



Register Number:  
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**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27**  
**B.Sc. MICROBIOLOGY - III SEMESTER**  
**SEMESTER EXAMINATION: NOVEMBER 2020**  
**MB 318 – MICROBIAL PHYSIOLOGY, GROWTH AND CONTROL OF MICROORGANISMS**

Time: 2 1/2 hours

Max Marks: 70

This paper contains 2 printed pages and 4 parts

**I. Answer any Five of the following**

**5X3=15**

1. Define water activity. Why is it difficult for microorganisms to grow at low  $a_w$  values?
2. How do homolactic fermenters and heterolactic fermenters differ?
3. Differentiate between complex media and defined media with an example.
4. Draw the microbial growth curve in a closed system.
5. Give three examples of high energy molecules.
6. Which enzyme links glycolysis to citric acid cycle? Write the reaction catalyzed by it.
7. Give one example each of the following
  - a. Inhibitors of cell wall synthesis
  - b. Protein synthesis inhibitor
  - c. Antifungal drug

**II. Answer any Five of the following**

**5X5=25**

8. Explain how the Entner-Doudoroff pathway differs from glycolysis.
9. Describe one preservation method each for bacterial culture and fungal culture?
10. What are the toxic effects of  $O_2$  on microorganisms? How do aerobes and other oxygen-tolerant microbes protect themselves from these effects?
11. What is the importance of the pentose phosphate pathway? Draw a general scheme of the pathway.
12. Write down the reactions of glycolysis that require ATP.
13. Calculate the growth rate constant and generation time of a culture that increases in the exponential phase from  $5 \times 10^2$  to  $1 \times 10^8$  in 6 hours.
14. Illustrate the steps involved in the synthesis of peptidoglycan.

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**III. Answer any Two of the following**

**2X10=20**

- 15 a. Explain how a chemostats and a turbidostat operate. **7**  
b. Describe one method of direct measurement of cell number. **3**
16. Describe the structure of ATP synthase and explain how it function
- 17 a. List the mechanisms of antibiotic resistance among bacteria and explain one of them. **5**  
b. What are the three steps of amino acids breakdown? Illustrate the urea cycle. **5**

**IV. Answer the following**

**1X10=10**

- 18 a. Suppose that a chemical reaction had a large negative  $\Delta G^{\circ}$  value. Is the reaction endergonic or exergonic? What would this indicate about its equilibrium constant? **3**
- b. Suppose you isolated a bacterial strain that carried out oxygenic photosynthesis. What photosystems would it possess, and what group of bacteria would it most likely belong to? **3**
- c. As a Microbiology student you want to isolate bacteria from sea water. You collected water from the Arabian Sea and brought it to the lab. What kind of culture media will you use to isolate halophilic bacteria from the sea water? Explain. **4**