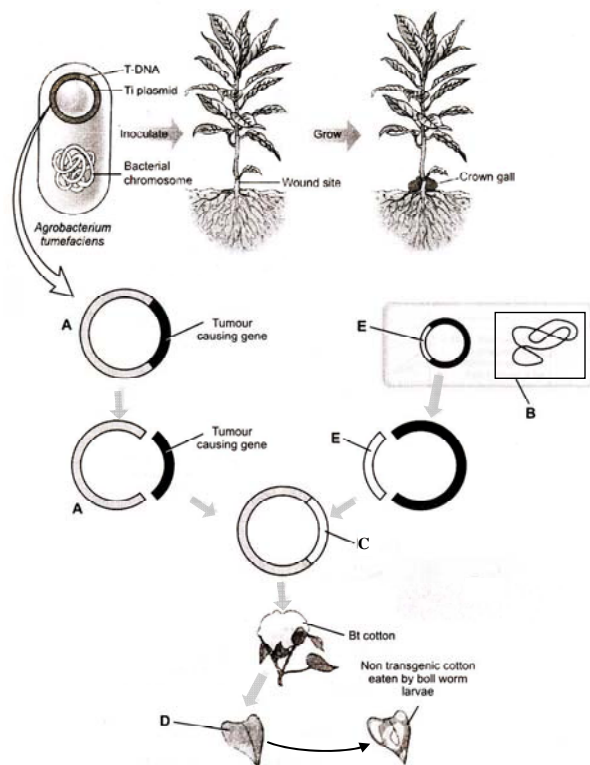
- | Apparatus                   | Function                           |
|-----------------------------|------------------------------------|
| (1) Gene gun                | Vectorless direct gene transfer    |
| (2) Column Chromatograph    | Separation of chlorophyll pigments |
| (3) Sparged tank bioreactor | Carry out fermentation process     |
| (4) Respirometer            | Finding out rate of respiration    |

**Q.67** Go through the figure and select the option out of (a – d)



- | A DNA      | B DNA   | Enzyme recognizing palindrome | Enzyme joining the sticky ends |
|------------|---------|-------------------------------|--------------------------------|
| (1) Vector | Foreign | DNA ligase                    | EcoRI                          |
| (2) Vector | Foreign | EcoRI                         | DNA ligase                     |
| (3) Vector | Foreign | Exonuclease                   | DNA ligase                     |
| (4) Vector | Foreign | DNA ligase                    | Exonuclease                    |

**Q.68** This is the method of making GM crops resistant to attack of pests. Pick up the correct befitting match .

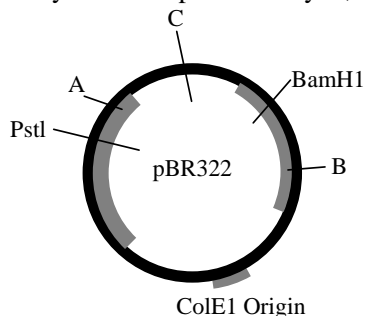


- (1) A-Ti plasmid from *Agrobacterium*, B-*Bacillus thuringiensis*, C- Recombinant DNA of plasmid of *Agrobacterium tumefaciens* and Bt genes of *Bacillus thuringiensis*, D-Bt cotton killing larvae of bollworm, E-Bt gene
- (2) A-Bt gene, B-*Bacillus thuringiensis*, C- Recombinant DNA of plasmid of *Agrobacterium tumefaciens* and Bt genes of *Bacillus thuringiensis*, D-Bt cotton killing larvae of bollworm, E-Ti plasmid from *Agrobacterium*

Space for rough work

- (3) A-Ti plasmid from *Agrobacterium*, B-Recombinant DNA of plasmid of *Agrobacterium tumefaciens* and Bt genes of *Bacillus thuringensis*, C-*Bacillus thuringensis*, D-Bt cotton killing larvae of bollworm, E-Bt gene
- (4) A-Bt gene, B-Bt cotton killing larvae of bollworm, C-Recombinant DNA of plasmid of *Agrobacterium tumefaciens* and Bt genes of *Bacillus thuringensis*, D-*Bacillus thuringensis*, E-Ti plasmid from *Agrobacterium*

**Q.69** This is figure of plasmid pBR322. The gene conferring resistance of ampicillin (ApR) can be interrupted by insertion of a DNA fragment into the PstI site, and the gene conferring resistance to tetracycline (TcR) can be interrupted by insertion of a DNA fragment into the BamHI site. Replication is controlled by the ColE1 origin. Use of the TcR and ApR genes allows for easy screening for recombinant carrying inserts of foreign DNA. For locating EcoRI, TcR and ApR genes on it. Identify what is represented by A, B and C.



