BIOCHEMISTRY

PAPER – II

BIO/D/16/03/II

Time : 3 hours
Max. Marks : 100

Important instructions:

- *Attempt all questions in order.*
- *Each question carries 10 marks.*
- *Read the question carefully and answer to the point neatly and legibly.*
- *Do not leave any blank pages between two answers.*
- *Indicate the question number correctly for the answer in the margin space.*
- *Answer all the parts of a single question together.*
- *Start the answer to a question on a fresh page or leave adequate space between two answers.*
- *Draw table/diagrams/flowcharts wherever appropriate.*

Write short notes on:

1. a) "Glucose+Pi →glucose 6 phosphate". 5+5
   "Dihydroxyacetone phosphate →glyceraldehyde 3 phosphate".
   The above two reactions are thermodynamically unfavorable (i.e. ΔG_0 is +ve), but yet they occur in human body. Explain how?
   b) Write the functional/physiological significance and reactions catalysed by protein kinases.

2. a) How can it be proved that both electrical and concentration gradient of proton across inner mitochondrial membrane is required to drive ATP synthetase (FoF_1 particle)? 5+5
   b) Explain the impact on ATP synthesis from $FADH_2$ by oxidative phosphorylation when following chemical individually is added to mitochondrial suspension:
      i) Cyanide
      ii) Amobarbital
      iii) Carboxine
      iv) Oligomycin and
      v) 2,4 dinitrophenol

3. a) Define 'Body mass index' and obesity. Write the role of gut, adipose tissue and hypothalamus in calorie homeostasis. 5+5
   b) Biochemical basis (pathogenesis) of beta cell dysfunction in diabetes mellitus.

4. a) Write the role of vitamin A in photoactivation of rhodopsin. 5+5
   b) How does photoactivation of rhodopsin cause hyperpolarization of rod cells?

5. a) List the chemicals having vitamin K activity. 3+6+1
   b) Mechanism of action of vitamin K.
   c) Indicate which step of vitamin K cycle is blocked by warfarin.

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6. a) List ultra-trace elements. 2+8
   b) Functions and clinical importance of ultra-trace elements.

7. a) List the substances (chemical names) that act as soluble and insoluble dietary fibre. 3+7
   b) How does the use of dietary fibres lead to primary and secondary prevention of diseases?

8. How can primary, secondary and tertiary thyroid dysfunctions be differentiated by using laboratory tests? 10

9. a) Define classI, II and III prostanoids. 1+6+3
   b) How are they synthesized?
   c) Explain how different drugs that can inhibit their synthesis.

10. a) How is HDL metabolized? 5+2+3
    b) Write its function(s).
    c) How can HDL-cholesterol level in blood be increased by different therapeutic means?

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