

CHEMISTRY

Question Bank

TECHNOLOGICAL
WORLD

Bihar Board

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2017

2017 (A) CHEMISTRY

Section-I (Objective Type)

Time : 1 Hour 10 Minutes]

[Marks : 28

Instructions to the Candidates :

1. Fill in your Roll No. in the space provided on the first page of this question paper.
2. This question paper consists of 28 objective type questions. Total marks allotted is 28.
3. The candidate has to answer all the questions in the OMR Answer-Sheet provided along with this question paper.
4. Before answering the candidate has to ensure that the OMR Answer-Sheet is available along with the question paper.
5. All entries must be confined to the area provided in the OMR Answer-Sheet.
6. Answer all the questions by completely darkening the circles against the question numbers in the OMR Answer-Sheet using Black/Blue Ball point pen only.
7. Do not fold or make any stray marks on the OMR Answer Sheet, failing which it would be difficult to evaluate the Answer Sheet.
8. Read all the instructions provided in the OMR Answer-Sheet carefully before answering. After you finish answering, hand over the OMR Answer-Sheet to the Invigilator. You are permitted to carry the question paper only along with you.

For the following Question Nos. 1 to 28 there is only one correct answer against each question. For each question, mark the correct option on the answer sheet. $28 \times 1 = 28$

1. Which of the following oxides shows electrical properties like metals?

- | | |
|-----------------------|--------------------|
| (A) SiO_2 | (B) MgO |
| (C) SO_2 (s) | (D) CrO_2 |

2. Which of the following is an amorphous solid?

- | | |
|------------------|--------------------------------------|
| (A) Graphite (C) | (E) Quartz Glass (SiO_2) |
| (C) Chrome Alum | (D) Silicon Carbide (SiC) |

3. Which of the following aqueous solution should have the highest boiling point?

- | | |
|------------------------------------|------------------------------------|
| (A) 1.0 M NaOH | (B) 1.0 M Na_2SO_4 |
| (C) 1.0 M NH_4NO_3 | (D) 1.0 M KNO_3 |

4. A Solution has an osmotic pressure of 0.0821 atm. at 300 K. Its concentration would be.

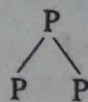
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|-------------|-------------|
| (A) 0.66 M | (B) 0.32 M |
| (C) 0.066 M | (D) 0.033 M |

5. Azeotropic mixture of HCl and H_2O has

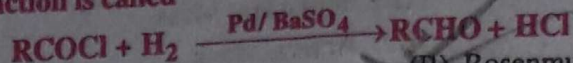
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|----------------------|------------------------|
| (A) 48% HCl | (B) 22.2% HCl |
| (C) 36% HCl | (D) 20.2% HCl |

6. When one faraday of electric current is passed, the mass deposited, is equal to

- | | |
|--------------------------------|--------------------------|
| (A) One gram equivalent | (B) One gram mole |
| (C) Electrochemical equivalent | (D) Half gram equivalent |

