

CUET UG – 2022

CHEMISTRY

Question : 1

Which of the following shows both Frenkel as well as Schottky defects?

- A Ag Br
- B NaCl
- C KCl
- D AgCl

Question : 2

Which of the following is correct for a hexagonal crystal system?

- A  $a = b \neq c, \alpha = \beta = \gamma = 90^\circ$
- B  $a \neq b \neq c, \alpha = \beta = \gamma = 90^\circ$
- C  $a = b \neq c, \alpha = \beta = 90^\circ, \gamma = 120^\circ$
- D  $a \neq b \neq c, \alpha = \gamma = 90^\circ, \beta \neq 90^\circ$

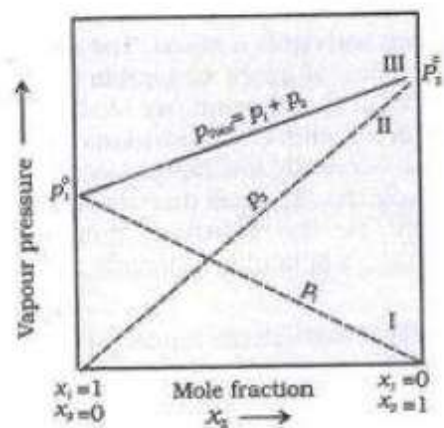
Question : 3

Efficiency of packing in body centered cubic structures is found to be:

- A 33 %
- B 74%
- C 52.4 %
- D 68 %

**Question : 4**

Observe the given graph and identify the correct statement for the solution.



- A Component 2 is more volatile than component 1.
- B Component 1 is more volatile than component 2.
- C Boiling point of component 1 is lower than that of component 2.
- D Volatility of a component depends upon its mole fraction.

**Question : 5**

18 g of a non-volatile solution A is dissolved in 1 kg of water, the boiling point of water is raised to 373.51 K. Given  $K_b$  for water is  $0.52 \text{ K kg mol}^{-1}$ , Boiling point for water is 373.15 K at 1.013 bar pressure.

The molecular weight of the solid A is

- A  $58.0 \text{ g mol}^{-1}$
- B  $26.0 \text{ g mol}^{-1}$
- C  $55.0 \text{ g mol}^{-1}$
- D  $110.0 \text{ g mol}^{-1}$

**Question : 6**

Based on solute solvent interactions, arrange the following in the order of increasing solubility in n – octane.

- A. Cyclohexane
- B. KCl
- C.  $\text{CH}_3\text{OH}$
- D.  $\text{CH}_3\text{NH}_2$
- E.  $\text{CH}_3\text{CN}$

Choose the correct answer from the options given below:

- A  $A < B < C < D < E$
- B  $B < C < E < D < A$
- C  $C < B < A < E < D$
- D  $B < C < D < E < A$

**Question : 7**

In a pseudo first order reaction, the rate constant –

- A is independent of the concentration of reactants.
- B depends on concentration of reactants present in small quantity.
- C depends on temperature.
- D depends on concentration of reactants present in excess.

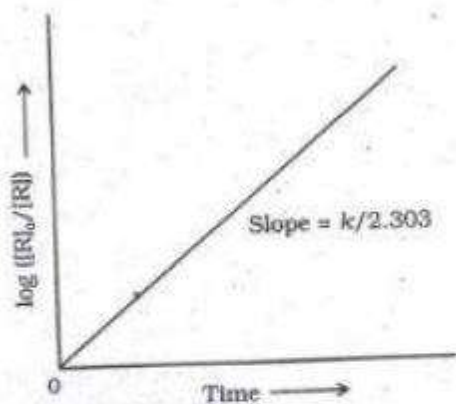
**Question : 8**

When the temperature of a reaction is increased by  $20^{\circ}\text{C}$ , the rate of reaction increases by

- A 3 times
- B 4 times
- C 2 times
- D 1.5 times

**Question : 9**

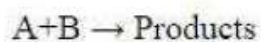
Observe the given graph. What will be the unit for the rate constant?



