

## **AIIMS MBBS ENTRANCE TEST 2018**

### **EXAMINATION PAPER WITH ANSWER & SOLUTIONS**

**(BASED ON MEMORY RETENTION)**

**Date : 27-05-2018 (Sunday) | Time : 9.00 am - 12.30 pm | Morning Session**

#### **NOTE :-**

1. Questions are collected from the appeared students.
2. The solutions are prepared by the expert faculty team of Resonance Pre-medical division, Kota.
3. Questions may not be in the order or sequence as asked in the actual examination paper.
4. The questions collected may not have all the options similar to the actual paper. Students are advised to see the question and answer / solutions.
5. Actual AIIMS Paper has 200 questions but we have included only those many questions which have been collected from the students as per following table :-

<b>Subject</b>	<b>No. of Question in Actual AIIMS Paper</b>	<b>No. of Question in this Paper</b>
<b>Physics</b>	60	13
<b>Chemistry</b>	60	52
<b>Biology</b>	60	60
<b>G.K. &amp; MAT</b>	20	15
<b>Total</b>	<b>200</b>	<b>140</b>

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## PART - A (PHYSICS)

1. Deuteron and an  $\alpha$  particle move in same radius in a uniform magnetic 'B' field. If energy of deuteron is  $E_0$ , then find out the energy of  $\alpha$  particle.

**Sol.**

$$r = \sqrt{\frac{2M_\alpha K_1}{Bq_\alpha}}$$

$$r_\alpha = \sqrt{\frac{2M_\alpha K_\alpha}{Bq_\alpha}}$$

$$r_\alpha = \frac{2M_d K_d}{Bq_d}$$

$$r_\alpha = r_\beta$$

$$\frac{M_\alpha K_\alpha}{q_\alpha^2} = \frac{M_\beta K_\beta}{q_\beta^2}$$

$$\frac{K_\alpha}{K_d} = \frac{M_d (q_\alpha)^2}{M_\alpha (q_d)^2}$$

$$\frac{2 (2e)^2}{4 e^2} = \frac{2}{1}$$

2. An elevator is going up with an acceleration  $2\text{m/s}^2$ . If radius of the wheel attached to the elevator is  $0.1\text{ m}$ , then find out number of revolutions in  $t = 10\text{ s}$ .

**Sol.**

$$\theta = 2\pi h = \frac{1}{2} (\alpha)t^2$$

$$x = \frac{1}{2} \left( \frac{a}{r} \right) t^2$$

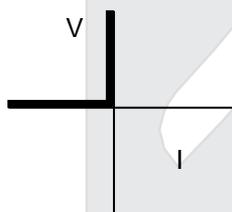
3. Find out the velocity of electron in second orbit of helium.

**Sol.** Velocity of  $e^-$  in  $n^{\text{th}}$  orbit =  $\frac{v_0}{n} z$

$$v_0 = 2.1 \times 10^6$$

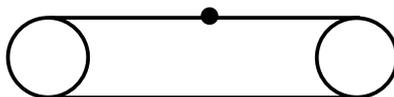
4. Which of the following is the correct graph showing V - I characteristics for an ideal PN junction diode?

**Sol.**



The forward resistance in forward bias is zero and in backward is infinite.

5. A tractor is connects with a belt the front an the back real. If mass of the belt is  $0.725$  and velocity of the belt is given as  $9\text{ km/hr}$ , when find out the kinetic energy of the belt.



**Sol.**  $KE = \frac{1}{2} M_{\text{belt}} V_{\text{belt}}^2$

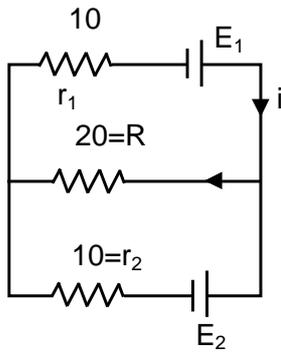
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6. In a YDSE experiment if position of first minima is given as  $Y_0$ , then find out the wavelength of light used if distance between slits is 'd' and screen is D.

**Sol.** position of nth maximum

$$(2n-1) \frac{\lambda}{2d} = \lambda_0$$

7.



Find out the current  $I_2$  as shown in the diagram.

**Sol.** 
$$E_{\text{net}} = \frac{E_1 r_2 + E_2 r_1}{r_1 + r_2}$$

$$I = \frac{E_{\text{net}}}{\frac{r_1 r_2}{r_1 + r_2} + R}$$

8. 2 long parallel wires which are 2 m apart carry current in the opposite direction but of same magnitude 2 amp. then find out the value of magnetic field intensity at the mid point of the 2 wires and in the same plane.

**Sol.** 
$$\frac{\mu_0 I}{2\pi \left(\frac{d}{2}\right)} + \frac{\mu_0 I}{2\pi \left(\frac{d}{2}\right)}$$

9. If decay constant of a radioactive sample is 0.05/year, then find out the time for which sample will decay by 75%.

**Sol.**  $X = 0.05$

$$\log_c \frac{N}{N_0} = -\lambda t$$

$$t = \frac{\log_e \frac{N_0}{N}}{\lambda} = \frac{\log_e 4}{\lambda}$$

$$N = \frac{N_0}{4}$$

10. Two masses undergo perfectly in elastic 1 dimension collision. In which  $M_1$  is 10 metric tonnes and moving with velocity 5 m/s collides with another stationary mass of 40 metric tonnes, then find out the loss of energy in collision.

**Sol.**  $M_1 = 10 M_T$

$M_2 = 40 M_T$

$u_1 = 5 \text{ m/s}$

$u_2 = 0$

Energy case = 100 J

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11. In a communication system the distance between 2 towers is given as 'd'. The height of the transmission antenna is  $h_1$ , then find out the height of the receiver antenna.

Sol.

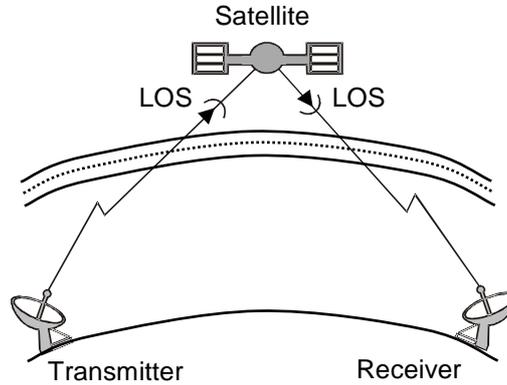
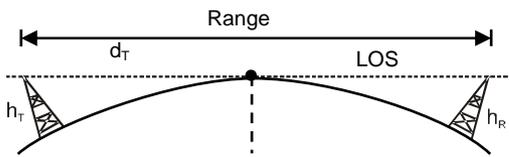


Figure. Space wave or line of sight LOS communication

The range versus antenna height relation may easily be determined using geometry of Figure 7. In

$$\begin{aligned} \Delta HMO, HO^2 &= HM^2 + MO^2 \\ \Rightarrow (R + h_t)^2 &= d_t^2 + R^2, R = \text{radius of the earth} \\ R^2 + h_t^2 + 2Rh_t &= d_t^2 + R^2 \\ 2Rh_t + h_t^2 &= d_t^2, h \ll R \end{aligned}$$

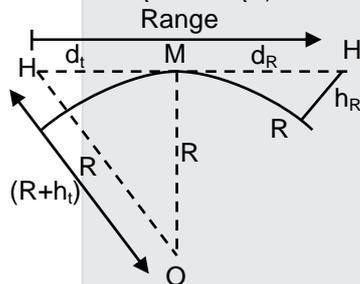


Figure . Ranger versus antenna height relation

$$d_T = \sqrt{2Rh_t}$$

$$\text{Similarly } d_R = \sqrt{2Rh_R} \quad \dots\dots(2)$$

$$\text{Hence range } d_m = (d_t + d_R) = \sqrt{2Rh_t} + \sqrt{2Rh_R} \quad \dots\dots(3)$$

12. If focal length of human eye is 2 cm, then find the focal length of contact lens. Such that a combined focus of 2.5 cm is obtained after using contact lens.