7. The rate at which a substance reacts, depends upon its
 (A) Atomic Mass (B) Equivalent Mass
 (C) Molecular Mass (D) Active Mass
8. For a zero order reaction
 (A) $t^{1/2} \propto a$ (B) $t^{1/2} \propto \frac{1}{a}$ (C) $t^{1/2} \propto a^2$ (D) $t^{1/2} \propto \frac{1}{a^2}$
9. A catalyst is a substance which
 (A) Increases the equilibrium concentration of the product
 (B) Changes the equilibrium constant of the reaction
 (C) Shortens the time to reach equilibrium
 (D) Supplies energy to the reaction
10. Sulphide ores are generally concentrated by
 (A) Froth Floatation method (B) Roasting
 (C) Gravity (D) Reduction by Carbon
11. Which of the following is Tribasic?
 (A) H_3PO_2 (B) H_3PO_3
 (C) $H_4P_2O_7$ (D) H_3PO_4
12. In white phosphorous (P_4) molecule, which one is not correct
 (A) 6 P-P single bonds are present (B) 4 P-P single bonds are present
 (C) 4 lone pair of electrons are present (D)  bond angle is 60°
13. The general electronic configuration of transition elements is
 (A) $(n-1)d^5$ (B) $(n-1)d^{(1-10)}ns^{0,1, \text{ or } 2}$
 (C) $(n-1)d^{(1-10)}ns^1$ (D) none of these
14. The highest magnetic moment shown by the transition metal ion with the outermost electronic configuration is
 (A) $3d^5$ (B) $3d^2$ (C) $3d^7$ (D) $3d^9$
15. What is the coordination number of Cr in $K_3[Cr(Ox)_3]$
 (A) 6 (B) 5 (C) 4 (D) 3
16. The EAN of cobalt in the complex ion $[Co(en)_2Cl_2]^{\oplus}$ is
 (A) 27 (B) 36 (C) 33 (D) 35
17. A Grignard reagent is prepared by the action of magnesium in dry ether on
 (A) C_2H_5OH (B) C_2H_6
 (C) C_2H_5Cl (D) C_2H_5CN
18. Primary, Secondary and Tertiary alcohols are distinguished by
 (A) Oxidation method (B) Lucas reagent method
 (C) Victor Meyer's method (D) All of these
19. Ethyl acetate reacts with CH_3MgBr to form
 (A) Secondary Alcohol (B) Tertiary Alcohol
 (C) Primary Alcohol and Acid (D) Carboxylic Acid
20. Carbon atom in the carbonyl group is
 (A) sp -hybridised (B) sp^2 -hybridised
 (C) sp^3 -hybridised (D) dsp^2 -hybridised

21. The reaction is called



- (A) Cannizzaro Reaction
(C) Haloform Reaction

- (B) Rosenmund's Reaction
(D) Clemensen's Reaction

22. Which of the following undergoes Cannizzaro's reaction?

- (A) CH_3CHO
(C) $(\text{CH}_3)_2\text{CHCHO}$

- (B) $\text{CH}_3\text{CH}_2\text{CHO}$
(D) HCHO

23. What is the decreasing order of basicity?

- (A) $\text{NH}_3 > \text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_2\text{NH} > (\text{C}_2\text{H}_5)_3\text{N}$
(B) $(\text{C}_2\text{H}_5)_3\text{N} > (\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > \text{NH}_3$
(C) $(\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_3\text{N} > \text{NH}_3$
(D) $(\text{C}_2\text{H}_5)_2\text{NH} > (\text{C}_2\text{H}_5)\text{NH}_2 > \text{NH}_3 > (\text{C}_2\text{H}_5)_3\text{N}$

24. Aniline reacts with Acetaldehyde to form

- (A) Carbylamines (B) Nitrobenzene (C) Imine

(D) Schiff's base

25. Sweetest of all sugars is

- (A) Glucose (B) Lactose (C) Sucrose

(D) Fructose

26. Enzyme is

- (A) Carbohydrate (B) Lipid (C) Proteins

(D) None of these

27. Natural Rubber is a polymer of

- (A) Styrene (B) Isoprene (C) Chloroprene (D) Butadiene

28. Antibiotic used for the treatment of typhoid is

- (A) Penicillin (B) Chloramphenicol
(C) Terramycin (D) Sulphadiazine

ANSWERS

- | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|
| 1. (D) | 2. (B) | 3. (B) | 4. (D) | 5. (D) | 6. (A) | 7. (D) |
| 8. (A) | 9. (C) | 10. (A) | 11. (D) | 12. (B) | 13. (B) | 14. (A) |
| 15. (A) | 16. (B) | 17. (C) | 18. (D) | 19. (B) | 20. (B) | 21. (B) |
| 22. (D) | 23. (C) | 24. (D) | 25. (D) | 26. (C) | 27. (B) | 28. (B) |

Section-II (Non-Objective Type)

Time : 2 Hour 05 Minutes]

[Marks : 42

Instructions to the Candidates :

- Candidates are required to give their answers in their own words as far as practicable.
- Figures in the right-hand margin indicate full marks.
- Section II of this question paper consists of 15 non-objective type questions having total marks 42.
- The candidate has to answer all the short answer questions from Q. No. 1 to Q. No. 11 and all 4 long answer type questions from Q. No. 12 to Q. No. 15 in his/her answer-book which is provided separately. Q.Nos. 1 to 11 carry 2 marks each and Q. Nos. 12 to 15 carry 5 marks each.
- Write the question number with every answer.

