

2013

(November)

CHEMISTRY

(Major)

Course : 505

(Organic Chemistry)

Full Marks : 48

Pass Marks : 19

Time : 3 hours

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

1. Select the correct alternative/Answer the following : 1×5=5

(a) Glucose although has an aldehydic group, it does not restore pink colour of Schiff's reagent, because

(i) there is a steric hindrance

(ii) -I effect of hydroxyl groups

(iii) aldehydic group is involved in hemiacetal formation

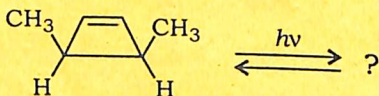
(iv) there is no aldehydic group in glucose

(b) The process of transfer of genetic message from DNA to *m*-RNA is known as

- (i) replication
- (ii) translation
- (iii) transcription
- (iv) transference

(c) Define monoterpene and give one example of cyclic monoterpene.

(d) Write down the product formed in the following reaction :



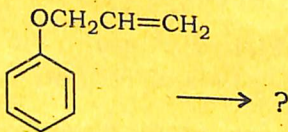
(e) Give the name of a drug which is used for bacillary dysentery.

UNIT—I

Answer *any one* question

2. (a) Define sigmatropic rearrangement. Complete the following reaction and suggest the mechanism :

1+2=3



- (b) With the help of FMO approach, show that (4+2) cycloaddition reaction is thermally allowed but (2+2) cycloaddition reaction is thermally forbidden.

2+2=4

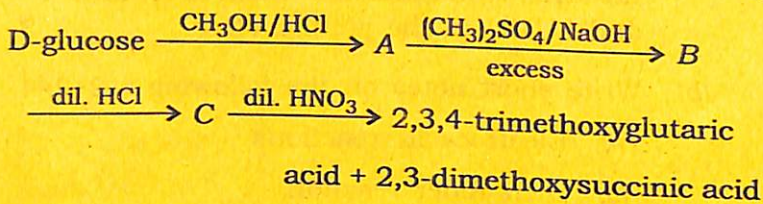
3. (a) Draw the molecular orbitals of 1,3,5-hexatriene and indicate which is HOMO and LUMO in the ground state. 3
- (b) Write short notes on the following : 2+2=4
- (i) Electrocyclic reactions
- (ii) Diels-Alder reaction

UNIT—II

Answer any one question

4. (a) Sketch the chair conformation of α -D-glucopyranose. 1
- (b) Establish the cyclic structure of D-glucose. 3
- (c) Glucose and fructose give same osazones. Explain giving reactions. 3
- (d) Convert the following : 2+2=4
- (i) Fructose into D-glucose
- (ii) D-Arabinose into D-mannose

5. (a) Sketch the conformation of β -D-glucopyranose. 1
- (b) Establish the open-chain structure of fructose. 3
- (c) Determine whether D-glucose is a furanose or pyranose form from the following data : 4



- (d) Define epimerization. Explain it considering the conversion of D-glucose into D-mannose. 3

UNIT—III

Answer any one question

6. (a) Distinguish between nucleotides and nucleosides. 2
- (b) Give the names of purine and pyrimidine bases that present in DNA and RNA. 2
- (c) How thymine can be synthesized from urea? 2

- (d) Explain the stereospecificity of enzyme with the help of a suitable example. Define active sites of enzyme. $2+1=3$
7. (a) Define nucleic acid. Write the differences between RNA and DNA. $1+1=2$
- (b) Write Traube synthesis of guanine from guanidine. 2
- (c) Discuss briefly the mechanism of enzymatic action. 2
- (d) Explain briefly the structure of DNA with the help of Watson and Crick model. 3

UNIT—IV

Answer *any one* question

8. (a) Write the structure of curcumin. 1
- (b) Give the preparation of the following : $2\frac{1}{2}+2\frac{1}{2}=5$
- (i) Ibuprofen from isobutyl benzene
- (ii) Sulphaguanidine
- (c) What are sulpha drugs? Write about the mechanism of action of sulpha drugs. $1+2=3$

9. (a) Write in brief about the medicinal importance of 'neem'. 2
- (b) Define antacid. Write down the structure of ranitidine. 2
- (c) Define broad spectrum and narrow spectrum antibiotic giving one example of each. 2
- (d) Write down the synthesis of chloramphenicol starting from benzaldehyde. 3

UNIT—V

Answer *any one* question

10. (a) What are terpenoids? Explain special isoprene rule. 1+2=3
- (b) Establish the structure of citral. 4
11. (a) Write down the structure of *cis*- and *trans*-isomer of citral. 2
- (b) Synthesize α -terpineol starting from diethyl malonate. 2½
- (c) Nerol undergoes acid catalyzed cyclization to α -terpineol by nine times faster than geraniol. Explain. 2½
