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**3 (Sem-6) CHM M 3**

**2020**

**CHEMISTRY**

(Major)

Paper : 6-3

**(Organic Chemistry)**

Full Marks : 60

Time : Three hours

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

1. Answer the following questions:  $1 \times 7 = 7$

(a) What is atactic polymer?

(b) State the Einstein's law of photochemical equivalence.

(c) What is protein?

Contd.

(d) What are ribozymes ?

(e) Write the name of a zinc-containing metalloenzyme.

(f) What is Wigner spin conservation rule ?

(g) What is Special isoprene rule ?

2. Answer **any four** of the following :  $2 \times 4 = 8$

(a) How is phosphorescence different from fluorescence ?

(b) What are elastomers ? Name a synthetic elastomer and give its structure.

(c) Give the names and structures of the sugar components present in RNA and DNA.

(d) What are essential and non-essential amino acids? Give one example of each.

(e) D-fructose is a ketohexose, yet it reduces Fehling's solution. Explain.

(f) Give an example each of narrow-spectrum and broad-spectrum antibiotics.

3. Answer **any three** of the following:

5×3=15

(a) Discuss photochemical *cis-trans* isomerisation. What is photostationary state? 4+1=5

(b) Why benzophenone acts as a good photosensitizer? Explain with an example, the process of photosensitisation of organic compounds. 2+3=5

(c) How will you establish the pyranose ring structure of glucose? 5

(d) Write in brief, how a polypeptide chain is biosynthesised by the process of translation. 5

(e) What are antibiotics? How are these classified? What is the possible mode of antibacterial activity of  $\beta$ -lactam antibiotics? 5

4. Answer (a) or (b), (c) or (d) and (e) or (f):  
10×3=30

(a) (i) How is photochemical process, the Norrish type-I different from the Norrish type-II? Give examples and mechanism. 5

(ii) What is glycolysis? Describe the glycolytic pathway of degradation of glucose into pyruvic acid. 2+3=5

(b) (i) Write the Zwitterionic structure of aspartic acid. Write three important properties of  $\alpha$ -amino acids due to their Zwitterionic structure. 2+3=5

(ii) Propose a mechanism for the polymerisation reaction leading to the formation of polystyrene from the corresponding monomer.

Write the reaction involved in the formation of urea-formaldehyde resin.  $3+2=5$

(c) (i) How phospholipids differ from triglycerides? Discuss the role of phospholipids in the formation of biological membranes. Which part of these lipid molecules determines the hardness or fluidity of the membrane?



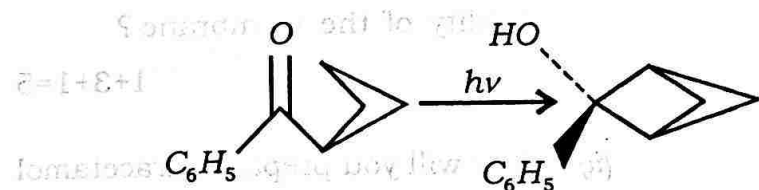
(ii) How will you prepare paracetamol and sulfapyridine?  $3$

(iii) Give an example of a chiral drug and draw its structure.  $2$

(d) (i) What are thermosetting and thermoplastic materials? Give examples. Discuss the structural differences of fibres and elastomers. 3+2=5

(ii) What are the characteristic properties of alkaloids? Comment on the possible roles of alkaloids in plant kingdom. Write the structure of nicotine and write the reactions by which the nature of the heteroatoms and heterocyclic rings of nicotine have been established. 1+1+1+2=5

(e) (i) Provide the mechanism of the following reaction: 3



(ii) Explain with examples, how nucleosides and nucleotides differ. 2

- (iii) Why citral is called a monoterpenoid? Show the isoprene units which build the molecule. Write a synthesis of citral.  $1+1+3=5$
- (f) (i) What is the structural unit present in sulfa drugs? Explain the mechanism of action of sulfa drugs.  $1+2=3$
- (ii) Point the structural differences between haemoglobin and myoglobin. 2
- (iii) Draw Jablonski diagram of the process of photoexcitation and energy dissipation of organic compounds. 3
- (iv) Discuss the importance of Sanger's reagent in peptide chemistry. 2
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