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Sr. No. of Question Paper : 8470 C Roll No.....

Unique Paper Code : 217365

Name of the Paper : CHHT-514 : Biochemistry and Environmental Chemistry

Name of the Course : B.Sc. (Honours) Chemistry, Part III

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt all **four** questions in Section A.
3. Question 5 in Section B is compulsory.
4. Attempt any **three** other questions from Section B (**four** questions per section, eight questions in all).
5. Clearly mention Section A and Section B in the heading before starting the respective sections.

SECTION A

Biochemistry

Attempt **all four** questions in this Section.

Maximum Marks : 38

1. (a) What do you mean by the Active Site ? Give the chief characteristics of the active site of an enzyme.
(b) How are proteins classified according to their function ? Explain with suitable examples.
(c) Write the structure of ATP. What is its role in biological reactions ?
(d) How does the structure of DNA differ from RNA ? (3,3,3,2)
2. Explain **any three** of the following :
(a) What is Chargaff's Rule and what is its significance ?

P.T.O.

- (b) How does an enzyme differ from any inorganic catalyst ?
- (c) What are the types of bonds responsible for stabilising the secondary and tertiary structure of proteins ?
- (d) What is the role of cholesterol in the body ?
- (e) How is pyruvate converted into lactic acid and ethanol under anaerobic conditions? What are these reactions called ? (3×3)
3. Write short notes on the following (**any two**):
- (a) Kreb's Cycle
- (b) Translation
- (c) β -pleated sheets
- (d) Mechanism of enzyme action (4½×2)
4. (a) Differentiate between the following (**any three**) :
- (i) Nucleoside and nucleotide. Give the structure of 1- β -deoxyribofuranosylthymine. What is it commonly called ?
- (ii) Reversible and irreversible inhibition.
- (iii) Fibrous and globular proteins.
- (iv) Lactate Fermentation and Alcoholic Fermentation (write the necessary equation).
- (b) What are liposomes ? Give their uses in a biological system. (3×2,3)

SECTION B

Environmental Chemistry

Question 5 is compulsory.

Attempt any **three** other questions from this Section.

Maximum Marks : 37

5. (a) Fill in the blanks :
- (i) _____ organisms live in the bottom sediments of water bodies.

- (ii) _____ is power produced by harnessing the energy of falling water.
- (iii) Detergents containing _____ surfactants are better because they are less persistent.
- (iv) _____ ecosystem is found in a still water body like a lake.
- (b) Explain diagrammatically the role played by water in the environment.
- (c) Give one word/phrase for the following :
- (i) Drainage of sulphuric acid from old coal mines due to the presence of FeS_2
- (ii) A group of symbiotic bacteria involved in nitrogen fixation
- (iii) A lake with low nutrient content and lower level of biological activity
- (iv) The study of communities of organisms in relation to their environment
(4×1,2,4×1)
6. (a) Draw a complete, labelled, self-explanatory diagram of a thermally stratified tropical lake.

OR

What are the sources of plant nutrients in a water body ? How does their presence affect water quality ?

- (b) Discuss the secondary stage of water purification. List three methods of tertiary water treatment.
- (c) Give a brief account of the Chernobyl nuclear disaster. (3,3,3)
7. (a) Distinguish between the following :
- (i) Primary pollutants and secondary pollutants
- (ii) Nuclear fission and nuclear fusion
- (b) Define the term 'biogeochemical cycle'. Draw a neat, labelled diagram of the biogeochemical nitrogen cycle.
- (c) Give a brief description of the troposphere and stratosphere regions of the atmosphere mentioning altitude, temperature profile and major chemical species. (3,3,3)

P.T.O.

8. (a) What do you understand by 'stratospheric ozone depletion'? Discuss its causes and consequences.
- (b) What do you understand by 'water quality parameters'? What is the importance of dissolved oxygen in a water body and what parameter measures its depletion?

OR

What are the sources, pathways and consequences of a marine oil spill?

- (c) What alternative energy sources are available in coastal areas? Discuss any one of them.

OR

Briefly discuss any two: solar energy; geothermal energy; hydrogen as fuel. (3,3,3)

9. (a) What is 'greenhouse effect'? Name the major greenhouse gases.
- (b) How are aquatic ecosystems classified? Mention three life forms in a marine ecosystem.

OR

Discuss the various segments of the environment.

- (c) Discuss three photochemical reactions occurring in the atmosphere. (3,3,3)