- (1) A-TcR, B-ApR and C-EcoRI  
 (2) A-EcoRI, B-ApR and C-TcR  
 (3) A-TcR, EcoRI and C-ApR  
 (4) A-ApR, B-TcR and C-EcoRI

**Q.70** Female gametophyte in life of angiospermic plants is developed in :  
 (1) Anther (2) Stigma  
 (3) Ovule (4) Seed

**Q.71** Most common type of ovule found in angiospermic plants is :  
 (1) Anatropous  
 (2) Hemitropous  
 (3) Campylotropous  
 (4) Carcinotropous

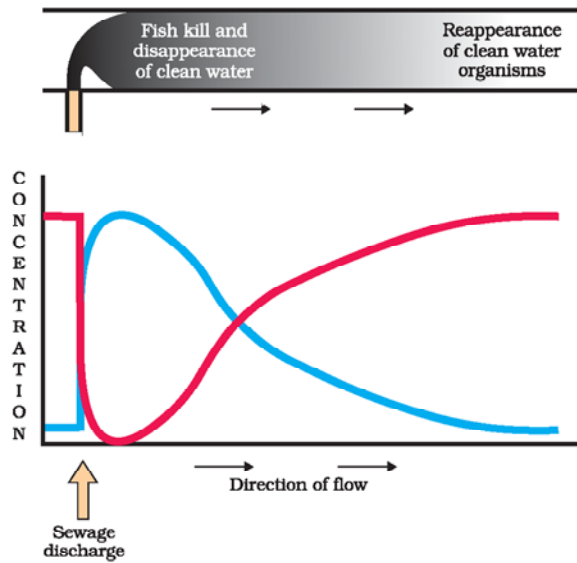
**Q.72** In Angiosperms each pollen grains produces two sperms. What do these sperms do in the fertilization of a flower ?  
 (1) Each one fertilizes a separate egg cell to give rise to two seeds  
 (2) One fertilizes an egg cell and the other fertilizes another cell that gives rise to the tissue of the fruit  
 (3) Both fertilizes a single egg cell  
 (4) One fertilizes an egg cell and the other fertilizes the cell that forms food reserve tissue

**Q.73** 'Pusa Sawani' and 'parbhani kranti' are varieties of  
 (1) Brassica (2) French bean  
 (3) Okra (4) Cauliflower

**Q.74** Green muffling can be used  
 (1) To reduce noise pollution  
 (2) To reduce green house gases  
 (3) To reduce ozone depletion  
 (4) Both (1) and (2)

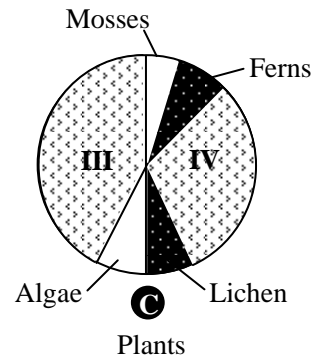
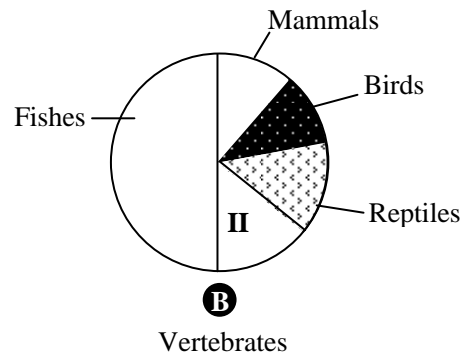
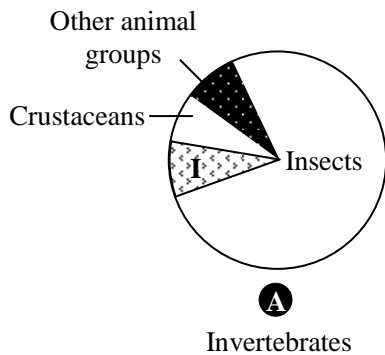
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**Q.75** The given water body the death of fishes will occur when –



- (1) BOD↓, D.O↓      (2) BOD↑, D.O↑  
 (3) BOD↑, D.O↓      (4) BOD↓, D.O↑

**Q.76** Given below are diagrams A, B and C related to proportionate number of species of major taxa of invertebrates, vertebrates and plants respectively. Critically study and fill in the blanks I, II, III and IV.

