otal No. of Printed Pages—15

5 SEM TDC CHM M 5 (N/O)

2017

(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. Select the correct answer from the following : 1×5=5

(a) In the ground state, HOMO of 1,3-butadiene is symmetric with respect to

(i) mirror plane (*m*)

(ii) C_2-axis

(iii) both mirror plane and C_2-axis

(iv) None of the above

(b) Epimeric carbohydrates differ through their

(i) functional group

(ii) ring size

(iii) configuration at α-C atom

(iv) None of the above

(c) In the double helix of DNA, guanine of one coil involves pairing with cytosine of the other through

(i) one H bond

(ii) two H bonds

(iii) three H bonds

(iv) Not through H-bond

(d) Chloramphenicol is an example of

(i) broad spectrum antibiotic

(ii) narrow spectrum antibiotic

(iii) polypeptide

(iv) lincomycin

(e) The nature of the —OH group in the α-terpineol is

(i) primary alcohol

(ii) secondary alcohol

(iii) tertiary alcohol

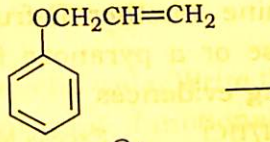
(iv) aryl alcohol

(Continued

UNIT—I

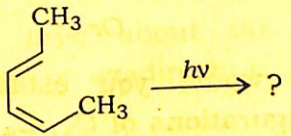
2. (a) Draw the molecular orbitals of 1,3-butadiene and indicate which is HOMO and LUMO in the ground state. 2

(b) Complete the following reaction and suggest the mechanism : 2



Or

In the following reaction, predict whether conrotatory or disrotatory motion will take place under the mentioned condition against the compound :



(c) With the help of FMO approach, show that [4+2] cycloaddition is thermally allowed but photochemically forbidden.

1½+1½=3

UNIT—II

3. (a) Draw the conformational structure of β-D-glucopyranose. 1

(b) Convert D-glucose into D-fructose. 2

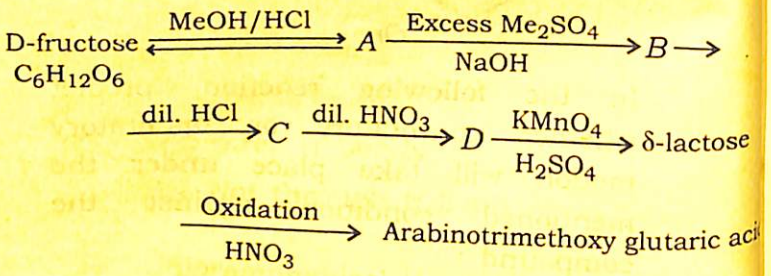
(Turn Over)

Or

Write in brief about the mutarotation of D-glucose.

(c) Establish the cyclic structure of D-(+)-glucose.

(d) Determine whether D-fructose is in a furanose or a pyranose form from the following evidences :



Or

How would you establish that the configurations of C_3, C_4 and C_5 atoms of D-glucose and D-mannose are the same?

(e) D-glucose reacts with HCN but not with $NaHSO_3$. Explain.

UNIT—III

4. *(a)* Distinguish between nucleotide and nucleoside.

(b) Synthesize uracil from urea.

(Continued

Or

Discuss briefly the mechanism of enzymatic action.

(c) Explain the stereospecificity of enzyme with the help of a suitable example. Define coenzyme. 2+1=3

Or

Define genetic code. Write the important structural and functional differences between DNA and RNA. 1+2=3

(d) Discuss briefly about the replication of DNA. 2

UNIT—IV

5. *(a)* Write in brief about the medicinal importance of azadirachtin present in neem. 2

(b) Draw the structure of vitamin C and write about its medicinal importance. 2

Or

Synthesize paracetamol from *p*-nitrophenol.

(c) Draw the structure of chloramphenicol and write in brief about its clinical properties. 1+2=3

(Turn Over)

Or

Write down the synthesis of anti-malarial drug chloroquine.

(d) Starting from acetanilide, write down the synthesis of sulphanilamide.

Or

Write down the green synthesis of ibuprofen.

UNIT—V

6. *(a)* Explain about special isoprene rule.

(b) In citral, one of the double bonds is at α, β-position with respect to aldehydic group. Explain.

(c) How will you synthesize citral from 6-methyl-hept-5-en-2-one?

Or

How can you synthesize α-terpineol starting from *p*-toluic acid?

(d) Write down the structure of *cis*- and *trans*-isomer of citral.