Sol.

$$\begin{aligned} P_{\text{net}} &= P_{\text{eye}} + P_{\text{contact lens}} \\ P_{\text{net}} &= \frac{1}{f_{\text{net}}} = \frac{1}{f_{\text{eye}}} + \frac{1}{f_{\text{contact lens}}} \\ \frac{1}{2.5} &= \frac{1}{2} + \frac{1}{f_{\text{contact lens}}} \\ F_{\text{contact}} &= -10 \end{aligned}$$

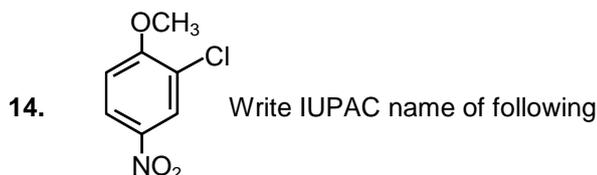
13. A closed vessel explodes at 15 atm pressure. If temperature of the vessel is 300 K at 10 atm pressure then find at what temperature will the vessel explodes.

Sol.

For closed vessel

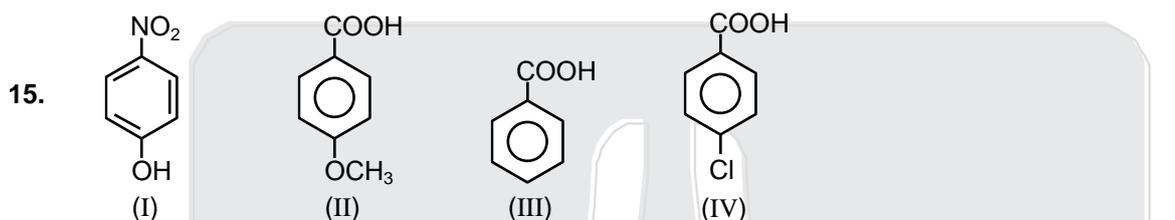
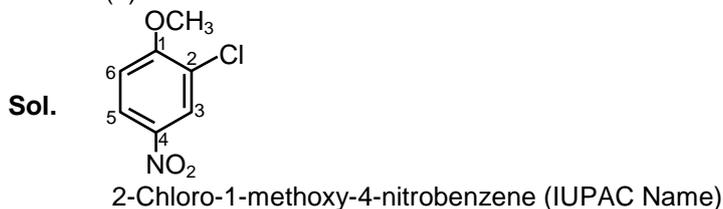
$$\begin{aligned} \frac{P_1}{T_1} &= \frac{P_2}{T_2} \\ \frac{10}{300} &= \frac{15}{T_2} \\ T_2 &= 450 \end{aligned}$$

## PART - B (CHEMISTRY)



- (1) 2-chloro-1-methoxy-4-nitrobenzene                      (2) 2-chloro-4-nitro anisole  
 (3) 3-chloro-4-methoxy-1-nitrobenzene                  (4) 1-chloro-2-methoxy-5-nitrobenzene

Ans. (1)

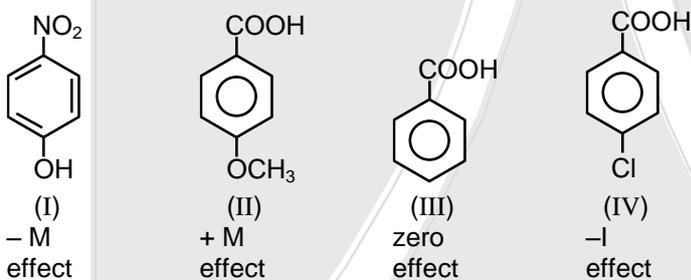


Write correct decreasing order of acidic strength ?

- (1) I > II > III > IV              (2) I > III > IV > II              (3) IV > III > II > I              (4) IV > III > I > II

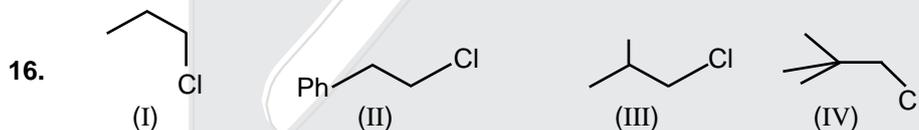
Ans (3)

Sol.



$K_a$  (acidic strength)  $\propto$  -I, -M effect  
 $\propto$  stability of conjugate base

Acidic strength = IV > III > II > I



Write decreasing order of  $S_N2$  reaction ?

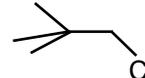
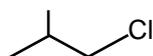
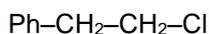
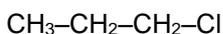
- (1) I > II > III > IV    (2) II > I > III > IV  
 (3) IV > III > II > I    (4) IV > III > I > II

Ans. (2)

Sol.

Rate of  $S_N2 \propto$  -I, -M effect

$$\propto \frac{1}{\text{steric crowding}}$$



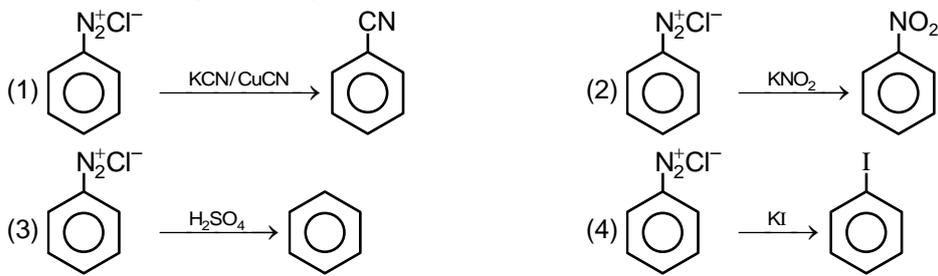
(I)    (II)  
 Rate of  $S_N2 = \text{II} > \text{I} > \text{III} > \text{IV}$

(III)

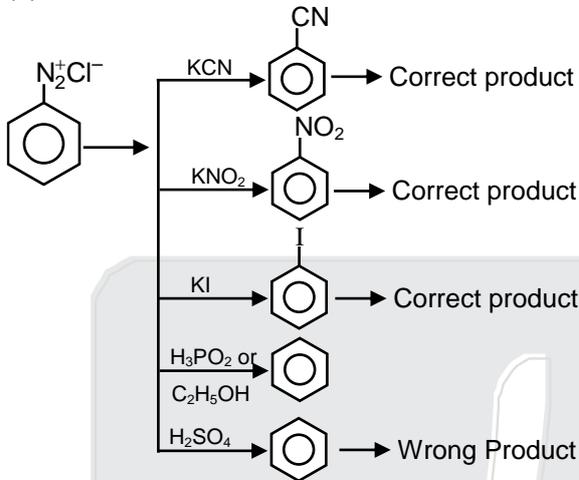
(IV)

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17. Which reaction give wrong product ?