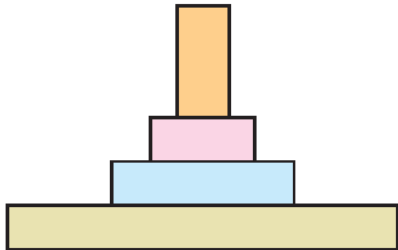


- (1) I- Molluscs, II-Amphibians, III-Fungi, IV-Angiosperms  
 (2) I-Molluscs, II-Amphibians, III-Angiosperms, IV-Fungi  
 (3) I-Hexapoda, II-Amphibians, III-Fungi, IV-Angiosperms  
 (4) I-Turtles, II-Amphibians, III-Fungi, IV-Angiosperms

*Space for rough work*

- Q.77** Which of the following is a secondary carnivore in an aquatic ecosystem ?  
 (1) Phytoplankton (2) Zooplankton  
 (3) Small fish (4) Large fish

- Q.78** The given kind of pyramid can **not** be possible for -



- (1) Pyramid of biomass in forest ecosystem  
 (2) Pyramid of number in grassland ecosystem  
 (3) Pyramid of number in lake ecosystem  
 (4) Pyramid of biomass in lake ecosystem

- Q.79** Match the components of '*lac operon*' of *E. coli* given under Column-I with their function listed in Column-II. Choose the answer with correct combination of alphabets of the two columns.

<b>Column-I</b> (Components of ' <i>lac operon</i> ')	<b>Column-II</b> (Function)
A. Structural gene	p. Binding site for repressor protein
B. Operator gene	q. Codes for repressor protein
C. Promoter gene	r. Induces lactose transport from the medium
D. Regulator gene	s. Codes for enzyme proteins
	t. Binding site for RNA polymerase

**Answer codes :**

- (1) A = q, B = t, C = p, D = r  
 (2) A = r, B = s, C = t, D = p  
 (3) A = s, B = p, C = t, D = q  
 (4) A = t, B = s, C = q, D = p

- Q.80** In operon model, RNA polymerase binds to -  
 (1) Regulator (2) Structural gene  
 (3) Promoter gene (4) Operator gene

- Q.81** P.C.R modification is  
 (1) A.F.L.P. (2) R.A.P.D.  
 (3) Both of above (4) R.F.L.P.

- Q.82** In DNA finger printing -  
 (1) Restriction enzyme digests or generate unique fragments  
 (2) The polymerase chain reaction amplifies fewer DNA  
 (3) The variability of repeated sequences between two restriction sites is evaluated  
 (4) All of these

- Q.83** Human genome project is being headed by -  
 (1) Watson (2) Crick  
 (3) Batson (4) Morgan

- Q.84** In the lac operon, the structural genes are switched off when repressor binds to the -  
 (1) Operator (2) Promoter  
 (3) Regulator (4) Inducer

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*Space for rough work*



**Q.85** ABO blood groups in humans are controlled by the gene  $I$ . It has three alleles –  $I^A$ ,  $I^B$  and  $i$ . Since there are three different alleles, six different genotypes are possible. How many phenotypes can occur ?

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

**Q.86** Based on the experiments conducted by Bridges on *Drosophila*, the female sex of *Drosophila* is determined by the genes located on which chromosomes ?

- (1) Autosomes (2) X and Y  
(3) Y (4) X

**Q.87** The linkage map of X chromosome of fruitfly has 66 units, with yellow body gene ( $y$ ) at one end and bobbed hair ( $b$ ) gene at the other end. The recombination frequency between these two genes ( $y$  and  $b$ ) should be -

- (1)  $\leq 50\%$  (2) 100% (3) 66% (4)  $> 50\%$

**Q.88** Imagine that in pea plant, the factors for controlling seed coat and seed shape are present on the same chromosome very close to each other, performing dihybrid experiments with these characters, Mendel would not have been able to arrive at the idea of -

- (1) dominance  
(2) independent assortment  
(3) incomplete dominance  
(4) segregation

**Q.89** Select the correct statement from the ones given below with respect to dihybrid cross –

- (1) Tightly linked genes on the same chromosome show higher recombinations  
(2) Genes far apart on the same chromosome show very few recombinations  
(3) Genes loosely linked on the same chromosome show similar recombinations as the tightly linked ones  
(4) Tightly linked genes on the same chromosome show very few recombination

**Q.90** In a back cross, a  $F_1$  hybrid is crossed with dominant parent, the offsprings :

- (1) All will be tall (2) 3 tall : 1 short  
(3) 1 tall : 1 short (4) 1 tall : 3 short

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*Space for rough work*

