

**B.Sc. CHEMISTRY
SIXTH SEMESTER
APPLIED CHEMISTRY
BSC – 602**

[USE OMR FOR OBJECTIVE PART]

SET
A

Duration: 3 hrs.

Full Marks: 70

Objective

Time: 30 min.

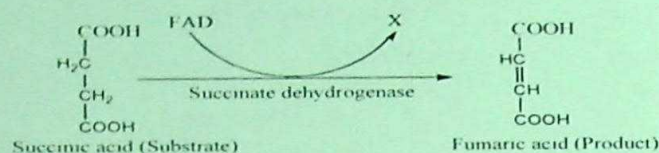
Marks: 20

$$1 \times 20 = 20$$

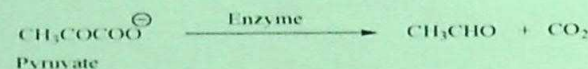
Choose the correct answer from the following:

1. What is the primary product obtained at the cathode during the electrolysis of sodium chloride?
 - a. Chlorine gas
 - b. Hydrogen gas
 - c. Sodium hydroxide
 - d. Sodium chloride
2. Which process uses sulfuric acid as a raw material?
 - a. Solvay process
 - b. Leblanc process
 - c. Both A and B
 - d. None of the above
3. What is the first step in the Ostwald process?
 - a. Oxidation of NO to NO₂
 - b. Absorption of NO₂ in water
 - c. Oxidation of NH₃ to NO
 - d. Reduction of NO₂ to NO
4. What is the primary raw material used in the manufacture of Lithopone?
 - a. Zinc oxide
 - b. Barium sulfate
 - c. Titanium dioxide
 - d. Lead oxide
5. What is the chemical formula for Single Superphosphate (SSP)?
 - a. Ca(H₂PO₄)₂
 - b. Ca₃(PO₄)₂
 - c. Ca₅(PO₄)₃OH
 - d. H₂SO₄
6. Which formula correctly represent a simple monosaccharide
 - a. C₅H₅O₄
 - b. C₄H₁₈O₉
 - c. C₄H₅O₄
 - d. C₆H₁₀O₆
7. How many optical isomers are possible for Glucose?
 - a. 8
 - b. 16
 - c. 4
 - d. 32
8. Find the correct statement
 - a. All epimers are anomers but all anomers are not epimers.
 - b. Epimer and anomer are same.
 - c. All anomers are epimers but not all epimers are anomers.
 - d. All anomer are epimer and all epimers are anomer.
9. Sucrose is composed of
 - a. Glucose & galactose
 - b. Glucose & fructose
 - c. Only glucose
 - d. Glucose & gulose

10. Amylose is a glucose polymer with
 a. $\beta(1-4)$ linkages
 b. $\alpha(1-6)$ linkages
 c. $\alpha(1-4)$ linkages
 d. $\beta(1-6)$ linkages
11. Select the correct expression from the following options for enzymes
 a. Apo enzyme = Holo enzyme + Co-factor
 b. Co-factor = Apo enzyme + Holo enzyme
 c. Holo enzyme = Apo enzyme + Co-factor
 d. Holo enzyme = Apo enzyme - Co-factor
12. Ligases are class of enzymes which is involved in
 a. Transfer of functional groups
 b. Addition to double bonds
 c. Making of bonds with ATP cleavage
 d. Catalysis of isomerisation
13. In the following biochemical reaction, the coenzyme X is identified as



- a. FADH_2
 b. FAD^+
 c. FADH
 d. FADH^+
14. The suitable coenzyme X and Y in the following biochemical reaction will respectively be
-
- $\text{Alcohol} \xrightarrow[\text{X} \rightarrow \text{Y}]{\text{Alcohol dehydrogenase}}$
 Ketone
- a. NADH^+ and NADH_2
 b. NAD^+ and NADH
 c. FMN and FAD
 d. None of the above
15. The enzyme used in the following biochemical reaction is,



