

M.Sc. (CBCS) DEGREE EXAMINATION,  
APRIL 2023

First Semester  
Microbiology – Core

PHYSIOLOGY AND METABOLISM

(For those who joined in July 2021 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- Which organelle is the site of metabolic process of bacterial cell including respiration and photosynthesis?
  - Plasmodesmata
  - Cell wall
  - Flagella
  - Mitochondria

- In Fermentation the ATP is formed by \_\_\_\_\_

- Oxidative phosphorylation
- Reductive phosphorylation
- substrate level phosphorylation
- product level phosphorylation

- In bacteria which type of photophosphorylation takes place \_\_\_\_\_

- Non cyclic
- Cyclic
- Both
- None

- In green and purple sulphur bacteria which photosystem is present \_\_\_\_\_

- PS I
- PS II
- PS III
- PS IV

- In which phase of growth curve the cell is synthesizing new cell components \_\_\_\_\_

- Log phase
- stationary phase
- Lag phase
- Exponential phase

- Function of hapanoids in bacterial membrane \_\_\_\_\_

- Nutrient transport
- Metabolism
- Respiration
- Stabilization of membrane

- The energy yielding process in metabolism is \_\_\_\_\_

- Anabolism
- Catabolism
- Metabolism
- All

- In glycolysis, how many molecules of ATP are formed by substrate level phosphorylation

- one
- two
- three
- four

- In fermentation which pathway do not operate to produce ATP

- Oxidative Phosphorylation
- Glycolysis
- Substrate level phospholrylation
- Electron transport chain

- Which of the following procedure uses a photocell to measure absorbance of a culture to regulate the flow of culture media.

- Coulter counter
- Hemostat
- Petroff Hausser chamber
- Turbidostat

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

- (a) Describe the structure and functions of flagella.

Or

- Briefly describe the nature and function of the cytoplasm and the regions and structure within it.

- (a) Discuss the ways in which organisms are classified based on their requirements for energy, carbon and electrons.

Or

- Summarize the major features of the Embden-Meyerhof pathway include the starting points, The products of the pathway and ATP yield.

13. (a) Describe the process of anaerobic respiration. Does anaerobic respiration yield as much ATP as aerobic respiration? Why or why not?

Or

- (b) What is denitrification? Why do farmers dislike this process?

14. (a) Describe the functions of accessory pigments?

Or

- (b) Define photophosphorilation? What is the difference between cyclic and noncyclic photophosphorylation?

15. (a) How do microorganisms adapt to hypotonic and hypertonic environment?

Or

- (b) State about cardinal temperature.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) List the functions of bacterial plasmamembrane why must their plasmamembrane carry out more functions than the plasma membrane of eukaryotic cell.

Or

- (b) Describe in detail the composition and structure of peptidoglycan.

17. (a) Describe facilitated diffusion, primary and secondary active transport and group translocation in terms of their distinctive characteristics and mechanisms?

Or

- (b) Describe the energy cycle and ATP's role in it what characteristics of ATP make it suitable for this role.

18. (a) What are fermentations and why are they useful to many microorganisms?

Or

- (b) Explain in detail about Bioluminescence.

19. (a) State the importance of asymbiotic nitrogen fixation.

Or

- (b) Describe in detail about hall bacterial photosynthesis?

20. (a) Describe the structure of the bacterial endospore using a labelled diagram.

Or

- (b) Describe the phases of the growth curve and discuss the causes of each.