2020

MICROBIOLOGY — HONOURS

Paper : CC-6

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 three*** questions from the rest.

1. Answer ***any ten*** questions : 2×10

(a) Why oxygen inhibits the fermentation process?

(b) What is meant by fastidious microorganisms? Give example.

(c) What is an enrichment culture media? Give example.

(d) Name two selective media and their uses.

(e) Which group of bacteria contain unique coenzymes like coenzyme M and coenzyme F420?

(f) Do cyanobacteria produce oxygen? State an important role played by the cyanobacteria.

(g) All pathogenic organisms are chemoheterotrophs. — Why?

(h) What is substrate level phosphorylation?

(i) Name the enzyme(s) catalysing the conversion of glucose to glucose-6-phosphate.

(j) Mention the role of hydrogen oxidising bacteria in metabolism.

(k) What is meant by symbiosome?

(l) What is an antiporter? Give example.

(m) Name an inhibiter of Na^+K^+ ATPase and mention its medical use.

(n) What is the difference between ED Pathway and Glycolysis?

(o) Explain proton motive force.

2. (a) Write down the reactions that occur in pyruvate dehydrogenase complex.

(b) Write down the ATP/GTP generating step of TCA cycle.

(c) Name the two three carbon molecules that are generated from cleavage of fructose – 1, 6 – bisphosphate.

(d) Why pentose phosphate pathway is called shunt? What are the two main functions of pentose phosphate pathway? 2+2+2+(2+2)

3. (a) What is ammonia assimilation? Discuss briefly the mechanism of ammonia assimilation in nitrogen fixing bacteria.

(b) Write the steps of module formation.

(c) Write the components of nitrogenase enzyme.

(d) Differenciate between nitrification and denitrificaton. (1+3)+3+1+2

4. (a) Do all photosynthetic bacteria produce oxygen during photosynthesis? Name one which producess oxygen.

(b) Although anaerobic respiration releases lesser amount of energy, it is useful in some ways. — Explain.

(c) Write a short note on Hill Reaction.

(d) What is the net yield of ATP during homolactic and butyrate fermentation? 2+2+2+(2+2)

5. (a) How bacteria can be classified nutritionally based on their source of energy and carbon? Explain with suitable examples.

(b) What are thermophiles? Explain how thermophiles and psychrophiles cope up with the extreme environmental condition.

(c) What is chemostat? How does a chemostat regulate growth rate and cell density independently? (2+2)+(1+2)+(1+2)

6. Write brief notes on ***any four*** of the following : 2½×4

(a) Group translocation

(b) Irreversible steps of TCA cycle

(c) Methanogenesis

(d) Adaptation of halophilic bacteria

(e) Role of uncoupler in electron transport chain.