

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
ADVANCED & APPLIED MICROBIOLOGY (BIO G523)
FIRST SEMESTER 2023-24 **MID-SEMESTER EXAM**

Total Marks: 60

Max time: 90 minutes

Date: 13.10.2023

Instruction: Please write the answers in a precise and pointwise manner. Write answers to questions section-wise.

Section-A

Q1. Answer the following. **[5×5=25]**

- (i) What kind of nutrition was present in the earliest bacterial cells and what were the possible sources for energy, electron, and carbon during initial evolutionary process?
- (ii) Suggest a method for bacterial identification based on the physiological process of bacteria with appropriate justification, principle, and limitation.
- (iii) Discuss the role and importance of gut microbiome in mental health.
- (iv) Many secondary metabolites produced by bacteria can have medical importance. Soil is a rich source of such bacteria. However, majority of them cannot be easily cultivated. Why? What will be your strategy to isolate some of the non-cultivables?
- (v) You have been provided with a soil sample to identify bacterial species capable of degrading benzene. How will you proceed with it? Explain

Q2. Describe the process of abiogenesis with a possible explanation. Try to write your explanation with appropriate headings/subheadings or important answers underlined. **[10]**

Q3. You collect muddy water from a pond in a long cylinder, cover it with a glass cover, and keep it in an open area for exposure to sunlight. Consider that oxygen near the bottom region is available for microbial utilization. How does microbial activity change on a day-night basis in the given cylinder at different depths? Also, mention the type of bacteria growing at different depths with appropriate justification. **[10]**

Section B

Q4. Can the terms 'fermenter' and 'bioreactor' be used synonymously? Justify your answer. **[2]**

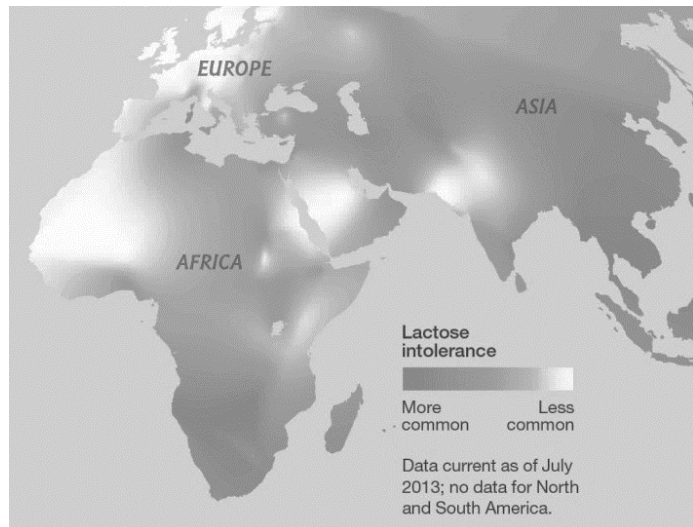
Q5. It is believed that fermented food facilitated the transition of human communities from hunter-gatherers to sessile agriculture communities. Explain how. **[3]**

Q6. One of your friends says that 'fermented foods are rich in probiotics, and one should consume them regularly as they have beneficial effects on health'. Is he correct in calling all fermented foods probiotics? Justify. **[5]**

Q7. Study the map showing lactose intolerance cases.

(i) Can you justify why most European countries have a low incidence of lactose intolerance? **[3]**

(ii) How fermentation can be beneficially used to tackle lactose intolerance? Explain. **[2]**



-----All the best-----