Question Nos. 1 to 11 are of short answer type. Each question carries 2 marks.

11 × 2 = 22

Short Answer Type Questions

1. Lithium form bcc crystals. Calculate the atomic radius of lithium if the length of the side of a unit cell of lithium is 351 pm.

$$\text{Ans. } r = \frac{\sqrt{3}}{4} \times a = \frac{1.732 \times 351}{4} = 151.98 \text{ pm.}$$

2. State and explain faraday's 2nd Law of electrolysis.

Ans. When the same amount of electricity is passed through solutions of different electrolytes connected in series, the masses of the substances produced at the electrodes are directly proportional to their equivalent.

Let I amp. current is passed through different electrolytes for time t . then deposited amount of substance is w_1 , w_2 and its equivalent weight is E_1 and E_2 respectively.

$$W_1 \times E_1 \text{ and } W_2 \times E_2 \Rightarrow \frac{W_1}{W_2} = \frac{E_1}{E_2}$$

3. What is specific conductance and molar conductance?

Ans. Specific conductance : The reciprocal of resistivity is known as specific conductance. It is denoted by K . $K = \frac{1}{\rho}$. Its unit is $S \text{ cm}^{-1}$.

Molar conductivity : The conductivity of an electrolyte solution containing one mole of electrolyte placed between two parallel electrodes separated by 1 cm is known as molar conductivity. It is denoted by Λ_m .

$$\Lambda_m = \frac{K \times 1000}{M}$$

4. Distinguish between Lyophilic and Lyophobic colloids.

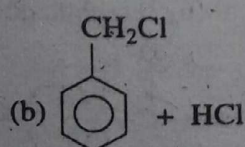
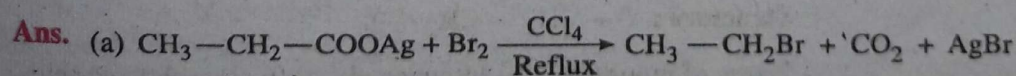
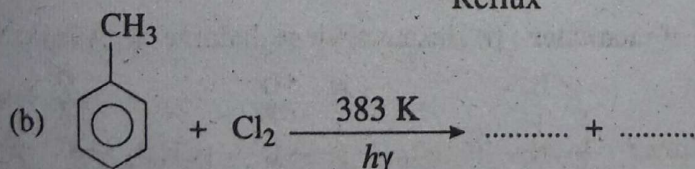
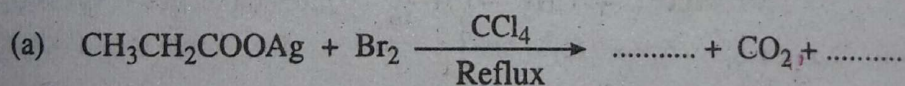
Ans. See answer Q.No. 1 in 2010 (A).

