REV-01
MSC/02/06

2024/07

SET A

M.Sc. CHEMISTRY
SECOND SEMESTER
ORGANIC CHEMISTRY-II
MSC – 201 DMJ [SPECIAL REPEAT]
[USE OMR FOR OBJECTIVE PART]

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

Objective

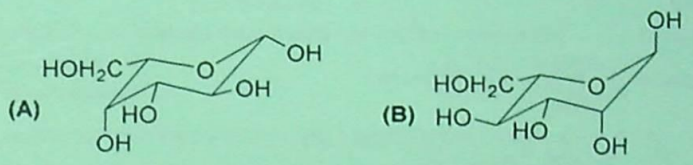
Time: 30 min. **Marks: 20**

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

1. Which of the following statement is **not correct**

   a. Starch is a mixture of two polymers.
   b. Cellulose is a polymer of glucose linked by β-1–4 glycosidic linkage.
   c. Glycogen is an animal sugar structurally similar to amylose.
   d. Chitin is a polymer of N-acetyl glucosamine.

2. The following molecules A and B, are respectively:



   a. α-galactose and α-mannose
   b. β-galactose and α-mannose
   c. β-mannose and α-galactose
   d. β -glucose and α mannose

3. Oxidation of sucrose with HIO_4 will have the following result

   a. consume 1 HIO_4 and produce 1 HCOOH
   b. consume 3 HIO_4 and produce 2 HCOOH
   c. consume 3 HIO_4 and produce 1 HCOOH
   d. consume 2 HIO_4 and produce 1 HCOOH

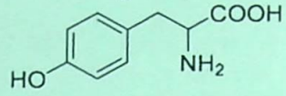
4. Which of the following statement is **not correct** about glycolysis?

   a. There is a net production of 2 equivalent of ATP.
   b. Overall process is an exergonic process.
   c. Conversion of phosphoenol pyruvate to pyruvate is an endergonic process.
   d. Pyruvate is the final product of glycolysis

5. Pick up the coenzyme not involved in redox reactions from the following:
   NAD^+, NADPH, TPP, CoASH

   a. NAD^+ & TPP
   b. NADPH, TPP & CoASH
   c. NAD^+ & NADPH
   d. TPP & CoASH

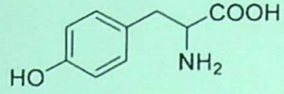
6. The name of the following amino acid is



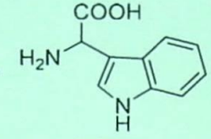
a. Tyrosine
b. Methionine
c. Histidine
d. Phenyl alanine

7. The structure of tryptophan is

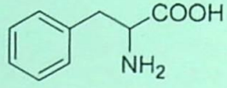
a.



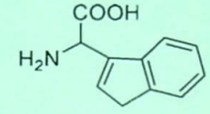
b.



c.

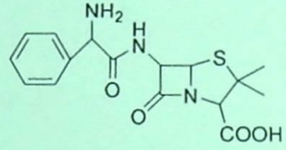


d.



8. Penicilloic acid readily undergoes decarboxylation to give
a. Penilloic acid
b. Penaldic acid
c. Penicillanic acid
d. Penilloaldehyde

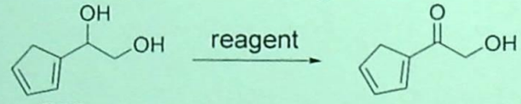
9. What is the name of the following antibiotic?



a. Penicillin
b. Streptomycin
c. Ampicillin
d. Amoxicillin

10. Antibiotic inhibiting protein synthesis by binding with 50S subunit of prokaryotic ribosome is
a. Tetracycline
b. Aminoglycosides
c. Clavulanic acid
d. Chloramphenicol

11. Suitable reagent for the following reaction is

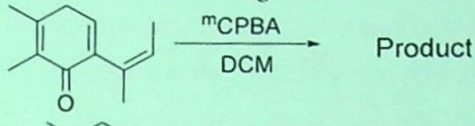


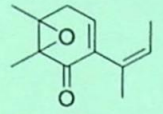
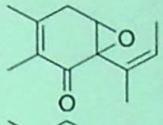
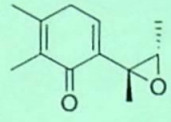
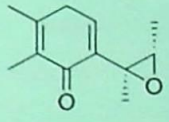
a. PCC
b. PDC
c. MnO_2
d. DMP

12. Oxidation of geraniol to geranial by PDC in DCM is an electron transfer process involving

a. two electrons
b. four electrons
c. six electrons
d. eight electrons

13. Product of the following reaction is

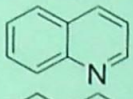
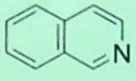
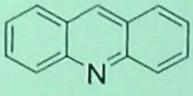


a. 
b. 
c. 
d. 