Ans. (3)



18. In following cell reaction



Calculate  $E_{\text{cell}}$  for the reaction [  $E^{\circ} = 3.17\text{ V}$ ,  $\frac{2.30 RT}{F} = 0.054$  ]

- (1) 2.63 V                      (2) 3.01 V                      (3) 3.33 V                      (4) 3.51 V

Ans. (2)

Sol.  $E_{\text{Cell}} = E_{\text{Cell}}^{\circ} - \frac{RT}{nF} \ln Q$

$$= 3.17 - \frac{0.059}{2} \log \frac{(\text{Mg}^{2+})}{(\text{Ag}^+)^2}$$

$$= 3.01\text{ V}$$

19. For first order reaction as time duration goes from 10min to 30 min rate of reaction decreases from  $0.4\text{Ms}^{-1}$  to  $0.04\text{ Ms}^{-1}$ . What is the half life of the reaction ?

- (1) 8 min                      (2) 4 min                      (3) 6 min                      (4) 2 min

Ans. (2)

Sol. For first order reaction :

$$\log \frac{r_2}{r_1} = -k \log \frac{t_2}{t_1}$$

$$\log \frac{0.04}{0.4} = -k \log \frac{30}{10}$$

$$t_{\frac{1}{2}} = \frac{\ln 2}{k} = 6\text{ min.}$$

20. Example of Molecular solid is :

- (1)  $\text{SO}_2(\text{s})$                       (2) SiC                      (3) C (graphite)                      (4) NaCl

Ans. (1)

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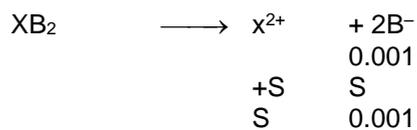
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21. Solubility of a sparingly soluble salt  $XB_2$  in water is  $x$ . What will be its solubility in a solution of  $yB$  having concentration of  $0.001M$ ?

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

Ans. (2)

Sol. In pure water :



$$K_{sp} = 4x^3 = S \times (0.001)^2$$

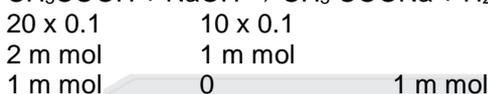
$$S = 4x^3 \times 10^6$$

22. 20 mL of 0.1 M acetic acid is mixed in a solution of NaOH. If 10 mL of 0.1 M NaOH is present in then  $H^+$  concentration in resulting solution is ( $K_a$  of acetic acid =  $1.7 \times 10^{-5}$ )

- (1)  $3.4 \times 10^{-5}$                       (2)  $1.7 \times 10^{-2}$                       (3)  $1.7 \times 10^{-5}$                       (4)  $1.7 \times 10^{-7}$

Ans. (3)

Sol.  $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$



$$pOH = pK_b + \log \frac{\text{Salt}}{\text{acid}}$$

$$pH = pK_a$$

$$[H^+] = K_a = 1.7 \times 10^{-5} M$$

23. Gas in a cylinder is maintained at 10 atm pressure and 300 K temperature. The cylinder will explode if pressure of gas beyond 15 atm. What is maximum temperature to which gas can be heated ?

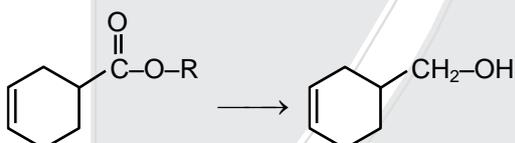
- (1) 400 K                      (2) 500 K                      (3) 450 K                      (4) 250 L

Ans. (3)

Sol.  $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

$$\frac{10}{300} = \frac{15}{T_2} = T_2 = 450 K$$

24.

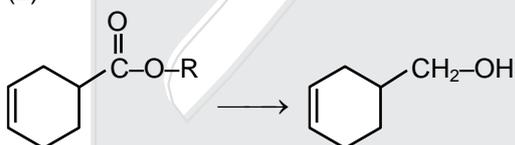


Which reagent is suitable for this conversion ?

- (1) Zn-Hg/HCl                      (2)  $LiAlH_4$                       (3)  $NH_2-NH_2/OH^-$                       (4) Red P + HI

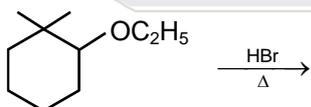
Ans. (2)

Sol.



Suitable Reagent for this conversion is  $LiAlH_4$ .

25.



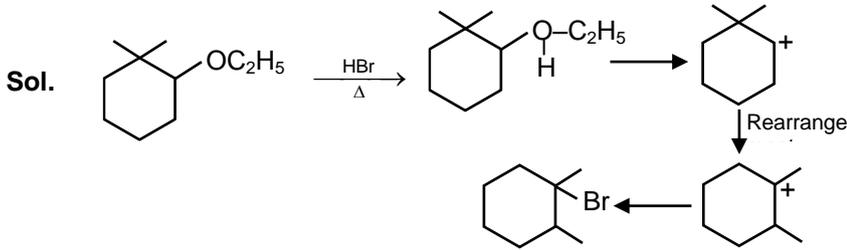
- (1)                      (2)                      (3)                      (4)

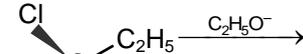
Ans. (1)

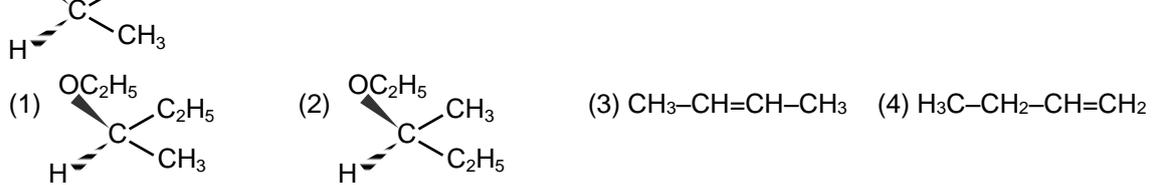
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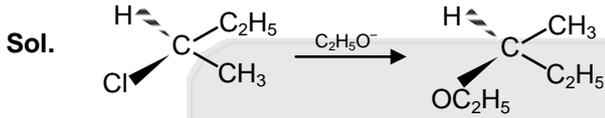
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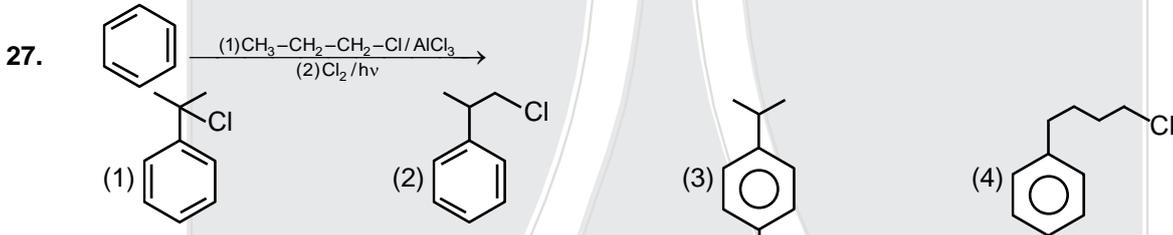
26.  What is product of following reaction ?



