

2018

M.Sc. 1st Seme. Examination

MICROBIOLOGY

PAPER—MCB-104

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Group-A

[Marks : 20]

1. Answer any *two* questions : 2×2
- (a) What is pure culture ? How can you preserve a pure culture ?
 - (b) How do you count viable cell from a given culture ?
 - (c) Why do the bacteria enter stationary growth phase ?
 - (d) What is Synchronous Culture ?

(Turn Over)

2. Answer any *two* questions :

2×4

- (a) Bacterial population increases from 10^3 cells to 10^9 cells in 10 hours. What is the growth rate constant ?
- (b) Illustrate the regulatory scheme for the control of aerobic and anaerobic respiratory pathways in *Escherichia Coli*.
- (c) Why do you think spore formation regulation in *Bacillus* is quorum sensing phenomenon ?
- (d) How does the superoxide anion affect the bacterial cell ?

3. Answer any *one* question :

1×8

- (a) How does the SoxRS system regulate the oxidative stress response ? How do the Min proteins help in cell division ?

4+4

(b) Write short notes on the following :

(i) Quorum sensing of *Vibrio Fischeri* for light emission.

(ii) Preservation of microbial culture.

4+4

Group-B

[Marks : 20]

1. Answer any *two* questions : 2×2

- (a) What is the metabolic pattern of photoautotroph ?
- (b) Why maximum of the EMP intermediates are phosphorylated ?
- (c) Write the name of cellulolytic enzymes with their pattern of cleavage.
- (d) What are the precursors of denovobiosynthesis of pyrimidine ?

2. Answer any *two* questions : 2×4

- (a) What is PHB ? When it is biosynthesized ? Schematically represent the process of biosynthesis of PHB. 1+1+2
- (b) State the significance of pentose phosphate pathway. What are the metabolic fates of pyruvate ? 2+2
- (c) Write the metabolic importance of 5-phosphoribosyl-1-pyrophosphate (PRPP). What are the precursors of palmitate biosynthesis ? What is GOGAT ? 2+1+1
- (d) State the importance of lysine biosynthesis pathway of bacteria. Write about the allosteric modulation of phosphofructokiuiase-1. 2+2

3. Answer any *one* question : 1×8

(a) What is the first committed step of pyrimidine biosynthesis. "TCA cycle is a central metabolic process have both anabolic and catabolic role" — explain. Write the biochemistry of N_2 -fixation. 2+3+3

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

- (i) Fatty acid synthase complex,
 - (ii) Photosystem-II,
 - (iii) Pasteur effect,
 - (iv) Regulation of nitrogenase,
 - (v) Rate limiting step in metabolism.
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