2022

ADVANCE ORGANIC CHEMISTRY-II

M.Sc. Third Semester End Examination - 2022

PAPER - CEM-303

Full Marks : 40 ***Time : 2 hours***

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.
Illustrate the answers wherever necessary.

Group-A

Answer <u>any four</u> of the following question. **4×2=8**

1. "Supramolecular chemistry plays a pivotal role in Biology"– Explain.

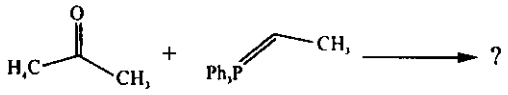
2. Write down the major product of the following reaction with proper stereochemistry.

   (R)-2-Chloropentan-3-one $\xrightarrow{NaBH_4}$?

3. What is isoelectric point? Indicate the isoelectric point of Gly in the curve.

4. Explain how cyclodextrin can be utilised in pharmaceutical industry.

5. Write down the product of the following reaction and calculate the atom economy



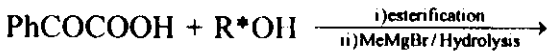
6. Though *cis* decalin is chiral but non resolvable –Explain.

7. What kind of forces are responsible for stabilizing the tertiary structure of a protein?

Group - B

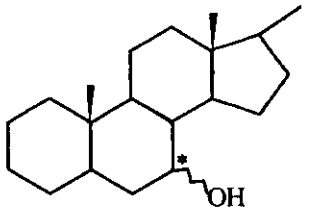
Answer <u>any four</u> of the following question **4×8=32**

8. a) Find the product of the following reaction as per Prelog's rule and assign R/S configuration of the marked centre.

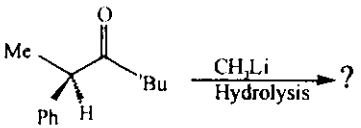


(R)-PhC(Me)(OH)COOH (Major)

R*OH is



b) Use Felkin-Anh model to explain the formation of major product in the following reaction :



c) Compare the stability of *trans* decalins in terms of their different non-bonded interaction. $2\frac{1}{2}+3+2\frac{1}{2}=8$

9. a) Deduce Curtin-Hammett principle from first principles for a case where the more stable conformer gives rise to the predominant product. Explain with an energy profile diagram. Briefly state the conditions for validity of the C-H principle.

b) Explain the following stereoselective elimination reaction applying Curtain-Hammet Principle.

$$PhCH_2CHPhOCOAr \xrightarrow{tBuOK} PhCH = CHPh$$

(Eez ratio 100:1) 5+3=8

10. a) Differentiate between face to face, edge-to-face and offset face-to-face π-stacking in molecular recognition.

b) Draw the structure of α-cyclodextrin and mention its use.

c) How 18-crown-6 can be synthesized from 1,2 diol?

3+3+2=8

11. a) Give one example of each steroidal and nonsteroidal decalin with proper structure.

b) Compare the conformational energy of methyl substituted *cis* and *trans* decalin. 4+4=8

12. a) How would you synthesize the following compounds (any one) ?

(i) Caprolactum from cyclohexanone (By sumitomo process)

(ii) Biodisel from plant oil.

b) Give examples (Green synthesis) :

(i) Ring opening metathesis (Under aqueous condition).

(ii) Borono-Manich reaction (Under Solvent free).

(iii) Suzuki coupling (Using ionic liquid)]

c) Biocatalytic procedure is more superior than classical chemical procedure for the preparation of 6APA from penicillin G' –Explain.

d) Give some example of unconventional energy sources.

2+3+2+1=8

13. a) Describe two major secondary structures of proteins pictorially and stabilizing forces for these structures.

b) What is Ramachandran plot? Show the allowed ranges of Φ and Ψ values of the secondary structures of the

proteins according to this plot. 4+4=8

14. a) Design a receptor for the selective binding of adepic acid.

b) Synthesize the above receptor.

c) How can one study the complexation of adepic acid with the above receptor? 2+3+3=8

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