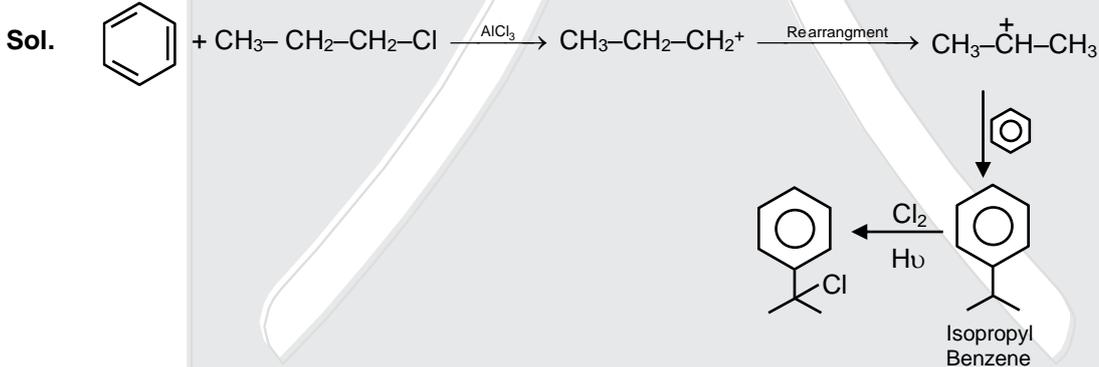
Ans. (2)



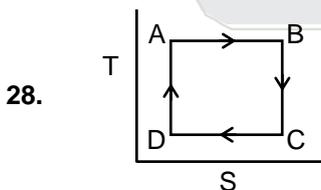
(R) (S)  
This is a  $\text{S}_{\text{N}}2$  Reaction, and walen inversion take place in which configuration become opposite



Ans. (1)



This is a friedal-craft alkylation. Followed by Free radical substitution reaction.



In which process volume increases

- (1) AB, CD (2) AB, BC (3) CD, DA (4) BC, CD

Ans. (2)

Sol. In Process AB, T is constant by tentropy increases thus increasing volu,e in BC, T decreasing with entropy is same that also increases volume.

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29. Freezing point of 0.4 m solution a weak monoprotic acid is  $-0.1^{\circ}\text{C}$ . What is its vant Hoff factor  $i$  ?  
 (1) 1.5 (2) 1.6 (3) 1.34 (4) 1.1

Ans. (3)

Sol.  $\Delta T_f = iK_f m$

$$i = \frac{\Delta T_f}{K_f m} = \frac{0.1}{1.86 \times 0.04} = 1.34$$

30. In second orbit of H atom what is velocity of  $e^-$

(1)  $2.18 \times 10^6 \text{m/sec}$  (2)  $3.27 \times 10^6 \text{m/sec}$  (3)  $10.9 \times 10^5 \text{m/sec}$  (4)  $21.8 \times 10^6 \text{m/sec}$

Ans. (3)

Sol.  $v = 2.18 \times 10^6 \times \frac{1}{2} = 1.09 \times 10^6 \text{m/sec}$

31. When on metal sheet fall  $\lambda_1$  light will eject electron with  $V_1$  velocity and with  $\lambda_2$  light eject electron of  $v_2$  velocity, what is  $v_2^2 - v_1^2$  value

(1)  $\frac{2hc}{m} \left( \frac{1}{\lambda_2} - \frac{1}{\lambda_1} \right)$  (2)  $\frac{hc}{m} \left( \frac{1}{\lambda_2} - \frac{1}{\lambda_1} \right)$  (3)  $\frac{2hc}{m} \left( \frac{1}{\lambda_1} - \frac{1}{\lambda_2} \right)$  (4)  $\frac{m}{2hc} \left( \frac{1}{\lambda_2} - \frac{1}{\lambda_1} \right)$

Ans. (1)

Sol.  $\frac{hc}{\lambda_1} - h\nu_0 = \frac{1}{2}mv_1^2$

$$\frac{hc}{\lambda_2} - h\nu_0 = \frac{1}{2}mv_2^2$$

$$\frac{hc}{\lambda_2} - \frac{hc}{\lambda_1} = \frac{1}{2}m(v_2^2 - v_1^2)$$

$$\frac{2hc}{m} \left( \frac{1}{\lambda_2} - \frac{1}{\lambda_1} \right) (v_2^2 - v_1^2)$$

32. For  $\text{N}_3^-$  which statement is wrong

(1) Iso electronic with  $\text{CO}_2$  (2)  $\text{NH}_2\text{OH}$  and  $\text{N}_3^-$  have same O.N. on nitrogen atom  
 (3) N-N bond length are same (4)  $\text{HN}_3$  have linear shape

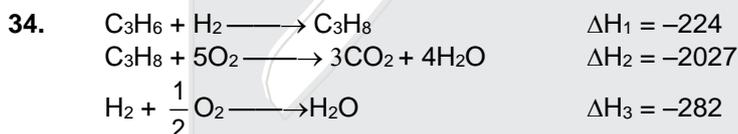
Ans. (4)

Sol.  $\text{HN}_3$  have bent shape.

33. Which compound do not react in dilute HCl at high temperature.

(1)  $\text{SnSO}_4$  (2)  $\text{PbSO}_4$  (3)  $\text{BiOCl}$  (4)  $\text{CdSO}_4$

Sol.  $\text{PbSO}_4$  belong to I<sup>st</sup> group so insoluble in HCl



Calculate combustion of propene

(1)  $-1020 \text{KJ}$  (2)  $-2085 \text{KJ}$  (3)  $-2020 \text{KJ}$  (4) None

Ans. (2)

Sol.  $\text{C}_3\text{H}_6 + \frac{9}{2}\text{O}_2 \rightarrow 3\text{CO}_2 + 3\text{H}_2\text{O}$

$$-124 = (\Delta H - 282) + 2027$$

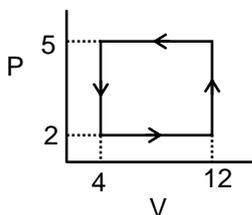
$$\Delta H = -2085$$

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35.



Calculate work done

- (1) 12 atm × lt      (2) 24 atm × lt      (3) 48 atm × lt      (4) 36 atm/l

Ans.

(2)

Sol.

$$w = \text{area under curve} = (12-4)(5-2) = 24 \text{ atm} \times \text{lt}$$

36.



- (1)  $[\text{Cr}(\text{CO})_4(\text{NO})_2]$       (2)  $[\text{Cr}(\text{NO})_4]$       (3)  $[\text{Cr}(\text{CO})_5 \text{NO}]$       (4)  $[\text{Cr}(\text{CO})_2(\text{NO})_4]$

Ans.

(2)

Sol.

NO is three e donor

37.

Which of the following give good synergic bond with metal

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

Ans.

(1)

Sol.

CO accepts d-electron from metal in  $\pi 2p^*$  orbital causing synergic bonding.

38.

Which pair of diatomic species do not have same bond order ?

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

Ans.

(1)

Sol.

$$\text{Bond order } \text{B}_2^- = 1.5$$

$$\text{C}_2 = 2$$

39.

Which of the following statement is wrong for solvey process

- (1)  $\text{NH}_3$  is regenerated      (2)  $\text{CaCl}_2$  is one of the by product  
(3)  $\text{CaCO}_3$  is used completely in reaction      (4)  $\text{Na}_2\text{CO}_3$  is partially convert into bi carbonate

Ans.

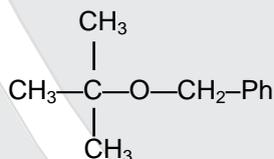
(4)

Sol.

 $\text{NaHCO}_3$  convert into  $\text{Na}_2\text{CO}_3$  mainly, reverse not happened here

40.

