2018

CHEMISTRY

(Major)

Paper : 6.3

(Organic Chemistry)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions : 1×7=7

(a) What is photostationary state?

(b) Mentioning the main source of citral, name one of the methods of extraction of citral from the source.

(c) Give the name and structure of a female sex hormone.

(d) What is the monomer of Teflon?

(e) Write the structure of ala-gly.

(f) What is isotactic polymer?

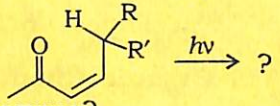
(g) Draw the structure of an energy-rich compound in biochemical reaction.

2. Answer any *four* of the following : 2×4=8

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

(b) Stating the condition of Norrish type-II reaction, explain why cyclohexanone does not give this type of reaction.

(c) Write down the following product :



(d) What is lysozyme?

(e) Write the structure of adrenaline and mention one of its function.

(f) How will you establish the presence of pyridine in nicotine?

3. Answer any *three* of the following : 5×3=15

(a) What is special isoprene rule? Plan a synthesis of citral starting from 6-methylhept-3-ene-2-one. Also draw the geometrical isomer of citral. 1+3+1=5

(b) What is isoelectric point of amino acids? Mention the use of Sanger's reagent in N-terminal amino acid determination. 1+4=5

(c) State and explain Wigner spin conservation rule by taking triplet-triplet energy transfer in photo-sensitization process. What is optical pumping? 4+1=5

(d) Draw the general structure of the penicillin and discuss the mechanism of action. 1+4=5

(e) Draw the structures of the bases present in RNA. 5

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

(a) (i) Complete the following reaction and write the mechanism :

$$\phi_2CO + Me_2CHOH \xrightarrow{h\nu} ?$$

What is the role of isopropyl alcohol here? 3+1=4

(ii) What is glycolysis? Mention the various steps involved. 1+3=4

(iii) Write the general mechanism of action of sulpha drugs. 2

(b) (i) Draw the Jablonski diagram to show IC, ISC, F and P. 3

(ii) Name and give the structure of any two antipyretic or analgesic. Write the general mechanism of action of such drugs. 4

(iii) Discuss briefly the effect of denaturation on the structure and activity of protein. 3

(c) (i) Plan a synthesis of the peptide gly-ala. 3

(ii) Explain why most of the photo-chemical reactions of ketone occur via T_1-state. 2

(iii) What is protein? Discuss the various levels of structure of protein. 5

(d) (i) What is mutarotation in glucose? Draw the α- and β-anomer of D(+)-glucose in pyranose form and hence explain anomerism. 1+2+2=5

(ii) Write a short note on biosynthesis of DNA. 3

(iii) What is nucleotide? Draw the structure of guanylic acid. 2

(e) (i) Explain why both glucose and fructose reduce Fehling's solution. 2

(ii) What is the cause of photo-isomerization of olefin? 2

(iii) How will you prepare paracetamol and sulphapyridine? 3

(iv) Give example of synthetic rubber and plan its synthesis. 3

(f) (i) Give the name and structure of a neutral, acidic and basic amino acid. What is zwitterion? 3

(ii) Describe Watson-Crick model for the structure of DNA. 4

(iii) What are the fractions of starch? Give the structures. 3

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