- A  $\text{mol L}^{-1} \text{s}^{-1}$
- B  $\text{mol}^{-1} \text{L s}^{-1}$
- C  $\text{s}^{-1}$
- D  $\text{mol}^{-2} \text{L}^2 \text{s}^{-1}$

**Question : 10**

**For a chemical reaction : -**



| Experiment | $\frac{[A]}{\text{mol L}^{-1}}$ | $\frac{[B]}{\text{mol L}^{-1}}$ | $\frac{\text{Initial rate}}{\text{mol L}^{-1} \text{ S}^{-1}}$ |
|------------|---------------------------------|---------------------------------|--|
| 1.         | 0.1                             | 0.1                             | $2.0 \times 10^{-3}$   |
| 2.         | 0.2                             | 0.2                             | $4.0 \times 10^{-3}$   |
| 3.         | 0.1                             | 0.2                             | $2.0 \times 10^{-3}$   |

What is the overall order of chemical reaction?

- A 3
- B 1
- C 2
- D 0

**Question : 11**

Match List I with List II.

| List I (Example of colloidal system ) | List II (Types of colloid) |
|---------------------------------------|----------------------------|
| A. Smoke                              | I. Foam                    |
| B. Cheese                             | II. Aerosol                |
| C. Soap lather                        | III. Emulsion              |
| D. Milk                               | IV. Gel                    |

Choose the correct answer from the options given below:

- A A- II, B- IV,C- I, D-III
- B A- I, B-II ,C- III, D- IV
- C A- I, B-III ,C- II, D- IV

**Question : 12**

The colloids that cannot be easily coagulated are

- A lyophobic colloids
- B lyophilic colloids
- C irreversible sols
- D associated colloids

**Question : 13**

Which of the following ores can be concentrated using froth floatation process?

- A Magnetite
- B Calamine
- C Copper pyrites
- D Bauxite

**Question : 14**

Match List I with List II.

| List I (Ore) | List II (Molecular form)                 |
|--------------|--|
| A. Haematite | I. $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$ |
| B. Malachite | II. $\text{Na}_3\text{AlF}_6$            |
| C. Calamine  | III. $\text{Fe}_2\text{O}_3$             |
| D. Cryolite  | IV. $\text{ZnCO}_3$                      |

Choose the correct answer from the options given below:

- A A- III, B- I, C- IV, D-II
- B A-I , B-III ,C- II, D-IV
- C A- IV, B-II ,C-I , D-III
- D A- II, B- IV,C- III, D- I



**Question : 15**

The correct order of boiling points for hydrogen halides is

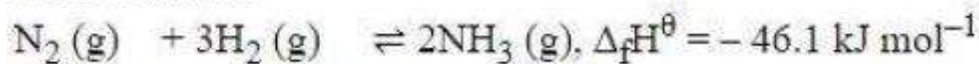
- A. HCl
- B. HBr
- C. HF
- D. HI

Choose the correct answer from the options given below:

- A HF < HI < HBr < HCl
- B HF < HCl < HBr < HI
- C HF > HCl > HBr > HI
- D HF > HI > HBr > HCl

**Question : 16**

In the reaction



the yield of ammonia is expected to be maximum at

- A high temperature and low pressure.
- B high temperature and high pressure.
- C low temperature and high pressure.
- D low temperature and low pressure.

**Question : 17**

The structure of  $\text{SF}_4$  is

- A Square planer
- B Tetrahedral
- C Trigonal bipyramidal
- D Octahedral

**Question : 18**

Which of the following interhalogen compound does not exist?

- A  $\text{BrF}$
- B  $\text{BrF}_3$
- C  $\text{BrF}_2$
- D  $\text{BrF}_5$

**Question : 19**

The electronic configuration of Cu in +1 oxidation state is

- A  $[\text{Ar}] 3d^{10}$
- B  $[\text{Ar}] 3d^9 4s^1$
- C  $[\text{Ar}] 3d^{10} 4s^1$
- D  $[\text{Ar}] 3d^9 4s^2$



Question : 20

Chemical formula and colour of manganate ion is \_\_\_\_

- A  $\text{MnO}_4^{2-}$ , Green
- B  $\text{MnO}_4^-$ , Green
- C  $\text{MnO}_4^-$ , Purple
- D  $\text{MnO}_4^{2-}$ , Purple

Question : 21

Which of the following elements is **not** regarded as a transition metal?