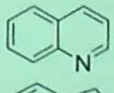
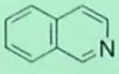
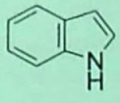
14. Chichibabin reaction of isoquinoline gives the product of

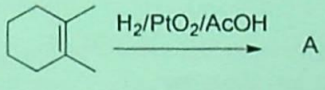
a. C1-alkylation
b. C2- alkylation
c. C1-amination
d. C2- amination

15. The heterocyclic compound having highest pKaH value is

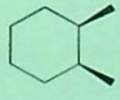
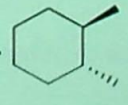
a. 
b. 
c. 
d. 

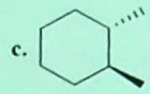
16. The most reactive compound towards electrophilic substitution reaction is

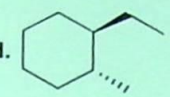
a. 
b. 
c. 
d. 

17. 

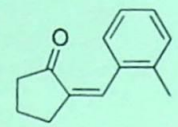
Product A is

a. 
b. 

c. 

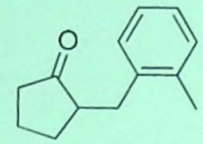
d. 

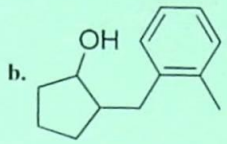
18.

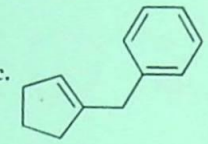


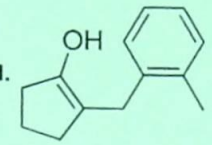
H_2/Pd/C → A

Product A is

a. 

b. 

c. 

d. 

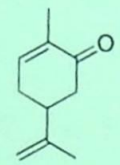
19.

H_2/Pd, $BaSO_4$ → A

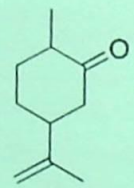
Which one is the product

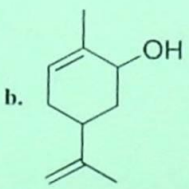
a. $RCOCH_3$
b. RCHO
c. RCOOH
d. $RCH{=}CH_2$

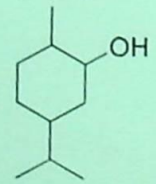
20.

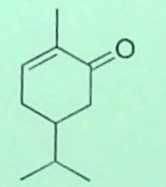


H_2/Wilkinson's cat., THF → A

a. 

b. 

c. 

d. 

-- --- --

Descriptive

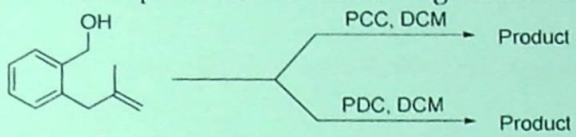
Time : 2 hrs. 30 mins. **Marks : 50**

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

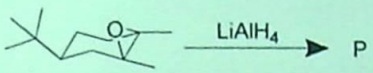
1. a. Explain what do you mean by inversion of sucrose? **2+3+2+1 +2=10**

   b. Discuss the structure activity relationship of penicillin.

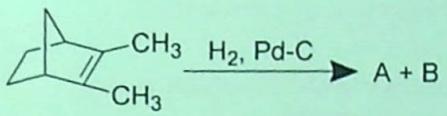
   c. Write the products of the following reactions.



   d. Write the product of the following reaction



   e. Write the products of the following reaction



2. a. What do you understand by mutarotation? Explain why maltose undergo mutarotation but not sucrose? **2×5=10**

   b. α-glucose show specific rotation of (+) 112° and β-glucose (+) 19°. Both these anomers of glucose exhibit mutarotation and specific rotation shown when the equilibrium is reached is (+) 52°. Calculate the percentage of α-glucose and β-glucose at equilibrium.