5. Give the name and chemical composition of important ores of Aluminium and Copper.

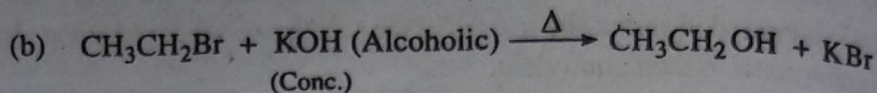
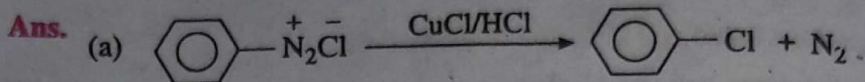
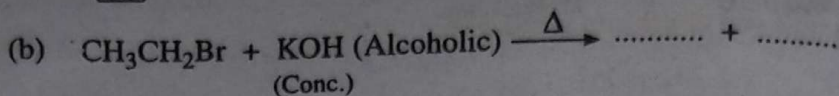
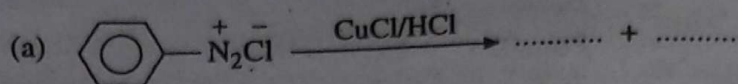
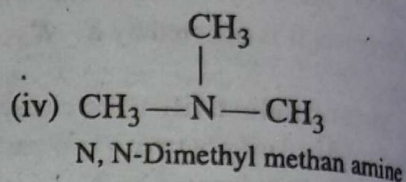
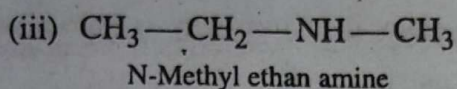
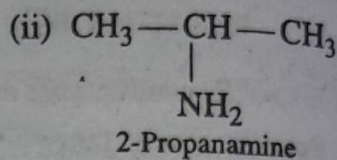
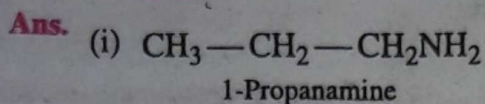
Ans. Ores of aluminium : (a) Bauxite — $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$ (b) Cryolite — Na_3AlF_6

Ores of copper : (a) Copper pyrites — CuFeS_2 (b) Cuprite — Cu_2O

6. Fill in the blanks :



7. Complete the reaction :

8. Write the names and structures of four isomeric amines having the molecular formula $\text{C}_3\text{H}_9\text{N}$.

9. Name two vitamins and their deficiency diseases.

Ans. Name of Vitamins

Name of diseases

(i) Vitamin A (Retinol)

Night blindness

(ii) Vitamin B₂ (Riboflavin)

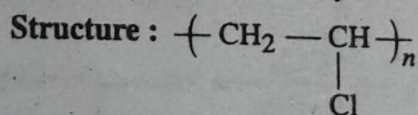
Skin swelling around the mouth

10. Name the Monomer and write the structure of any two of the following polymers.

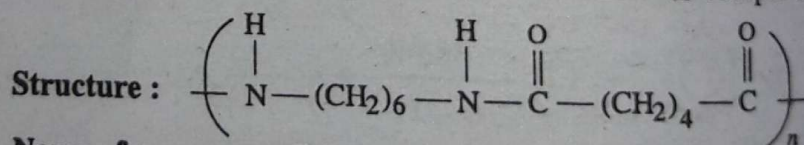
(a) PVC (b) Nylon-6, 6 (c) Polythene (d) Polyester

Ans.

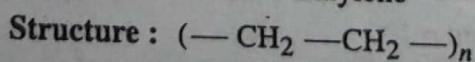
(a) PVC → Name of monomer : Vinyl Chloride



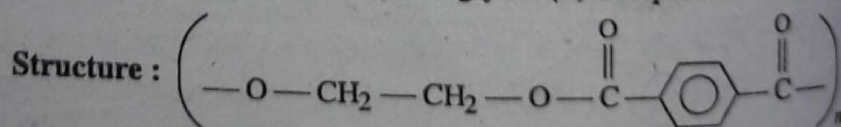
(b) Nylon-6, 6 → Name of monomer : (i) Hexamethylene diamine & Adepic acid



(c) Polythene → Name of monomer : Ethylene



(d) Polyesters → Name of monomer : (i) Ethylene glycol (ii) Terephthalic acid



11. Write the name of any two of the following medicines :

(a) Analgesics (b) Antiseptic (c) Antibiotic (d) Antihistamine

Ans. (a) Analgesics — Aspirin
 (b) Antiseptic — Dettol
 (c) Antibiotic — Penicillin
 (d) Antihistamine — Terfenadine

Question Nos. 12 to 15 are of long answer type. Answer must be explanatory and in your own language. All questions have alternative out of which you have to choose any one alternative. Each question carries 5 marks.