- A Cu
- B Sc
- C Mn
- D Zn

Question : 22

Coordination number of central metal ion in  $[\text{Cu}(\text{H}_2\text{O})_4 \text{en}]^{2+}$  is

- A 3
- B 4
- C 5
- D 6

**Question : 23**

Oxidation number of cobalt ion in  $[\text{CoCl}_2(\text{en})_2]^+$  will be

- A 2
- B 3
- C 4
- D 5

**Question : 24**

Number of ions produced on hydrolysis of  $\text{Cr}(\text{NH}_3)_4\text{Cl}_3$  reacting with  $\text{AgNO}_3$  to give 1 mole of  $\text{AgCl}$ , will be

- A 2
- B 3
- C 4
- D 5

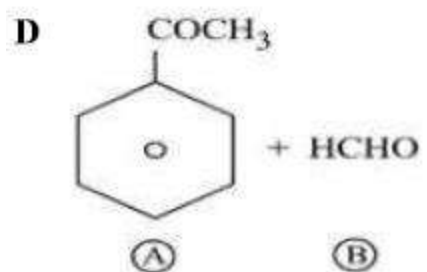
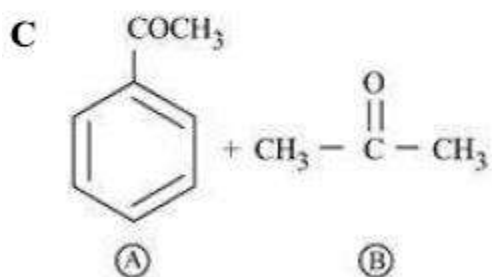
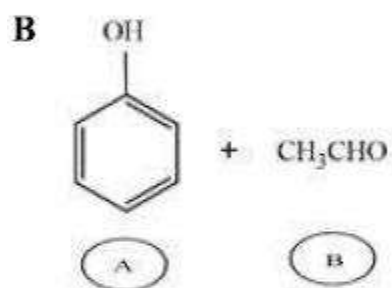
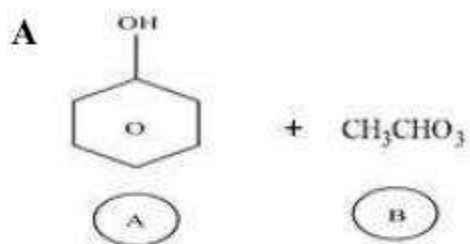
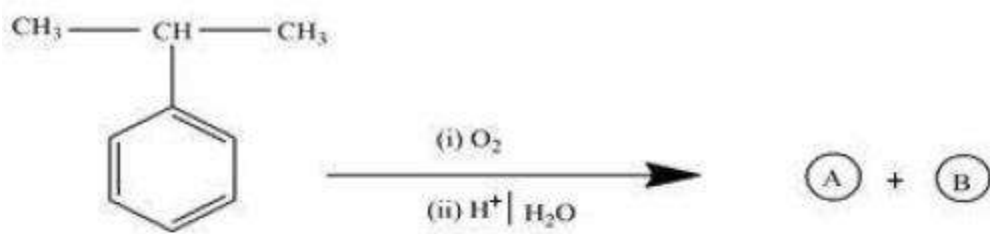
**Question : 25**

Hybridisation state of central metal ion in  $[\text{Fe}(\text{NH}_3)_4(\text{en})]^{2+}$  will be

- A  $sp^3$
- B  $dsp^2$
- C  $d^2 sp^3$
- D  $sp^3 d^2$

Question : 26

What are the products obtained in the chemical reaction?



**Question : 27**

The IUPAC name of glycerol is

- A 2 – Methyl phenol
- B Propane – 1, 2, 3 – triol
- C 2 – Methylpropan-2-ol
- D 2 – Methylcyclopentanol

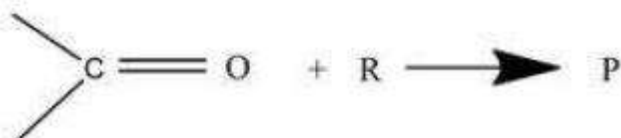
**Question : 28**

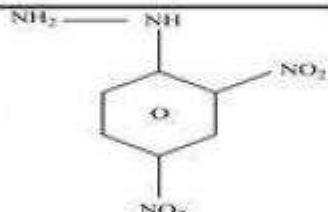
Which set of reagents will be most suitable to bring about the following change?  
2, 4, 6 – Trinitrochlorobenzene to picric acid

