2016

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 *all* questions : 1×7=7

(a) State the Einstein's law of photo-chemical equivalence.

(b) What are enzymes and their major biological functions?

(c) What are drugs?

(d) Both cellulose and starch are polysaccharides. What is common between them?

(e) What is a gene?

(f) What is isoprene rule?

(g) Write about AIDS and its cause.

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

(a) What is a photon? How is quantum yield related to photons?

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

(c) Write briefly about the molecular components of biological membranes.

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

(e) What is nicotine? Give its structure and write about its source and harmful effects.

(f) What is cisplatin? Write its structure and use.

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

(a) Fluorescence and phosphorescence are two different types of luminescence. Elaborate the phenomena—luminescence, fluorescence and phosphorescence.

(b) Discuss photochemical *cis-trans* isomerization. What is photostationary state?

(c) Give the names and structures of pyrimidine and purine bases present in nucleic acids.

(d) Write briefly about Calvin cycle in photosynthesis.

(e) What are sulpha drugs? Briefly write about their mode of action.

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

(a) (i) Show the pictorial representation of hydrogen bonding in purine and pyrimidine bases between two poly-nucleotide chains of a DNA double-helical structure. 5

(ii) Write the zwitterionic structure of aspartic acid. Write three important properties of α-amino acids due to their zwitterionic structure. 2+3=5

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

(ii) How are amino acids, peptides and polypeptides related? What is ninhydrin test? 3+2=5

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

(ii) Discuss the open-chain and ring structures of glucose. 5

(d) (i) What is Patterno-Büchi reaction in photochemistry? Give an example. 2+3=5

(ii) How will you convert an aldose into its next higher aldose by Kiliani-Fischer cyanohydrin synthesis? 5

(e) (i) What are antibiotics? How are these classified? What is the possible mode of action of penicillin? 1+2+2=5

(ii) Write one function each of chymotripsin and lisozyme. 2

(iii) What are metalloenzymes? Name one zinc-containing metalloenzyme. 2+1=3

(f) (i) Against which malarial parasite chloroquin is active? Write the mode of action of chloroquin. 1+4=5

(ii) What are coenzymes? 2

(iii) What are the causes of vitamin D_2 deficiency? How can it be overcome? 2+1=3

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