2021

MICROBIOLOGY — HONOURS

Third Paper

(Group - B)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer ***Question no.*** **1** and ***any four*** questions from the rest.

1. (a) Define Katal and International Unit.

(b) Give the names of 'nonstandard amino acids' involved in urea cycle.

(c) Define glucogenic amino acid with an example.

(d) Name an enzyme which requires FAD/$FADH_2$. Write down the reaction.

(e) How many molecules of acetyl-CoA are produced in oxidation of palmitic acid (C_{16}), which involves seven rounds of oxidation? 2+2+2+2+2

2. (a) Distinguish between non-competitive and uncompetitive inhibition with the help of Lineweaver-Burk plot.

(b) Define activation energy.

(c) Describe the kinetics of allosteric enzymes.

(d) What are suicide inhibitors? Give examples. 3+2+3+2

3. (a) What is carnitine and what is its role in fatty acid oxidation? — Explain with diagram.

(b) What is β-oxidation of fatty acid?

(c) Write down the structure of :

(i) Arachidonic acid (ii) Phosphatidyl choline (iii) Sphingolipid (iv) Plasmalogen.

(1+3)+2+(1+1+1+1)

4. (a) How is fatty acid synthase enzyme regulated?

(b) What is substrate level phosphorylation? Give an example.

(c) How many ATP molecules can be derived from each molecule of acetyl CoA that enters the Krebs' cycle? What makes ATP a high-energy molecule?

(d) Write a short note on decarboxylation reaction. 3+2+(1+2)+2

Please Turn Over

5. (a) Explain the role of 5-ribosyl pyrophosphate and folate in purine biosynthesis.

(b) Mention the steps of conversion of IMP to GMP.

(c) How is Xanthine metabolised?

(d) How is urea cycle connected to TCA cycle? (2+2)+2+2+2

6. (a) How does galactose enter into glycolytic pathway?

(b) What is Strickland reaction?

(c) Schematically explain Z-scheme of light phase reaction in cyanobacteria.

(d) Write a short note on the microbial metabolism of phenylalanine and lysine. 2+2+3+3

7. (a) Define — (i) Ribozyme (ii) Coenzyme (iii) Abzyme.

(b) Give an account of the number of ATP generated from complete oxidation of palmitic acid.

(c) Explain the role of pyridoxal 5-phosphate in amino acid metabolism.

(d) Draw the structure of triglyceride with proper labelling. 3+2+3+2

8. (a) Explain double displacement reaction with example.

(b) Explain feedback inhibition with example.

(c) Mention an enzyme where Mn^{2+} is used as a cofactor.

(d) Define activity and specific activity mentioning their units. State the importance of specific activity. 3+3+1+(2+1)