- A NaOH, 623 K, 300 atm
- B Hot conc sulphuric acid
- C Warm water
- D Acidified water

Question : 29

Match List I with List II



| Reagent (R)   | Name of the product formed on addition to carbonyl compounds (P) |
|---|--|
| A. $\text{NH}_2 \text{ NH CO NH}_2$   | I. Imine   |
| B. $\text{NH}_2 -\text{OH}$   | II. Hydroazone   |
| C. $\text{NH}_2 \text{ NH}_2$   | III. 2, 4 – Dinitrophenylhydrazine                               |
| D.  | IV. Semicarbazone  |

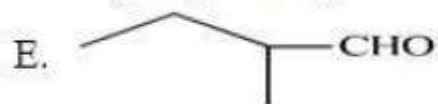
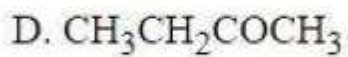
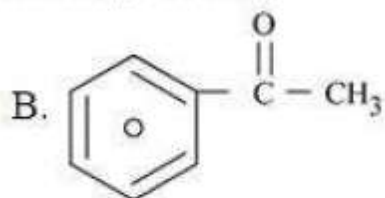
Choose the correct answer from the options given below:

- A A- I, B- III, C- IV, D- II  
B A- IV, B- I, C- II, D- III  
C A- II, B- III, C- IV, D- I  
D A- II, B- III, C- I, D- IV

Question : 30



X can be



Choose the correct answer from the options given below:

A A, B and C only

B B, C and D only

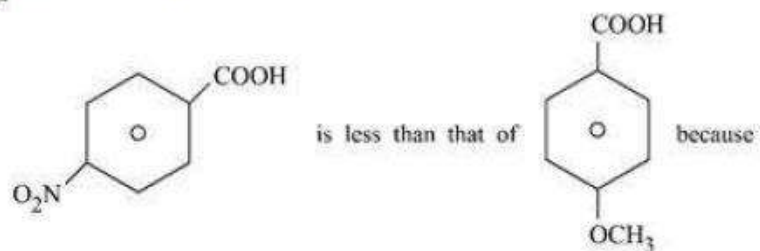
C C and E only

D B and D only

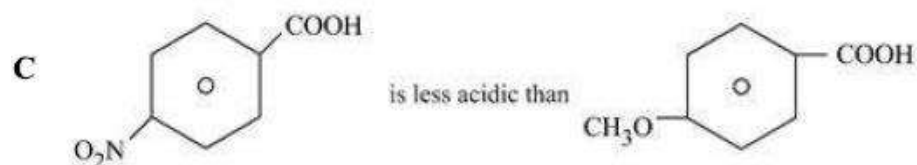



Question : 31

pKa value of



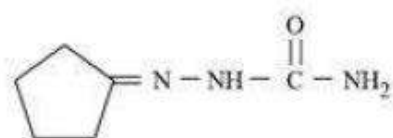
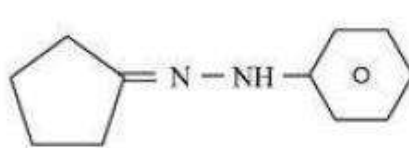
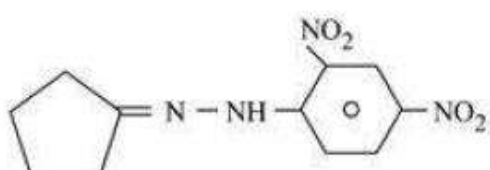
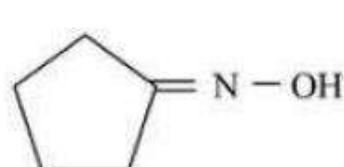
- A NO<sub>2</sub> is an electron donating group which increases electron- density on ring.  
B NO<sub>2</sub> is an electron- withdrawing group which decreases electron- density on ring.