What are the suitable reactant for the following ether synthesis

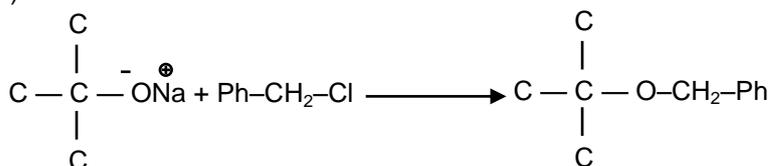


- (1)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{O}^- \text{Na}^+ \\ | \\ \text{CH}_3 \end{array} + \text{Ph}-\text{CH}_2-\text{Cl}$       (2)  $\text{Ph}-\text{CH}(\text{Cl})-\text{CH}_2-\text{CH}_3 + \begin{array}{c} \text{O}^- \text{Na}^+ \\ | \\ \text{CH}_3-\text{CH}-\text{CH}_3 \end{array}$   
(3)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{Cl} \\ | \\ \text{CH}_3 \end{array} + \text{PhCH}_2\text{O}^- \text{Na}^+$       (4)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{O}^- \text{Na}^+ \\ | \\ \text{CH}_3 \end{array} + \text{CH}_3-\text{Cl}$

Ans.

(1)

Sol.



This is a Williamson ether synthesis in which alkylhalide should be either 1°/2°

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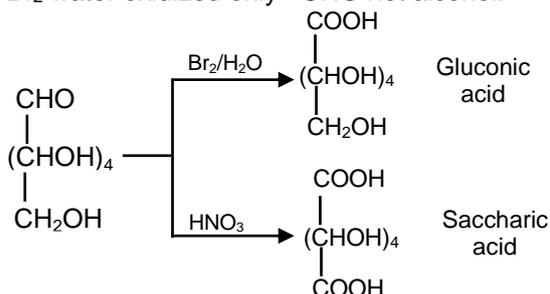
51. **Assertion** : Oxidation of glucose by  $\text{Br}_2$  water gives saccharic acid

**Reason** :  $\text{Br}_2$  water oxidized  $-\text{CHO}$  and alcohol

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (4)

**Sol.**  $\text{Br}_2$  water oxidized only  $-\text{CHO}$  not alcohol.



52. **Assertion** : Metal deficiency defect can be seen in  $\text{FeO}$

**Reason** :  $\text{Li}$  compound ( $\text{LiCl}$ ) have violet colour due to F center.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (2)

**Sol.** Both are true but not related.

53. **Assertion** : Zone refining is based on solubility of impurity in liquid metal

**Reason** : Pure metal oxide is obtained in zone refining

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (3)

**Sol.** Zones refining produces pure metal

54. **Assertion** : Pure  $\text{N}_2$  is formed from  $\text{Ba}(\text{N}_3)_2$

**Reason** : Mass of Barium is high

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (2)

**Sol.**  $\text{N}_2$  from azide is also produced by  $\text{NaN}_3$ . Hence mass of  $\text{Ba}$  is irrelevant.

55. **Assertion** : Aldehyde have lower boiling point than ether.

**Reason** : Aldehydes are less polar than ether.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (4)

**Sol.** Aldehyde are more polar and have more boiling point than ether.

56. **Assertion** : Addition of  $Q$  and  $w$  give  $\Delta U$

**Reason** : addition of two path function can not give state function

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (3)

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- Sol.**  $\Delta U = Q + W$   
Internal energy is state function but Q and W are path function.
- 57. Assertion :** Red phosphorous on heating changes its colour into black  
**Reason :** Black phosphorous contain  $P_4$  units  
(1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.
- Ans.** (3)  
**Sol.** Black P has graphite like network structure.
- 58. Assertion :**  $Mg(CH_3)_2$  behave as a polymer  
**Reason :**  $CH_3$  can form a very good bridge bond  
(1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.
- Ans.** (4)  
**Sol.**  $CH_3$  (methyl group) can not form bridge bond, so  $(CH_3)_2 Mg$  can not exist in polymeric form.
- 59. Assertion :** Non competitive drugs alter the shape of active site of enzyme.  
**Reason :** They attack on the active site of enzyme  
(1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.
- Ans.** (3)
- 60. Assertion :**  $Na_2SO_3$  solution give basic solution in litmus solution  
**Reason :** It react with water and  $H_2SO_3$  form  
(1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.
- Ans.** (2)  
**Sol.** Both statements are true.
- 61. Assertion :** All C—C—C bonds angles in Isobutene ( $\begin{array}{c} CH_3-C=CH_2 \\ | \\ CH_3 \end{array}$ ) are different.  
**Reason :**  $CH_3$  (Methyl group) show steric crowding.  
(1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.
- Ans.** (1)  
**Sol.** Bond angles are different due to steric crowding of  $CH_3$  group.
- 62. Assertion :**  $F_2$  and  $Cl_2$  when passed through water,  $F_2$  is more reactive.  
**Reason :**  $F_2$  is most electronegative.  
(1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.
- Ans.** (2)  
**Sol.**  $F_2$  is more reactive because of higher  $E^\ominus$  value.

63. **Assertion :** Gold sol first convert into red to blue than blue to red on heating.

**Reason :** In gold sol extent of metallic bonding increases.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (3)

**Sol.** On heating extent of metallic bonding decreases.

64. **Assertion :**  $[\text{Co}(\text{NH}_3)_6]^{+3}$  and  $[\text{Co}(\text{en})_3]^{+3}$  are more stable complex.

**Reason :** They are low spin complex

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (2)

**Sol.** Stability of complex cannot be judged by spin.

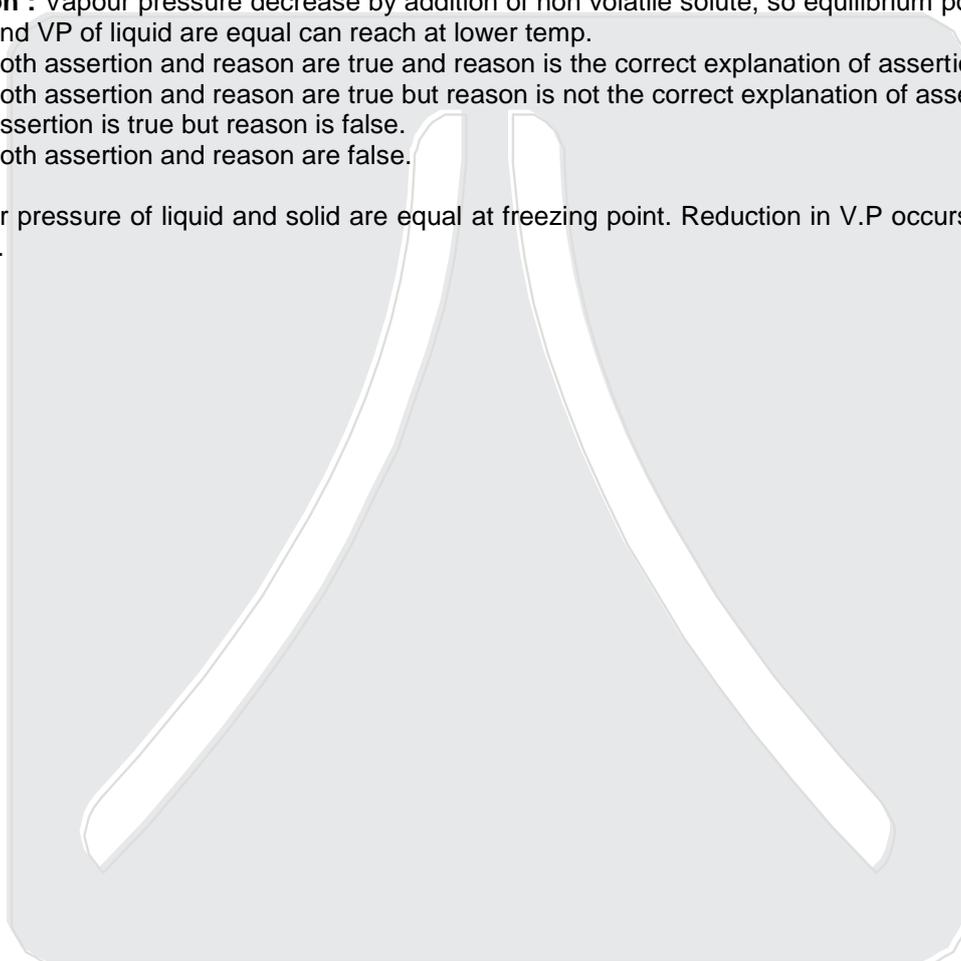
65. **Assertion :** A non volatile solute added in solvent liquid then freezing point of mixture decreases.