4 × 5 = 20

Long Answer Type Questions

12. (a) What do you mean by the term 'Depression of freezing point'?

(b) State Raoult's Law of depression of freezing point. How is it useful in determining the molecular weight of non-volatile and non-electrolyte solute?

Ans. (a) The difference between freezing point of pure solvent and its solution is known as depression in freezing point. It is denoted by ΔT_f .

$$\Delta T_f = T_f^o - T_f^s$$

(b) Raoult's Law : The depression in freezing point is directly proportional to molality of solution.

Let ΔT_f is the depression in freezing point of solution. Its concentration is m mole/kg.

$$\Delta T_f \propto m \Rightarrow \Delta T_f = K_f \cdot m$$

where K_f is known as molal depression constant

$$\Delta T_f = K_f \times \frac{\text{weight of solute} \times 1000}{\text{molecular weight of solute} \times \text{weight of solvent (gram)}}$$

$$\text{Mole weight of solute} = \frac{K_f \times \text{weight of solute} \times 1000}{\Delta T_f \times \text{weight of solvent (gram)}}$$

Or,

(a) What do you mean by Relative lowering of vapour pressure?

(b) The relative lowering of vapour pressure of 1% solution of Aniline in Ether was 0.007. Calculate the molecular weight of Aniline.

Ans. (a) When a non volatile solute is added to pure solvent then its vapour pressure is decreased. Decreased vapour pressure is known as lowering of vapor pressure.

The ratio of lowering of vapour pressure to vapour pressure of pure solvent is known as relative lowering of vapour pressure.

Let vapour pressure of pure solvent is p^o and p^s is the vapour pressure of solvent in solution.

$$\text{Lowering of vapour pressure} = P^o - P^s$$

$$\text{Relative lowering of vapour pressure} = \frac{P^o - P^s}{P^o}$$

$$(b) \frac{\Delta f}{P^o} = 0.007, \text{ Mass of solute} = 1 \text{ g}$$

$$\text{Mass of solution} = 100 \text{ g}$$

$$\text{Mass of solvent} = 100 - 1 = 99 \text{ g}$$

$$\text{Molecular mass of solvent} = 48 + 10 + 16 = 74$$

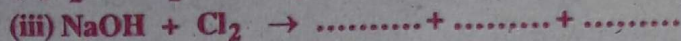
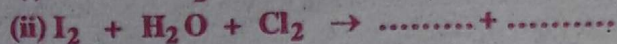
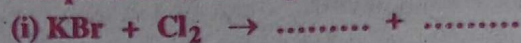
$$\frac{\Delta P}{P^o} = \frac{\text{weight of solute} \times \text{molecular of solvent}}{\text{molecular weight of solute} \times \text{weight of solvent}}$$

$$\Rightarrow 0.007 = \frac{1 \times 74}{\text{molecular weight of solute} \times 99}$$

$$\Rightarrow \text{Molecular of solute} = \frac{1 \times 74}{0.007 \times 99} = 106.78.$$

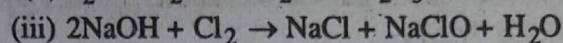
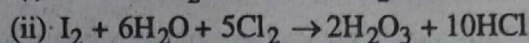
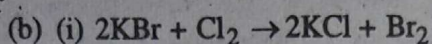
13. (a) Write only the principle for the manufacturing of sulphuric acid by contact process.

(b) Complete the following reactions :

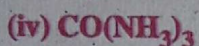
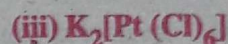
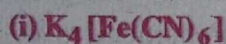


(Cold and dilute)

Ans. (a) See answer Q.No. 12 in 2009 (A).



14. Write the IUPAC name of the following coordination compounds :



Ans. (i) Potassium hexacyano ferrate (II)

(ii) Tetra carbonyl nickel (0)

(iii) Potassium hexa chloro platinate (IV)

(iv) Triamine cobalt (III)

(v) Iron hexa cyano ferrate (II)

Or,

(a) State Werner's coordination theory.

