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

**2021**

**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 : 1×5=5
  - (a) Define quantum yield of photochemical reaction.
  - (b) What is optical pumping ?
  - (c) What are proteases ?
  - (d) What are coenzymes ?
  - (e) Write the structure of maltose.

*Contd.*

2. Answer the following questions :  $2 \times 5 = 10$
- (a) Write briefly about hemoglobin and its function.
  - (b) What is nicotine and its source ? Show the structure of nicotine.
  - (c) What are nucleotides ? Write the name and structure of a nucleotide obtained from DNA.
  - (d) Stating the condition of Norrish type-II reaction, explain why cyclohexanone does not give this type of reaction.
  - (e) Mention the essential difference between fluorescence and phosphorescence.
3. Answer the following questions :  $5 \times 3 = 15$
- (a) Discuss the mechanism of photochemical *cis-trans* isomerisation. Show how *cis*-stilbene can be converted to *trans*-stilbene by this process.
  - (b) What are proteins ? Discuss how proteins are denatured.

- (c) "Citral is an acyclic monoterpene." Explain this by writing the characteristics of such compounds. How many stereoisomers of citral are possible? How these stereoisomers can be distinguished? Write a synthesis of citral. 1+1+1+2=5

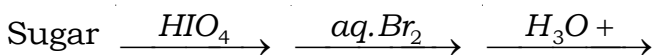
4. Answer **any three** of the following :

10×3=30

- (a) (i) Draw the basic fused steroid ring system present in many important naturally occurring compounds such as cholesterol and designate the rings with letters. Show the location of the Me's and classify the polycyclic system. 3

- (ii) Suggest a mechanism for the acid catalysed mutarotation of D(+)-glucose. 2

- (iii) How can the sequence,



show if a methyl glycoside has a pyranose or furanose ring? 5

- (b) (i) The Norrish type I process is not important for the photolysis of diaryl ketones. Suggest a reaction. 2

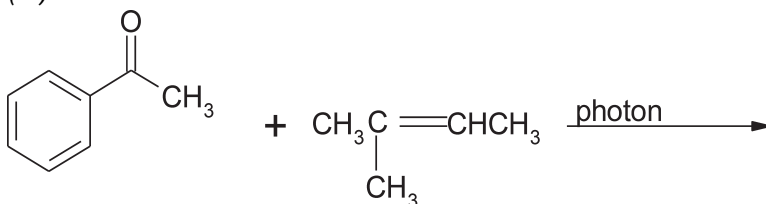
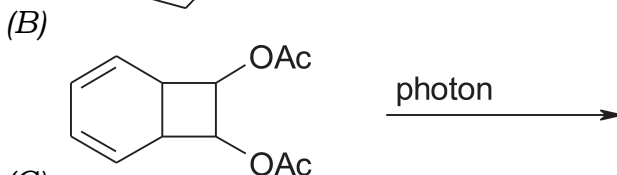
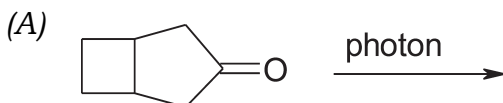
- (ii) What are the likely products from the vapour phase irradiation of *trans*-2,6-dimethylcyclohexanone ?  
2
- (iii) Mention *any two* reasons why benzophenone is a good triplet sensitiser.  
2
- (iv) Which of the following compounds will quench benzophenone triplets as a diffusion controlled rate ?  
Butadiene, Benzene,  
2-acetophenone and  
Acetophenone. 4
- (c) (i) Define primary, secondary, tertiary and quaternary structure of a protein. 2
- (ii) What kind of bonding is greatly responsible for the secondary structure of protein ? 1
- (iii) Describe the three types of secondary structure of protein. 2
- (iv) Describe the kind of bonding responsible for the tertiary and quaternary structure of proteins. 4

(v) Name the peptide hormone which produces milk in the mammary glands of women. 1

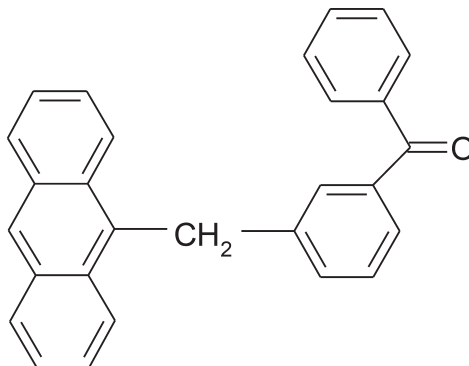
(d) (i) A dipeptide is treated with the reagent 2,4-dinitrofluorobenzene (DNFB). The resulting DNP-derivative of the dipeptide on hydrolysis with the acid gives DNP-gly and alanine. Write the name of the dipeptide, its structure and write the reactions involved. 3

(ii) What is Merrifield solid-phase peptide synthesis? 2

(iii) Predict the products in the following reactions:  $1 \times 3 = 3$



- (iv) Do you expect that the following compound to undergo efficient photoreduction ? Why ? 2



- (e) (i) Write the tautomeric structures of adenine, guanine, cytosine and thymine. 2
- (ii) Describe Watson-Crick Model for the structure of DNA. 2
- (iii) Write the different types of monosaccharides. 2
- (iv) Why do glucose and mannose form same osazones ? 2

(v) What is the role of co-factors in enzymatic reactions? 2

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