**Reason :** Vapour pressure decrease by addition of non volatile solute, so equilibrium point where Vp of solid and VP of liquid are equal can reach at lower temp.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (1)

**Sol.** Vapour pressure of liquid and solid are equal at freezing point. Reduction in V.P occurs when solute is added.



## PART - C (BIOLOGY)

66. Full form of GFC is :  
(1) Grazing food chain (2) Grazing fish chain  
(3) Gross food chain (4) Green forest conservation

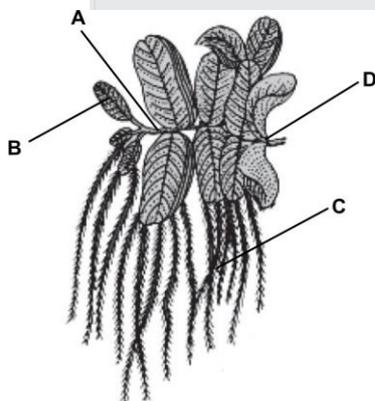
Ans. (1)

67. Biomagnification refers to :  
(1) Breeding of crops that are rich in minerals and vitamins, good proteins and healthier fats for human health  
(2) Increase in concentration of the toxicant at successive trophic levels.  
(3) Exploring at molecular, Genetic and species level diversity for the products of economic importance  
(4) Decomposition of organic waste in water by the action of microbes

Ans. (2)

68. Codons of Arginine are  
(1) CGU, CGC, CGG (2) CAC, CAG, CAU  
(3) GGU, GGC, GGA (4) CGU, CCC, CGG

Ans. (1)



69.

In above diagram, the labelling 'C' is

- (1) Leaf (2) Internodal elongation  
(3) Third leaf is modified into root (4) Rhizoid

Ans. (3)

70. Function of smooth endoplasmic reticulum is  
(1) Synthesis of lipid (2) Synthesis of minerals  
(3) Synthesis of protein (4) None

Ans. (1)

71. Which group of hormones is natural  
(1) IAA, IBA, NAA (2) IAA, GA<sub>3</sub>, ABA  
(3) 2,4-D, Kinetin, ABA (4) GA<sub>3</sub>, Zeatin, NAA

Ans. (2)

72. The saturation point of CO<sub>2</sub> in C<sub>4</sub> plants is  
(1) 390 μl/L (2) 450 μl/L  
(3) 460 μl/L (4) 360 μl/L

Ans. (4)

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73. The ratio of complementary gene in  $F_2$  generation  
 (1) 12 : 3 : 1 (2) 9 : 7  
 (3) 9 : 3 : 4 (4) 9 : 6 : 1

Ans. (2)

74. **Column-I**                      **Column-II**  
 (i) + –                              (A) Amensalism  
 (ii) + 0                             (B) Parasitism  
 (iii) + +                            (C) Commensalism  
 (iv) – 0                            (D) Mutualism  
 (1) i–B, ii–A, iii–D, iv–C                      (2) i–A, ii–B, iii–D, iv–C  
 (3) i–B, ii–A, iii–C, iv–D                      (4) i–B, ii–C, iii–D, iv–A

Ans. (4)

75. Match the Column-I and Column-II  
**Column-I**                      **Column-II**  
 (i) Auxin                            (A) Adenine derivatives  
 (ii) Gibberellin                    (B) Carotenoid derivatives  
 (iii) Cytokinin                    (C) Terpenes  
 (iv) ABA                            (D) Indole compounds  
 (1) i–B, ii–A, iii–D, iv–C                      (2) i–D, ii–B, iii–A, iv–C  
 (3) i–B, ii–A, iii–C, iv–D                      (4) i–D, ii–C, iii–A, iv–B

Ans. (4)

76. Which of the following statement is wrong about auxin  
 (1) 2,4–D prevents the growth of dicot weeds  
 (2) 2,4–D prevents the growth of monocot weeds  
 (3) It promotes parthenocarpy  
 (4) IAA is natural auxin

Ans. (2)

77. Which of the following is false fruit  
 (1) Groundnut                      (2) Mustard, Mango  
 (3) Citrus                            (4) Apple, strawberry

Ans. (4)

78. Haemophilia is  
 (1) Sex linked                      (2) Sex limited  
 (3) Autosomal recessive                      (4) Autosomal dominant

Ans. (1)

79. Which of the following chains of haemoglobin is affected in thalassaemia  
 (1) Only  $\beta$  chain                      (2) Only  $\alpha$  chain  
 (3) Both  $\alpha$  and  $\beta$  chain                      (4)  $\gamma$  chain

Ans. (3)

80. Which of the following statement is wrong about transcription in bacteria.  
 (1) Splicing is not required  
 (2) Single RNA polymerase controls all DNA polymerases  
 (3) This process required more/less energy  
 (4) None

Ans. (2)

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81. Free living  $N_2$  fixation bacteria  
(1) Anabaena, Azotobacter, Frankia (2) Rhizobium, Azotobacter, Rhodospirillum  
(3) Beijerinckia, Azotobacter, Clostridium (4) Nostoc, Frankia, Bacillus  
**Ans. (3)**

82. In somatic hybridization of leaf and nucellus cells of pinus the ploidy level is  
(1)  $2n$  (2)  $3n$   
(3)  $5n$  (4)  $4n$   
**Ans. (4)**

83. Which statement is wrong about satellite  
(1) They show high degree of polymorphism  
(2) They do not take part in protein synthesis  
(3) They do not inherit from parents to offsprings  
(4) None  
**Ans. (3)**

84. Which statement is wrong about pollution :  
(1) Leaded petrol is used in vehicle that has catalytic converter  
(2) Hot water releases from thermal power plants  
(3) Presence of DDT in food chain  
(4) Biological control does not create pollution  
**Ans. (1)**

85. Lichens are best indicator of –  
(1) Air pollution (2) Water pollution  
(3) Soil pollution (4) Noise pollution  
**Ans. (1)**

86. Which enzymes will be required to obtain protoplast from plant cell?  
(1) Cellulase, Pectinase (2) Cellulase, Protease  
(3) Chitinase, Pectinase (4) Cellulase, Lipase  
**Ans. (1)**

87. Which of the following is correct pair :
- | Organism      |   | Number of Chromosomes |
|---------------|---|-----------------------|
| (1) Human     | – | $2n = 42$             |
| (2) Fruit fly | – | $2n = 10$             |
| (3) Onion     | – | $2n = 28$             |
| (4) House Fly | – | $2n = 12$             |
- Ans. (4)**