- a. Pyruvate carboxylase
 b. Transferase
 c. Lactate dehydrogenase
 d. Pyruvate decarboxylase
16. As the crystallinity increases, the strength and flexibility of the polymer
 a. Strength increases, flexibility decreases
 b. Strength decreases but flexibility increases
 c. Strength and flexibility both are increases
 d. None is correct

17. which polymerization technique is mainly used in surface coatings and paint industry
- Bulk polymerisation
 - Solution polymerisation
 - Suspension polymerisation
 - Emulsion polymerisation techniques.
18. Which type of polymers cannot be recycled
- Thermoplastics
 - Thermosetting plastics
 - Elastomers
 - All polymers
19. Which of the following act as an initiator in free-radical polymerisation
- Benzoyl peroxide
 - Lewis acids
 - Grignard reagent
 - Potassium amide
20. $F_2C=CF_2$ is a monomer of
- HDPE
 - PVC
 - Teflon
 - PMMA

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(Descriptive)

Time : 2 hrs. 30 min.

Marks : 50

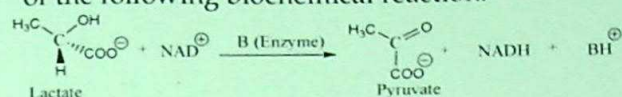
[Answer question no.1 & any four (4) from the rest]

- What is oleum and how is it related to the Contact Process?
Write the primary use of Lithopone? 3+2+3+2
=10
 - Lactose and sucrose both are disaccharide. Which one shows mutarotation and why?
 - What is Degree of Polymerisation? Write the differences between thermoplastics and thermosetting plastics. Give examples of thermoplastics and thermosetting plastics.
 - What are transferases? Explain with examples.
- Describe the two main steps involved in the separation and concentration of sodium hydroxide solution after electrolysis. 3+3+4
=10
 - Describe the Haber-Bosch process for the production of ammonia.

- c. What is the chemical reaction involved in the manufacture of White Lead from lead oxide? Write the chemical composition of White Lead?
3. a. Write down the open chain structure of Glucose. What will happen when Glucose treated with (i) HI/ Red P, (ii) HCN, (iii) Conc. HNO_3 3+5+2
=10
- b. Explain why D-glucose and D-fructose yield the same osazone when it reacts with excess phenylhydrazine - Explain with mechanism.
- c. Why Glucose response to the silver mirror test? Write down the reactions involved.
4. a. Show the detailed mechanistic pathway for the conversion of Fructose $\rightarrow$ Glucose. 4+3+3
=10
- b. Describe Killiani-Fisher synthesis with example.
- c. What category of carbohydrate is cellulose? Draw the structure of cellulose and show the glycosidic linkage.
5. a. What are the typical chemical compositions used in the manufacture of glass, including the percentage ranges for each component? 2+1+2+2+3
=10
- b. Write down the formula of following components: Alite, Belite, and Gypsum.
- c. Write two differences between Cast Iron and Cast Steel?
- d. What is gel-effect observed in bulk polymerisation technique. How it can be minimized.
- e. Write about the solution polymerization technique? Write the applications of this technique. What are the drawbacks of this technique.
6. a. Discuss the classification of biochemical enzymes with appropriate example. 4+3+3
=10
- b. What are holoenzyme and apoenzyme? Outline the differences between them.
- c. Discuss the role of coenzymes in biochemical reaction.

7. a. What is NAD⁺? Draw its Structure and discuss the mechanism of the following biochemical reaction.

4+3+3
=10



- b. What is TPP? Draw its structure and label its different constituent.
- c. Discuss the functions of FAD.
8. a. A sample of polymer contains 30% molecules with molecular mass 20,000, 40% with molecular mass 30,000 and 30% with molecular mass 60,000. What is the number average and weight average molecular mass of the polymer? Also calculate the polydispersity index value.
- b. Write the free radical polymerization mechanism for the preparation of polythene from ethylene monomer.
- c. What is Ziegler-Natta catalyst? Write the importance of this catalyst in polymer industry?
- d. Write the chemical reaction of preparation of nylon 6 from caprolactam.
- e. What is role of initiator in polymerisation reaction?

3+3+2+1+
1=10

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