2016

(April)

BIOTECHNOLOGY

(Honours)

(Biological Chemistry)

Marks : 56

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question No. **1**, which is compulsory and **four** from the rest

1. *(a)* What do you understand by electrochemical gradient? 2

(b) What general properties do fatty acids have? 2

(c) Give the steps involved in glycogen breakdown to glucose. 2

(d) What are the various ways by which enzyme activity is regulated? 2

(e) Is gluconeogenesis a reversal of glycolysis? 2

(f) What are symport and antiport? 2

(Turn Over)

2. *(a)* "Buffers resist a change in pH upon addition of small amounts of acid or base." Explain how buffers resist this change in pH when *(i)* an acid and *(ii)* a base are added to it. 5

   (b) Derive Henderson-Hasselbalch equation. 6

3. *(a)* What is entropy? 3

   (b) "Entropy of the universe is always increasing." Comment. 3

   (c) How does the chemiosmotic theory explain the generation of ATP in mitochondria? 5

4. *(a)* Give the structure of sucrose. Why is it called a non-reducing sugar? 2+2=4

   (b) Why are α-amino acids so called? Explain with a diagram. 2

   (c) What are the forces that stabilize quaternary structure of proteins? Give an example of a protein that exhibits quaternary structure. 5

5. *(a)* Trace the route taken by an electron in the inner mitochondrial membrane starting from NADH and ending at oxygen. Illustrate using suitable diagrams. 7

   (b) Explain the regulation of glycolysis with respect to the irreversible steps of the pathway. 4

(Continued)

6. *(a)* How is palmitate oxidised to form acetyl CoA? 5

   (b) Discuss the essential differences between the C3, C4 and the CAM pathways. 6

7. On what basis are enzymes given their names? Explain in detail the nomenclatural procedure giving suitable examples. 11

8. *(a)* Write a brief account on enzyme isolation and purification. What are the criteria of purity? 6+2=8

   (b) Explain the role of zymogens with one example. 3

★★★