88. Which among the following is true for protein synthesis in bacteria?  
(1) It involves all the three types of RNAs (m-RNA, t-RNA and r-RNA)  
(2) It involves 3 types of RNA polymerases  
(3) It involves single type of RNA polymerase  
(4) It involves RNA processing  
**Ans (3)**

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89. Examples of essential amino acids are –  
 (1) Lys, Gly, Trp, Val (2) His, Val, Lys, Trp  
 (3) Phe, Glu, Met, Ala (4) Ala, Arg, Asn, Pro

Ans. (2)

90. Select the incorrect matching –  
 (1) Annelida - *Nereis*, *Hirudinaria*, *Lumbricus*  
 (2) Echinodermata - *Echinus*, *Cucumaria*, *Asterias*  
 (3) Reptilia - *Hemidactylus*, *Ophisaurus*, *Chelone*  
 (4) Mammalia - *Betta*, *Rattus*, *Felis*

Ans. (4)

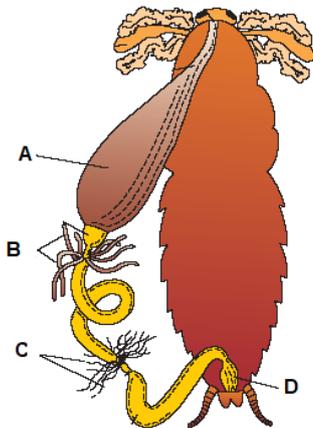
91. Which of the following condition is true at the time just after ovulation?  
 (1) High estrogen, low progesterone (2) Low estrogen, low progesterone  
 (3) High estrogen, high progesterone (4) Low estrogen, high progesterone

Ans. (1)

92. Which of the following explained evolution in most acceptable form?  
 (1) Lamarck, Darwin, Hugo de Vries (2) Anaximander, Darwin, Malthus  
 (3) F. Redi, Richter, Cuvier (4) Lamarck, Hardy Weinberg, Darwin

Ans. (1)

93. Select the option having correct matching of parts of the digestive tract of cockroach –



- (1) A - Hepatic caecae, B - Crop, C - Malpighian tubules, D - Rectum  
 (2) A - Crop, B - Hepatic caecae, C - Malpighian tubules, D - Rectum  
 (3) A - Malpighian tubules, B - Crop, C - Hepatic caecae, D - Rectum  
 (4) A - Crop, B - Hepatic caecae, C - Malpighian tubules, D - Rectum

Ans. (2)

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94. Match column-I with column-II and select the option having correct matching –

Column-I		Column-II	
A.	Streptokinase	i.	<i>Penicillium notatum</i>
B.	Statins	ii.	<i>Monascus purpureus</i>
C.	Cyclosporin-A	iii.	<i>Streptococcus</i>
D.	Penicillin	iv.	<i>Trichoderma</i>

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

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

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

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

Ans. (3)

95. Select the correct option for Reptilia –

(1) 4 chambered heart - *Chelone*

(2) Tympanum represents ear - *Crocodile*

(3) External ear present - *Ophiosaurus*

(4) Dry and scaly skin - *Salamandra*

Ans. (2)

96. In smooth and cardiac muscles, cell junctions are represented by –

(1) Gap junction

(2) Desmosomes

(3) Tight junction

(4) Zonula occludens

Ans. (1)

97. Vinblastin is obtained from –

(1) *Catharanthus roseus*

(2) *Curcuma amada*

(3) *Atropa belladonna*

(4) *Syzygium cumini*

Ans. (1)

98. Select the option having correct sequence of geological periods –

Permian, Triassic, Jurassic

(1) 1 → 2 → 3

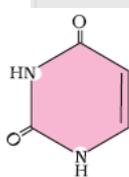
(2) 3 → 2 → 1

(3) 2 → 3 → 1

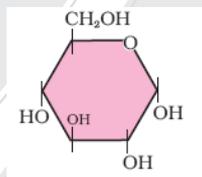
(4) 3 → 1 → 2

Ans. (1)

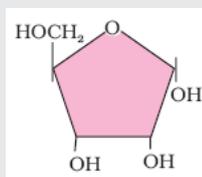
99. Select the option having correct matching of structure and sequence of the molecules given below –



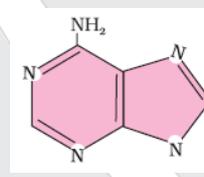
A



B



C



D

(1) A - Uracil, B - Glucose, C - Ribose, D - Adenine

(2) A - Adenine, B - Glucose, C - Uracil, D - Ribose

(3) A - Uracil, B - Ribose, C - Glucose, D - Adenine

(4) A - Adenine, B - Uracil, C - Ribose, D - Glucose

Ans. (1)

100. Select the correct one –

(1) Beer produced by distillation of fermented broth

(2) Bottled juices are cleared by protease and pectinase

(3) Methanogens digest cellulose aerobically

(4) Streptokinase is used to lower the blood cholesterol

Ans. (2)

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101. Meiosis II in ovum doesn't completes until –  
(1) Birth (2) Puberty  
(3) Fertilization (4) Developing follicles

Ans. (3)

102. Which of the following is incorrect about DNA finger printing?  
(1) It is not inherited from parents to offspring  
(2) Show high degree of polymorphism  
(3) It is used to detect sex during fetal development  
(4) It is used in medico - legal suits

Ans. (3)

103. How is Ascariasis transmitted?  
(1) By air (2) By mosquitoes  
(3) By contaminated food and water (4) By infected needles

Ans. (3)

104. Which one is the reason for fast conduction of impulse in heart muscles?  
(1) Presence of intercalated discs (2) SA node  
(3) AV node (4) Purkinje fibers

Ans. (1)

105. Creatinine is formed by –  
(1) Urea  
(2) Uric acid  
(3) Breakdown of creatine phosphate in muscle  
(4) Kidney

Ans. (3)

106. Which among the following is predominant epithelia in digestive tract?  
(1) Stratified squamous epithelia (2) Simple cuboidal epithelia  
(3) Simple squamous epithelia (4) Pseudostratified ciliated epithelia

Ans. (1)

107. Pancreatic amylase acts on –  
(1) Starch (2) Protein (3) Lipid (4) Disaccharide

Ans. (1)

108. Type-1 diabetes is -  
(1) Insulin independent (2) Insulin dependent  
(3) Caused by UV-radiation (4) Infectious

Ans. (2)

109. Thrombin is used –  
(1) To convert fibrinogen into fibrin  
(2) To convert angiotensinogen to angiotensin-I  
(3) To dissolve clots inside the blood vessels  
(4) In clearing of packed fruit juices

Ans. (1)

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- 110. Assertion :** Oxalo-acetic acid is first stable compound of  $C_4$  plants  
**Reason :** It takes place in mesophyll cell in the presence of RuBisCo
- (1) Both A and R are true and R is the correct explanation of A.
  - (2) Both A and R are true but R is not correct explanation of A
  - (3) A is true but R is false
  - (4) A and R are false

**Ans. (3)**

- 111. Assertion :** In active transport, movement of substance takes place from lower to higher concentration  
**Reason:** Transpiration is natural process
- (1) Both A and R are true and R is the correct explanation of A.
  - (2) Both A and R are true but R is not correct explanation of A
  - (3) A is true but R is false
  - (4) A and R are false

**Ans. (2)**

- 112. Assertion :** IR-8 variety of rice developed in international rice research institute(IRRI) in Phillipines  
**Reason :** Jaya & Ratna developed in international rice research institute(IRRI)
- (1) Both A and R are true and R is the correct explanation of A.
  - (2) Both A and R are true but R is not correct explanation of A
  - (3) A is true but R is false
  - (4) A and R are false

**Ans. (3)**

- 113. Assertion :** Algin is obtained from Algae  
**Reason :** Rust of wheat is due to Puccinia
- (1) Both A and R are true and R is the correct explanation of A.
  - (2) Both A and R are true but R is not correct explanation of A
  - (3) A is true but R is false
  - (4) A and R are false

**Ans. (2)**

- 114. Assertion :** Groundnut & pea are non endospermic  
**Reason :** They do not synthesis endosperm
- (1) Both A and R are true and R is the correct explanation of A.
  - (2) Both A and R are true but R is not correct explanation of A
  - (3) A is true but R is false
  - (4) A and R are false

**Ans. (3)**

115. **Assertion** : Genes show mutation, they are rare, stable and inheritable.

