

# **KAMARAJ COLLEGE (Autonomous)**

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

**(6 Pages)**

**Reg. No: .....**

**Question Code No : 25001602**

**Sub Code : 25PMMB12**

**PG Degree - End Semester Examinations, November 2025**

**First Semester**

**M.Sc. MICROBIOLOGY**

**Microbial Physiology**

**(For those who joined in July 2025 onwards)**

**Time : 3 Hours**

**Maximum : 75 Marks**

**PART – A (10 × 1 = 10 Marks)**

**Answer ALL Questions**

**Choose the correct answer:**

1. Which type of bacteria synthesize their own organic compounds from inorganic sources, utilizing either light or chemical energy?
  - (a) Heterotrophic bacteria
  - (b) Chemoheterotrophic bacteria
  - (c) Autotrophic bacteria

- (d) Photoheterotrophic bacteria
2. Mark the Sulphur bacteria, which obtain energy by oxidizing elemental sulfur, are an example of:
- (a) Photoheterotrophs                      (b) Chemoheterotrophs  
(c) Chemoautotrophs                      (d) Photoautotrophs
3. What is the name of the bacterial growth phase during which the death rate and the birth rate are equal?
- (a) Lag phase                                      (b) Log (exponential)  
(c) Stationary phase                              (d) Decline phase
4. Choose the bacteria that grow best at moderate temperatures (20°C to 45°C) are known as:
- (a) Psychrophiles                              (b) Mesophiles  
(c) Thermophiles                              (d) Extremophiles
5. What is the primary role of lactate dehydrogenase in anaerobic conditions?
- (a) To directly produce ATP from pyruvate  
(b) To convert pyruvate into a form that enters the Krebs cycle  
(c) To oxidize NADH to NAD<sup>+</sup>  
(d) To synthesize glucose from pyruvate



(c) To produce ATP and NADPH during the light-dependent reactions.

(d) To convert carbon dioxide into organic sugars

10. Which of the following is NOT an accessory pigment?

(a) Chlorophyll

(b) Carotenoids

(c) Chlorophyll a

(d) Xanthophylls

**PART - B (5 X 5 = 25 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 250 words.**

11. (a) Analyze the different nutritional requirements for bacteria.

**(OR)**

(b) Discuss the significance of siderophores and its application.

12. (a) Illustrate the different stages of growth curve with neat diagram.

**(OR)**

(b) Compare the cell mass and metabolic activity of bacterial growth.

13. (a) Explain the glycolysis and its role in energy production.

**(OR)**

(b) Compare the Chemiosmosis and Pasteur effect.

14. (a) Describe the procedure of methanogenesis in detail.

**(OR)**

(b) Compare dissimilatory Nitrate reduction and dissimilatory Sulfate reduction.

15. (a) Write about antenna of light harvesting and accessory pigments.

**(OR)**

(b) Infer the details of *Halobacterial* Photosynthesis.

**PART - C (5 X 8 = 40 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 600 words.**

16. (a) Classify the types of bacteria based on their nutritional requirements.

**(OR)**

(b) Evaluate the different methods of nutrient transport mechanisms in bacteria.

17. (a) Elaborate the Batch, Continuous, Synchronous and Asynchronous cultures with suitable diagram.

**(OR)**

(b) Discuss the factors affecting microbial growth.

18. (a) Evaluate the homo, hetero lactic acid fermentation and analyze its significance in energy production.

**(OR)**

(b) Explain the different stages of lipid metabolism focusing on  $\beta$  oxidation.

19. (a) Analyze the biosynthesis of aliphatic and aromatic amino acids with suitable examples.

**(OR)**

(b) Outline the biosynthesis of glycolipids and phospholipids.

20. (a) Compare the cyclic and non-cyclic photosynthetic electron transport chain.

**(OR)**

(b) Discuss the oxygenic and anoxygenic photosynthesis with suitable examples.