PG/IS/MCB-104/19

M.Sc. 1st Semester Examination, 2019

MICROBIOLOGY

PAPER—MCB-104

Full Marks : 40

Time : 2 hours

Answer **all** questions

The figures in the right-hand margin indicate marks

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

Illustrate the answers wherever necessary

Write the answers to questions of each Group in separate books wherever necessary

GROUP – A

[*Marks* : 20]

1. Answer any *two* questions : 2 × 2

   (a) Why endospores are highly resistant compare to the vegetative cell ?

(*b*) Mention the role of ionizing radiation on bacteria.

(*c*) What is diauxic growth ?

(*d*) 'Mac-Conkey media is both selective and differential media' – Justify.

2. Answer any *two* questions : 4 × 2

(*a*) State the mechanism of steady state kinetics of continuous culture. 4

(*b*) What do you mean by two-component system ? How bacteria respond against osmotic-stress ? 2 + 2

(*c*) How phoregulon is controlled ? 4

(*d*) A bacterial population in the log-phase grows from 4×10^6 cells to $8{\cdot}64 \times 10^6$ cells in 20 minutes. What will be the doubling time of the bacterium ? 4

3. Answer any *one* question : 8 × 1

(*a*) What is quorum sensing ? State the mechanism

of quorum sensing in Gram-Positive bacteria. Name one method of direct measurement of bacterial growth. 2 + 5 + 1

(*b*) Write short notes on (any *four*) : 2 × 4

(*i*) Characteristics of pure culture

(*ii*) Role of FtsZ in binary fission

(*iii*) Method of cultivation of anaerobes

(*iv*) Fractional sterilization

(*v*) Role of Arc regulon

(*vi*) Enrichment media.

GROUP – B

[*Marks* : 20]

4. Answer any *two* questions : 2 × 2

(*a*) Define photoautrotophic bacteria.

(*b*) Mention the regulatory components of nif regulon with their role.

(*c*) What are *the precursors* of denovo biosynthesis of pyrimidine ?

(*d*) What is Pasteur effect ?

5. Answer any *two* questions : 4 × 2

(*a*) How glycolysis is regulated ? State the significance of pentose phosphate pathway. 2 + 2

(*b*) When and how PHB is biosynthesized ? 1 + 3

(*c*) State the role of (*i*) Glycogen phosphorylase and (*ii*) Fatty acid synthase in metabolism. 2 + 2

(*d*) Write in brief about bacterial photosystem I. 4

6. Answer any *one* question : 8 × 1

(*a*) Mention the role of enzymes in N_2-fixation. Write the metabolic importance of 5-phosphoribosyl-1-pyrophosphate (PRPP). State the salient features of lysine biosynthesis in bacteria. 4 + 2 + 2

(*b*) Write short notes on (any *four*) : 2 × 4

(*i*) Anabolic role of TCA cycle.

(*ii*) Role of Glutamine synthetase and glutamate synthase

(*Continued*)

(*iii*) Importance of glyoxalate pathway

(*iv*) Cellulose biodegradation

(*v*) Correlation between fatty acid metabolism and energy demand

(*vi*) Metabolic fates of Pyruvate.
