REV-01
BSC/01/05

2023/08

SET A

M.Sc. CHEMISTRY
FIFTH SEMESTER
ORGANIC CHEMISTRY IV
BSC – 501 [SPECIAL REPEAT]

[USE OMR FOR OBJECTIVE PART]

Duration : 3 hrs. **Full Marks : 70**

Objective

Time : 30 min. **Marks : 20**

Choose the correct answer from the following: ***1X20=20***

1. Ester value' is related to
   a. mmol of NaOH
   b. mmol of KOH
   c. mg of NaOH
   d. mg of KOH

2. Iodine number of a fat sample is related to the fat of
   a. 1 g
   b. 10 g
   c. 100 g
   d. 1000 g

3. Geraniol is an example of
   a. glycerolipid
   b. sphingolipid
   c. prenol lipid
   d. Sterol lipid

4. Which one of the following drugs is not to be considered in the NSAID class?
   a. Aspirin
   b. Naproxen
   c. Ibuprofen
   d. Paracetamol

5. The functional group present in Ibuprofen is
   a. Carbixylic acid
   b. Keto
   c. Methoxy
   d. Hydroxy

6. Beta-lactam structure is found in
   a. Penicillin G
   b. Paracetamol
   c. naproxen
   d. ibuprofen

7. Pyruvate is fed in TCA cycle as
   a. Acetic acid
   b. Acetyl CoA
   c. Co-enzyme A
   d. Oxal acetate

8. Pantothanic acid is a vitamin, necessary to form the Co-enzyme
   a. Co-enzyme A
   b. Co-enzyme NAD^+
   c. Co-enzyme TPP
   d. Co-enzyme FAD

9. Which of the following statement is not correct about glycolysis?
   a. There is a net production of 2 equivalent of ATP
   b. Overall process is an exergonic process.
   c. Conversion of glucose to glucose-6-phosphate is an exergonic process.
   d. Pyruvate is the final product of glycolysis.

10. Which is the correct mode of base pairing in DNA
    a. A=T & G≡C
    b. A≡T & G=C
    c. A=G & C≡T
    d. C≡T & A=G

11. Mannose is a
    a. Ketopentose
    b. Ketohexose
    c. Aldohexose
    d. Aldopentose

12. Fructose can show mutarotation because of
    a. presence of keto group
    b. α- and β-fructopyranose structure
    c. only β-fructofuranose structure
    d. ability to form cyclic structure

13. 2,3-dihydroxy propanal is a monosaccharide, fall in the category of
    a. Ketotriose
    b. Aldotriose
    c. Ketotetrose
    d. Aldotetrose

14. Sucrose upon hydrolysis gives
    a. Glucose and Fructose
    b. Glucose & galactose
    c. Fructose & galactose
    d. only glucose

15. In the solid phase synthesis of protein after the formation of the peptide linkage, protecting group of Boc-protected NH_2 group is removed by adding
    a. CH_3COOH
    b. CCl_3COOH
    c. CF_3COOH
    d. CBr_3COOH

16. Alanine molecule will exist with a net negative charge at a pH
    a. pH lower than 3
    b. pH lower than 5
    c. pH lower than 7
    d. pH greater than 10

17. The amino acid that corresponds the one letter code 'K' is
    a. Methionine
    b. Phenyl alanine
    c. Arginine
    d. Lysine

18. Which of the following statements is true about the primary structure of proteins?
    a. The helical structure of the protein
    b. The linear sequence of amino acids joined by a peptide bond
    c. Three-dimensional structure of the protein
    d. Subunit structure of the protein

19. Alanine will have a net positive charge at
    a. pH lower than 2
    b. pH lower than 7
    c. pH greater than 9
    d. pH greater than 10

20. For the conversion of alanine to valine, the α-keto acid needed is
    a. α-keto isovaleric acid
    b. α-keto valeric acid
    c. α-keto glutaric acid
    d. pyruvic acid

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(Descriptive)

Time : 2 hrs. 30 mins. **Marks : 50**

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

1. a. Give a short account of classification of enzymes. 3

   b. What is the full form of NSAID? Give one example of drug that belongs to NSAID category. 2

   c. Write the mechanism of synthesis of alanine by Strecker's method. 2

   d. Why Glucose response to the silver mirror test? Write down all the reactions involved. 3

2. a. What is osazone? Describe the formation of osazone with detailed mechanism. How can you convert Glucose to Fructose via osazone formation? 1+2+2 =5

   b. What is anomer? Is anomer and epimer are same-comment? Draw all the possible anomeric structures of Glucose. Write a short note on Ruff degradation. 1+1+1+ 2=5

3. a. What are the different steps involved in the synthesis of dipeptide? Write the synthesis of the dipeptide Gly-Ala. 2+3=5

   b. What is transamination? Write the reactions of transformation of alanine to valine by this method. 3

   c. Name the product formed when glycine reacts with acetyl chloride in presence of NaOH. Write the reaction. 2

4. a. What is monosaccharide? Give an example. 1+1=2

   b. Write down the open-chain structure of fructose. How many chiral centres are present in fructose and mark them with asterisk sign. What will happen when fructose reacts with (i) HCN and (ii) hydroxylamine? 1+1+1 =3

c. Write down the product and its corresponding common name of the following reactions: 1+1+1 =3

(i) $CH_2OH(CHOH)_4CHO \xrightarrow{Br_2/H_2O} ?$

(ii) $CH_2OH(CHOH)_4CHO \xrightarrow{Na\text{-}Hg/H_2O} ?$

(iii) $CH_2OH(CHOH)_4CHO + NH_2OH \longrightarrow ?$

d. What do you mean by mutarotation? Explain with respect to Glucose. 1+1=2

5. a. What is solid phase synthesis of protein? Mention the benefits of this method as compared with the normal synthesis. 3

b. Explain in brief solid phase synthesis of protein. 4

c. Describe the primary structure of protein. 3

6. a. What are endergonic and exergonic reactions? Explain with example role of coupled reactions in biological systems. 4

b. What is the full form of NAD^+? What is its biological function? Write a biochemical reaction involving NAD^+. 3

c. ATP is involved in driving a coupled reaction. Illustrate with example. 3

7. a. Write a short note on classification of lipid. Give an example of unsaturated fatty acid with structure. 4+1=5

b. Given AV = 20 & SV = 356 for a fat sample. What will be the M.W. of the fat? Suppose the fat is composed of a single fatty acid. What will be MW of the Fatty acid? 5

8. a. Write a short note of antibiotics. Give the name and structure of an antibacterial drug. Discuss the green synthesis of a NSAID. 2+1+2 =5

b. Illustrate nucleotides and nucleosides with example. 3

c. Show the structure with name of any two bases found in DNA. 2

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