(b) What are legends? Classify them with examples.

Ans. (a) Werner's theory : (i) Metals possess two types of valencies called primary valency and secondary valency. (ii) Every metal atom has a tendency to satisfy both its primary and secondary valencies primary valencies are satisfied by negative ions whereas secondary valencies are satisfied by negative ion or neutral molecule. (ii) The Legends satisfying secondary valencies are always directed towards fixed position in space thereby giving a definite geometry to the complex but primary valencies are non-directional.

(b) Legends : The donar atoms, molecules or anions which donate a pair of electrons to the metal atom of ion form a co-ordinate bond with it are called legends.

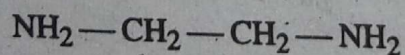
Types of legends :

(1) *Unidentate legends* : They have one donar atom.

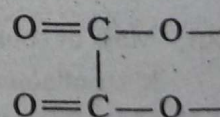
e.g., F^- , Cl^- , Br^- , NH_3

(2) *Bindenate legends* : They have two donar atoms.

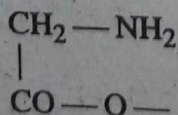
(i) en (Ethylenediamene)



(ii) ox (Oxalate)



(iii) gly (Glycinate)



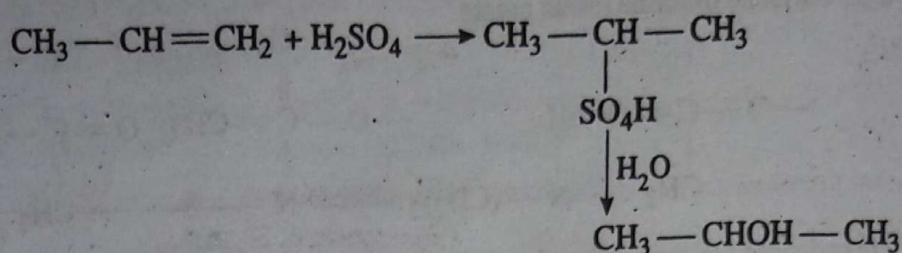
Or,

What happens when

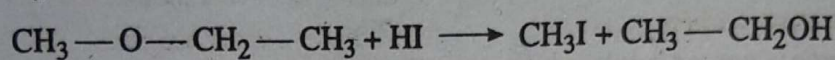
- (a) Propene is passed into concentrated H_2SO_4 and the product is boiled with water.
 (b) Methoxy ethane is heated with HI.
 (c) Ethanol is heated with Fenton's reagent.
 (d) Toluene is heated with Chromyl Chloride in CS_2 and the product is hydrolysed.
 (e) Crotonaldehyde is treated with LiAlH_4 / dry ether and the product is acid hydrolysed.

Ans.

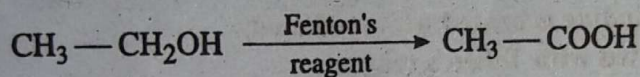
- (a) 2-Propanol is obtained.



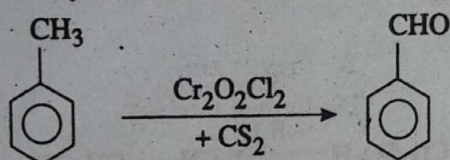
- (b) Ethyl alcohol and methyl iodide is obtained.



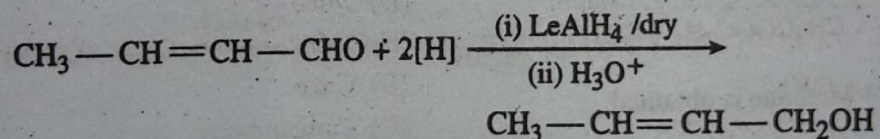
- (c) Acetic acid is obtained.



- (d) Benzaldehyde is obtained.



- (e) But-2-en-1-ol is obtained.



□