

[This question paper contains 4 printed pages.]

Sr.No. of Question Paper : 76 G Your Roll No.....

Unique Paper Code : 217365

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

Name of the Course : **B.Sc. (Honours) Chemistry/B.Sc. Analytical Chemistry/Industrial Chemistry**

Semester : V / III

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 from Sections A and B, **eight** questions in all.
3. Clearly mention Section A and Section B before starting the respective sections.

**SECTION A**

*Biochemistry*

*Attempt all four questions in this Section.*

*Maximum Marks : 38*

1. (a) Outline the complete reactions with enzymes to show how pyruvate is converted to the following :
  - (i) Acetyl CoA
  - (ii) Ethanol
- (b) How is DNA transcribed into RNA ? Explain using a diagram.
- (c) Mention the different types of specificity shown by enzymes. What type of specificity is shown by the enzyme maltase ? (4,4,3)

*P.T.O.*

2. Differentiate between (any three) :
- (a) Competitive and non-competitive enzyme inhibition
  - (b) Enzymes and Ribozymes
  - (c) Glycerophospholipids and Sphingolipids
  - (d)  $\alpha$ -Helix and  $\beta$ -pleated structure of proteins
  - (e) Nucleosides and Nucleotides (3×3)
3. (a) Outline the complete reactions of the Krebs' cycle and give an account of the total ATPs generated.
- (b) Draw structures of any three of the following :
- (i) ATP
  - (ii) Cholesterol
  - (iii) Deoxycytidine
  - (iv) An  $\omega$ -3 fatty acid (6,3)
4. Answer any three of the following :
- (a) Explain the terms Apoenzyme, Holoenzyme and Coenzyme.
  - (b) What is Biocatalysis ? What is its importance in 'Green Chemistry' ?
  - (c) What is Gene Therapy ?
  - (d) Explain Chargaff's Rule. What is its significance ?
  - (e) Elaborate upon the analytical and industrial applications of enzymes. (3×3)

### SECTION B

#### *Environmental Chemistry*

*Attempt all four questions in this section.*

*Maximum Marks : 37*

5. (a) Fill in the blanks (any four) :
- (i) \_\_\_\_\_ is the secondary air pollutant.

- (ii) \_\_\_\_\_ is the bio-degradable pollutant.
- (iii) Detergents harm a water body because \_\_\_\_\_ .
- (iv) Stratospheric temperature increases with the altitude. This is termed as \_\_\_\_\_ .
- (v) The primary pollutants involved in the photochemical smog are \_\_\_\_\_ and \_\_\_\_\_ .
- (b) Indicate True or False (any three) :
- (i) PAN is the major constituent in the formation of photochemical smog.
- (ii) A molecule of CFC-12 is more effective as a green house gas than a molecule of carbon dioxide.
- (iii) Solar, hydro, wind and tidal are four important non renewable sources of energy.
- (iv) Aerosols of natural origin having diameters  $<0.2\mu$  are called Aitkin Particles.
- (c) With the help of a labeled diagram explain the biogeochemical cycle of sulphur or carbon. (4,3,3)
6. (a) What is meant by the lapse rate ? How do you account for the observed lapse rate in different regions of the atmosphere ?

**OR**

Why does thermal inversion increase air pollution ? What harm can thermal inversion cause to humans ?

- (b) Discuss sources and sinks of carbon monoxide.

**OR**

What do you understand by the term "Acid Rain" ? Explain with reactions.

- (c) Discuss in details the environmental effects of Ozone depletion.

**OR**

Describe the Green House effect and its consequences. (3,3,3)

P.T.O.

7. (a) What are the different Water Purification Methods used for purifying water ?

**OR**

Discuss three techniques for measuring water pollution.

- (b) How can geothermal energy be utilized ?

**OR**

What are the possibilities of using Tidal power ?

- (c) Mention the different ways of safe disposal of nuclear waste. Discuss the problems faced in doing so.

**OR**

Discuss one Nuclear Disaster as a case study taking into account its causes and effects. (3,3,3)

8. (a) Mention the principle renewable sources of energy. Explain any one.

**OR**

Why are non-conventional energy sources preferred over conventional energy sources ?

- (b) Discuss the methods of reducing hazardous nuclear waste at source.

**OR**

Differentiate between nuclear fission and nuclear fusion. Why is fission preferred over fusion to harness power ?

- (c) What is Thermal Pollution ? How can it be controlled ?

**OR**

Hydrogen is the fuel of future. Justify. (3,3,3)