

tal No. of Printed Pages—15

**5 SEM TDC CHM M 5 (N/O)**

**2016**

( November )

**CHEMISTRY**

( Major )

Course : 505

**( Organic Chemistry )**

*The figures in the margin indicate full marks  
for the questions*

( New Course )

Full Marks : 48

Pass Marks : 14

Time : 2 hours

1. (a) Select the correct answer of the following : 1×3=3

(i) Which of the following pairs give the same osazone?

- (1) Sucrose, Fructose
- (2) Mannose, Fructose
- (3) Glucose, Galactose
- (4) Maltose, Lactose

( Turn Over )

( 2 )

(ii) The enzyme which hydrolyzes triglycerides to fatty acids and glycerol is called

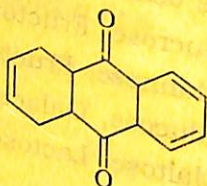
- (1) maltase
- (2) zymase
- (3) lipase
- (4) pepsin

(iii) In DNA, the complementary bases are

- (1) adenine and guanine; thymine and cytosine
- (2) uracil and adenine; cytosine and guanine
- (3) adenine and thymine; guanine and cytosine
- (4) adenine and thymine; guanine and uracil

(b) Draw the structure of Ranitidine (Zantac).

(c) What dienes and dienophiles would you employ to synthesize the following compound?



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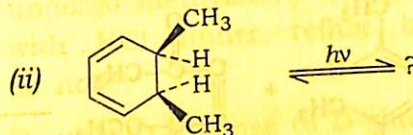
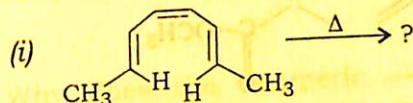
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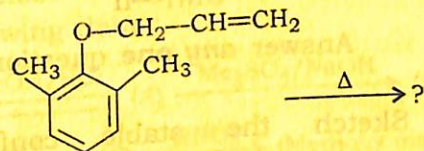
## UNIT—I

Answer any **one** question

2. (a) Predict the stereochemical products obtained in the following electrocyclic reactions (any one) :



(b) Complete the following reaction and discuss the mechanism involved :



(c) Explain briefly as to how a conjugated diene under photochemical conditions undergoes cyclization via a disrotatory path.

3. (a) How would you convert *trans*-5,6-dimethyl-1,3-cyclohexadiene into its *cis*-isomer?

(b) Draw the MO of 1,3-butadiene indicating HOMO in the ground and excited state.

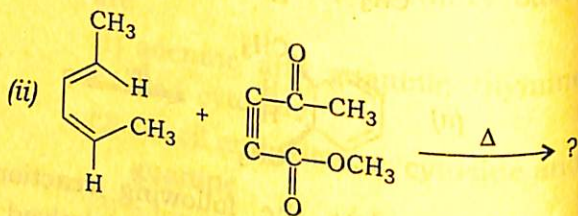
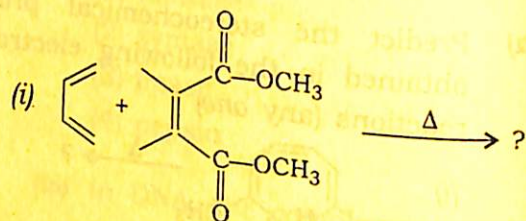
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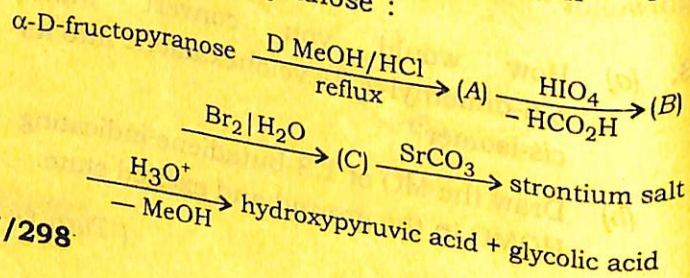
- (c) Write the products with stereochemistry in the following Diels'-Alder reaction (any one) :



## UNIT-II

Answer any one question

4. (a) Sketch the stable conformational structure of the anomer of  $\alpha$ -D-glucopyranose.
- (b) Explain the products obtained in the following periodic oxidation of  $\alpha$ -D-fructopyranose :



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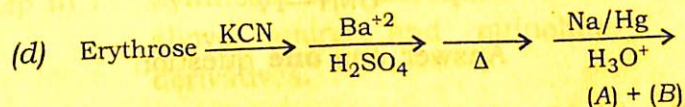
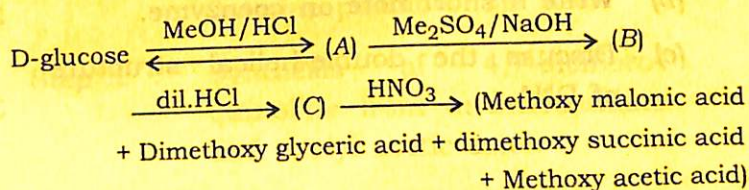
- (c) Explain that C-2 epimeric aldoses give the same lower aldose by Ruff degradation.

- (d) What is epimerization? Explain it considering the conversion of D-mannose to D-glucose.

5. (a) Why does the anomeric  $-\text{OH}$  group undergo methylation with  $\text{CH}_3\text{OH}$  and with  $\text{HCl}$  under reflux but others do not?

- (b) Convert D-fructose to D-glucose.

- (c) Determine whether D-glucose is in a furanose or a pyranose form from the following data :



- (A)  $\xrightarrow{\text{HNO}_3}$  Dibasic acid (optically active)
- (B)  $\xrightarrow{\text{HNO}_3}$  Dibasic acid (optically inactive)

Identify A and B.



## UNIT—III

Answer any **one** question

6. (a) Synthesize one important pyrimidine base present only in RNA.  
 (b) How are enzymes classified on the basis of their functions?  
 (c) How does DNA replicate? How is the process responsible for preservation of heredity?
7. (a) What are complementary bases? Draw the structure to show hydrogen bonding between adenine—thymine and guanine—cytosine.  
 (b) Write a short note on coenzyme.  
 (c) Discuss the double-helical structure of DNA.

## UNIT—IV

Answer any **one** question

8. (a) Synthesize a drug which is used to bring down body temperature during fever.  
 (b) Draw the structure of chloramphenicol. What type of drug is it?

1+1=2

- (c) Sulpha drugs work like antibiotics but they are not antibiotics. Is this a valid statement and why? 2½

- (d) Name the food sources and the deficiency diseases caused due to lack of vitamin C. 2½

9. (a) Write in brief about the medicinal importance of curcumin. 2

- (b) Carry out the synthesis of an antimalarial-chloroquine using the following sequential steps :  $1\frac{1}{2}+1\frac{1}{2}+1=4$

Step I : Synthesis of 5-dimethylamino-2-amino pentane from AAE.

Step II : Synthesis of 4,7-dichloro-quinoline from *m*-chloroaniline and oxalyl acetic ester.

Step III : Synthesis of chloroquine from above amino and quinoline derivatives.

- (c) Name the chemical responsible for antiseptic properties of Dettol. 1

- (d) Synthesize sulphanilamide from sulphanilic acid. 2

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( Turn Over )



## UNIT—V

Answer any **one** question

10. (a) Synthesize ( $\pm$ )  $\alpha$ -terpineol from *p*-toluic acid.
- (b) Establish the structure of citral on the basis of analytical and synthetic evidences.

11. (a) What are geraniol and nerol? How would you assign their configuration?

- (b) Complete the following oxidative degradation reactions of  $\alpha$ -terpineol :