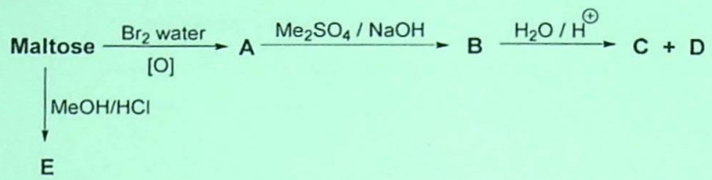
   c. Chemical tests of glucose shows the presence of –CHO group, but IR spectrum of glucose does not show any peak due to carbonyl group. Give reason.

   d. Write down Haworth projection formulae for (i) Sucrose and (ii) β-methyl maltoside.

e. Write down the structure of the reactant and the product formed.

$$\text{Glucose} \xrightarrow{Ac_2O/NaOAc} ?$$

3. a. Complete the following reaction: Write down the structures of A, B, C, D and E. 5+3+2 =10



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

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

4. a. What are the products formed when penicillin is hydrolysed with hot dilute inorganic acids? Write their structures. 2+3+2+3 =10

b. How will you establish the presence of the thiazolidine ring in penilloic acid obtained from penicillin? Explain with chemical reaction.

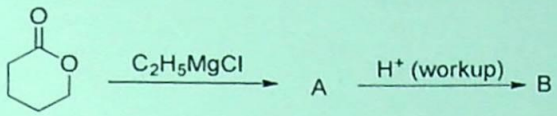
c. Draw the structure of Cephalosporin C. To which class of antibiotic does it belong?

d. Discuss the mechanism of action of Chloramphenicol.

5. a. Explain the determination of N-terminal residue of a polypeptide chain. 2+3+2+3 =10

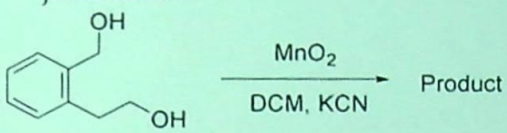
b. Write the structure of the dipeptide, Ala-Val and starting from this dipeptide give the synthesis of the tripeptide, Ala-Val-Ser.

c. Write down the structure of A and B of the following reaction

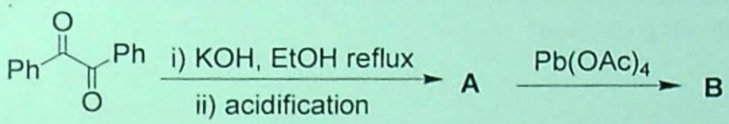


d. How Grignard reagents are synthesized? Show all the reactions. Why Grignard reagent is soluble in ether?

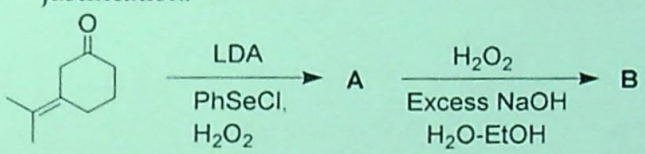
6. a. Write the product of the following reaction with justification 3+4+3 =10



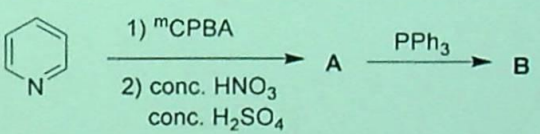
b. Identify the products **A** and **B** with reaction mechanisms of the following reactions.



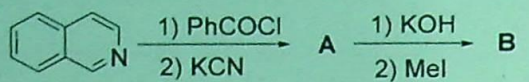
c. Write the products (**A** & **B**) of the following reactions with justification.



7. a. Write down the products (**A** & **B**) of the following reactions with explanation. 3+4+3 =10

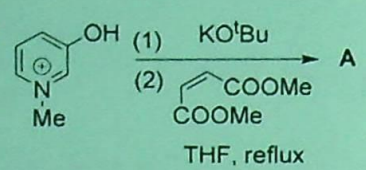


b. Identify the products (**A** & **B**) with explanation.

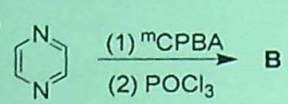


c. Write down the products (**A** & **B**) of the following reactions with mechanism.

(i)

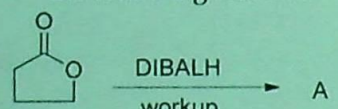


(ii)

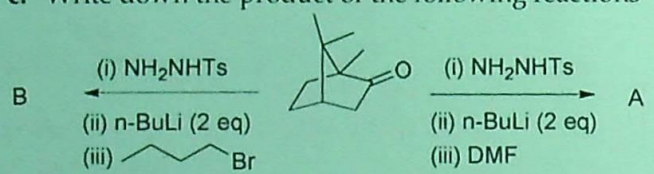


8. a. Write down the structure of Wilkinson's catalyst. Show the detailed mechanism of Wilkinson's catalytic hydrogenation of alkene? **5+2+3 =10**

b. Write down structure of DIBALH. Mention the product of the following reaction



c. Write down the product of the following reactions



= = *** = =