- D Hyperconjugation is more in 

Question : 32

The structure representing semicarbazone of cyclopentanone correctly is: -

- A 
- B 
- C 
- D 

Question : 33

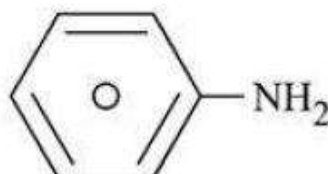
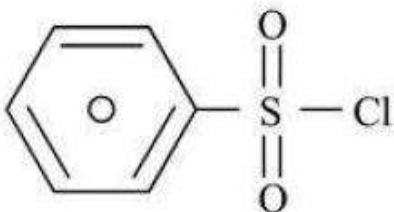
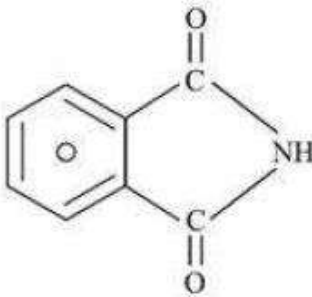
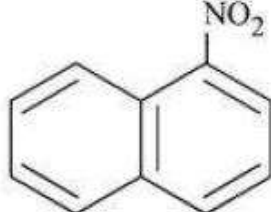
Benzenediazonium chloride when heated with warm water, would produce

- A benzene
- B phenol
- C chlorobenzene
- D aniline

Question : 34

The reagent used in the Hinsberg test of primary, secondary and tertiary amines, is

—

- A 
- B 
- C 
- D 

**Question : 35**

Which of the following is an oligosaccharide?

- A Starch
- B Glucose
- C Ribose
- D Maltose

**Question : 36**

During denaturation of proteins

- A Secondary and tertiary structures remain intact.
- B Secondary and tertiary structures are destroyed.
- C Primary structures is destroyed.
- D Only tertiary structures remain intact.

**Question : 37**

The polymer used as a substitute for wool is

- A Polyether
- B Polyacrylonitrile
- C Polyester
- D Teflon

**Question : 38**

Which of the following polymers involve cross linkages?

- A Bakelite
- B PVC
- C Nylon 6
- D Novolac

**Question : 39**

The tranquilizer used to control depression and hypertension is

- A Equanil
- B Seldane
- C Maprobamate
- D Asprin

**Question : 40**

Which of the following is **not** an antiseptic?

- A 1% solution of phenol
- B Tincture of Iodine
- C Dettol
- D Iodoform

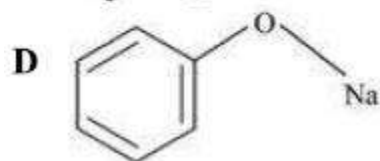
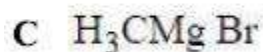
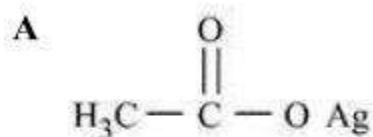
**Passage:**

Read the passage given below to answer questions

Most of haloalkanes and haloarenes react with certain metals to give compound containing carbon metal bonds, called organometallic compounds. Grignard reagent is such organo magnesium compound. Grignard reagent can be prepared from halogen derivative of alkanes / arenes with magnesium metal in dry ether. These are highly reactive compounds and react with source of proton to give hydrocarbon. Grignard reagents undergo addition with carbonyl compounds to give corresponding alcohols.

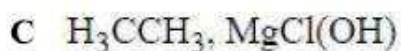
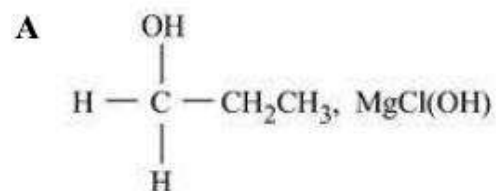
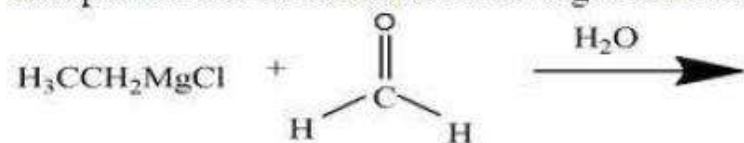
Question : 41