**Reason** : One allele is modified into other allele by mutation.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A
- (3) A is true but R is false
- (4) A and R are false

**Ans.** (2)

116. **Assertion** : All enzymes can be inhibited.

**Reason** : Enzyme activity can be inhibited by temperature.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (1)

117. **Assertion** : Human has diphyodont dentition.

**Reason** : Human has four types of teeth – incisor, canine, premolars and molars.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (2)

118. **Assertion** : Many bony fishes are ammonotelic.

**Reason** : Ammonia is highly soluble in water

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (1)

119. **Assertion** : In females, parturition occurs after the pregnancy.

**Reason** : Signal for parturition originates from fully developed embryo.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (1)

120. **Assertion** : Cu T is an intrauterine device.

**Reason** : It decreases sperm motility.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (2)

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**Pre-Medical Division Campus:**

121. **Assertion** : AIDS occurs by retroviruses whose RNA is enveloped.

**Reason** : It enters into the cell & forms new viruses.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (2)

122. **Assertion** : Bt cotton is resistant to insects.

**Reason** : Butterfly feeding on Bt cotton will die

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (3)

123. **Assertion** : Non-competitive inhibitor binds to active site of enzyme.

**Reason** : Competitive inhibitor binds to the active site and change its structure.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (4)

124. **Assertion** : *Agrobacterium tumefaciens* cause crown gall disease in dicots.

**Reason** : Ti plasmid infects dicot plants.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A.
- (3) A is true but R is false.
- (4) A and R are false.

**Ans.** (1)

125. **Assertion** : Baculovirus are used as biocontrol agent

**Reason** : Baculovirus are used in ecologically vulnerable areas

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not correct explanation of A
- (3) A is true but R is false
- (4) A and R are false

**Ans.** (2)

## PART - D (GK + MENTAL ABILITY)

126. Where is the head office of EMS Speed Post ?

- (1) New Delhi                      (2) Canberra                      (3) London                      (4) Paris

Ans. (1)

127. Where is the Headquarter of United Nations ?

Ans. **New York**

128. What is the name of the yacht on which Six women naval officers completed their journey around the world?

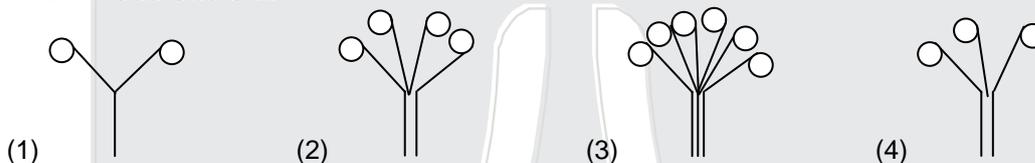
Ans. **TARINI**

129. Find the Odd One Out.



Ans. (3)

130. Find the Odd One Out.



Ans. (4)

131. Put these cities in a proper sequencing  
Srinagar .....Bangalore .....Mumbai .....Bhopal .....Delhi

Ans. **Srinagar , Delhi, Bhopal, Mumbai, Bangalore**

132. What is the full form of PIN in postal system ?

Ans. **Postal Index Number**

133. Establish the relation...



USA



?

Ans. **North Korea**

134. Advertisers are charged more money for their ads by the Channels during IPL.

1. More viewers watch the TV during IPL
  2. Advertisers are ready to pay more money during IPL
- (1) Only 1                      (2) Only 2                      (3) 1 and 2 both                      (4) Both are not correct

Ans. (3)

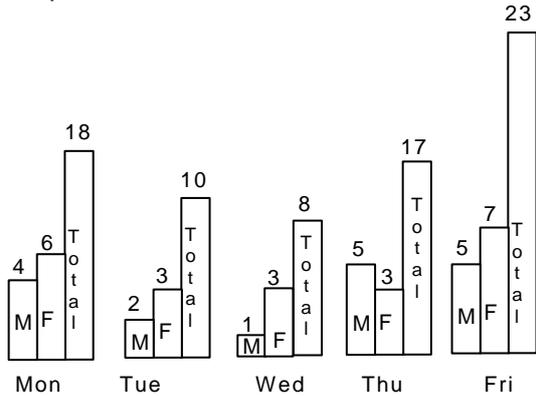
135. There are 5 friends in a group. One more friend joins them & the average weight of the group increases. Find the weight of the 6<sup>th</sup> friend?

1. 6<sup>th</sup> friend increases the average weight by 20%.
  2. Total weight of 5 friends is 250 Kg.
- (1) Only 1 is required                      (2) Only 2 is required  
(3) 1 and 2 both required                      (4) Can't be determined.

Ans. (3)

### Pre-Medical Division Campus:

136. Male, Female, Transgender and children visit a hospital on a daily basis. Transgender number are constant on each day. See the graph below & find the day on which the maximum children visited the hospital?



- (1) Monday (2) Tuesday (3) Friday (4) Saturday

Ans. Friday

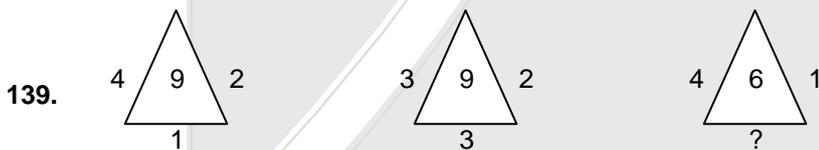
137. The Price of 2 Tables is equal to price of 5 chairs. If a person purchases 10 Chairs & 10 Tables in Rs. 7000/- then find out the price of 2 chairs & 4 tables.

Sol. Given  $2T = 5C$   
 Given  $10T + 10C = 7000$   
 Since  $2T = 5C$  then  $10C$  will be equal to  $4T$

Now  $10T + 4T = 7000$   
 $14T = 7000$   
 $T = 7000/14$   
 $T = 500$   
 Since  $2T = 5C$   
 Then  $2 \times 500 = 5C$   
 $C = 1000/5$   
 $C = 200$

Total Price of 2 Chairs (C) and 4 Tables (T) will be  
 $2 \times 200 + 4 \times 500 = 2400/-$ .

138. Climate change agreement

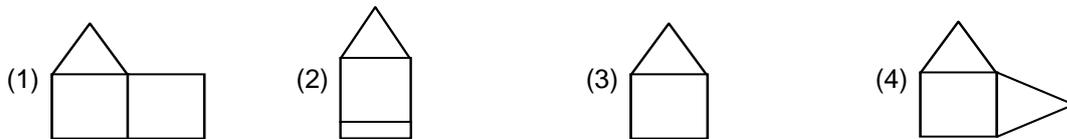


139. (1) 2 (2) 4 (3) 3 (4) 5

Ans. (1)



- 140.



Ans. (2)

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