The organometallic compound from the following, is: -



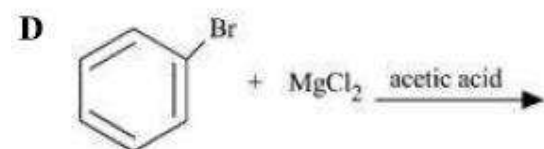
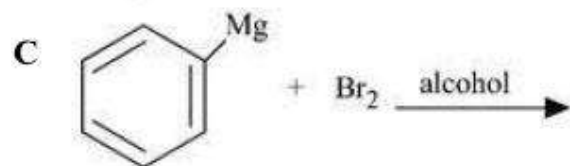
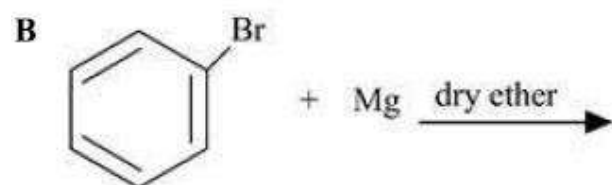
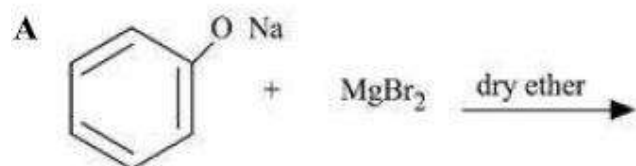
Question : 42

The products formed in the following reaction is: -



Question : 43

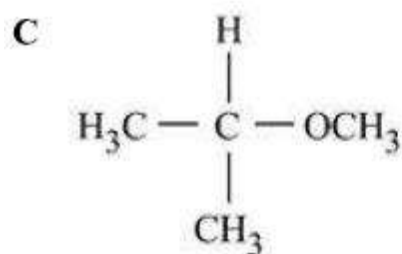
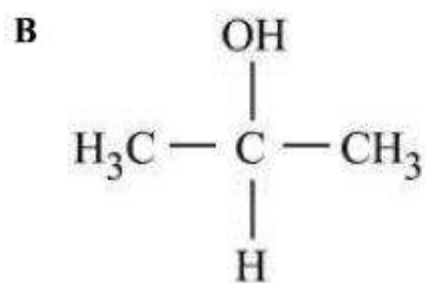
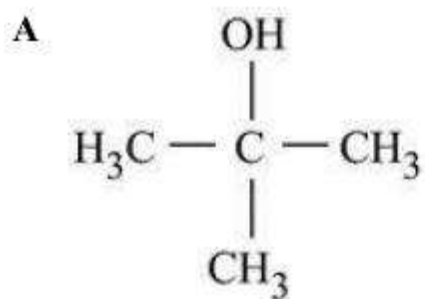
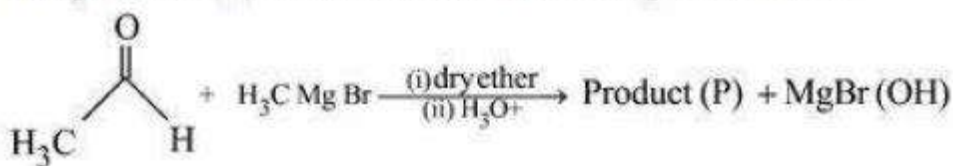
The correct equation from the following representing the preparation of phenyl magnesium bromide is





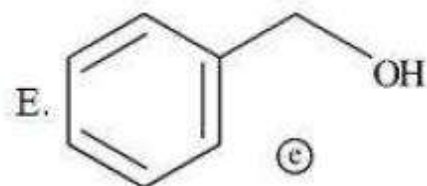
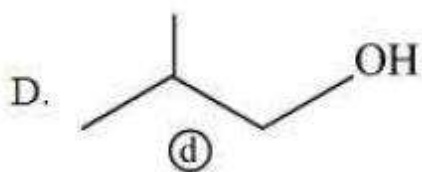
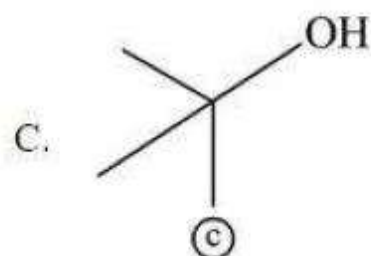
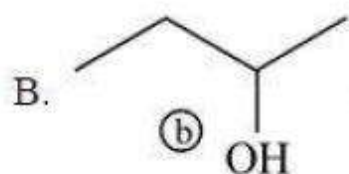
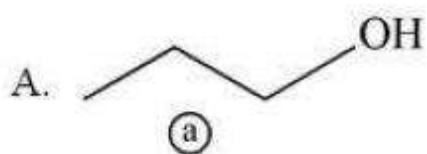
Question : 44

The product (P) formed in the following reaction is



Question : 45

The number of alcohols which can be produced from Grignard reagent and formaldehyde from the following is



Choose the correct answer from the options given below:

A 5

B 2

C 4

D 3

**Passage:**

Read the passage given below to answer question

A potential difference developed between the electrode and electrolyte is called electrode potential. When the concentrations of all the species involved in a half cell is unity, then the electrode potential is known as standard electrode potential. In a galvanic cell, the half- cell in which oxidation takes place is called anode and it has a negative potential with respect to solution. The other half cell in which reduction takes place, is called cathode and it has a positive potential with respect to solution. Thus, there exists a potential difference between the two electrodes, cathode and anode. This difference is called cell potential and is measured in volts. It is called the cell electromotive force when no current is drawn through the cell. A galvanic cell is represented by putting a vertical line between metal and electrolyte solution and putting a double vertical line between the two electrolytes connected by salt bridge. Under this convention, emf of cell is positive and is given as

$$E_{\text{cell}} = E_{\text{right}} - E_{\text{left}}$$

The standard electrode potential, are very important. The value at standard electrode potential of an electrode is greater than zero, then its reduced form is more stable compared to hydrogen gas. The value at some standard electrode potentials at 298 K are given below (ions are present as aqueous species and H<sub>2</sub> O as liquid).

|                                  | $\epsilon^0/V$ |
|----------------------------------|----------------|
| $\text{Ag}^+ / \text{Ag (s)}$    | 0.80           |
| $\text{Cu}^{2+} / \text{Cu (s)}$ | 0.34           |
| $\text{Pb}^{2+} / \text{Pb (s)}$ | -0.13          |
| $\text{Fe}^{2+} / \text{Fe (s)}$ | -0.44          |
| $\text{Mg}^{2+} / \text{Mg (s)}$ | -2.36          |

Question : 46

The strongest oxidising agent amongst the following  $\text{Ag}^+$ ,  $\text{Cu}^{2+}$ ,  $\text{Fe}^{2+}$ ,  $\text{Pb}^{2+}$ , is

- A  $\text{Ag}^+$
- B  $\text{Cu}^{2+}$
- C  $\text{Fe}^{2+}$
- D  $\text{Pb}^{2+}$

Question : 47

Amongst the following, the weakest reducing agent is

- A Mg
- B Pb
- C Fe
- D Cu

Question : 48

The emf of the cell  $\text{Ag (s)} \mid \text{Ag}^+ (1\text{m}) \parallel \text{Pb}^{2+} (1\text{m}) \mid \text{Pb (s)}$ , is

- A 0.67 V
- B 1.06 V
- C -0.93 V
- D 0.93 V

**Question : 49**

When Pb is added to an aqueous solution of a mixture of  $\text{Cu}^{2+}$  and  $\text{Mg}^{2+}$  ions, it is observed

- A  $\text{Cu}^{2+}$  is reduced.
- B  $\text{Mg}^{2+}$  is reduced.
- C Cu is reduced.
- D  $\text{Pb}^{2+}$  is reduced.

**Question : 50**

The combination of electrodes which will give maximum value of  $E^\circ$  cell at 298 K is

- A 

|              |                |
|--------------|----------------|
| <b>Anode</b> | <b>Cathode</b> |
| Ag           | Mg             |
- B 

|              |                |
|--------------|----------------|
| <b>Anode</b> | <b>Cathode</b> |
| Cu           | Fe             |
- C 

|              |                |
|--------------|----------------|
| <b>Anode</b> | <b>Cathode</b> |
| Mg           | Ag             |
- D 

|              |                |
|--------------|----------------|
| <b>Anode</b> | <b>Cathode</b> |
| Pb           | Mg             |