

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**FIRST SEMESTER 2023-24**  
**MICROBIOLOGY (BIO F212)**

**MID SEMESTER TEST (CLOSE BOOK)**

**Total Marks: 40**

**Max. Time: 90 minutes**

**Date: 12.10.2023**

**Note: 1. Answer all parts of the same question together, in sequence.**

**2. Answer briefly, to the point and in the format asked.**

**Q1. (a)** Louis Pasteur used a goose-necked flask in one of his breakthrough experiment. Which phenomenon did he prove/disprove by this experiment? Had he used plant extract instead of meat broth, would his results/conclusion would have been same or different? Justify your answer. **(4)**

**(b)** Can a stain which is repelled by a bacterial species be used to observe the bacterial cells under microscope? Justify your answer. **(4)**

**(c)** *Listeria monocytogenes* stained purple after gram staining. Briefly discuss various parts of the basal body of its flagella. **(4)**

**Q2. (a)** *Streptococcus pneumoniae* (causative agent of pneumonia) is a gram-positive, diplococci, and facultative anaerobic bacterium. Explain the mechanism(s) by which this bacterium protect itself in presence of oxygen? **(5)**

**(b)** Aditya: “*Conidiospores are non-reproductive structures formed under stress*”.

Priyanka: “*Endospores are sexual reproductive structures formed under favorable conditions*”.

Based on your learning, suggest who is correct/ incorrect? Write proper justification for your answer in each case. **(4)**

**Q3. (a)** Abhimanyu, a Ph.D. student in EMBL Lab, BITS, Pilani isolated a gram positive bacterial strain that could degrade polyethylene [(C<sub>2</sub>H<sub>4</sub>)<sub>n</sub>]. Unfortunately, the pure culture of this bacterial strain got contaminated with five other gram positive bacteria having similar morphological features. He asked you to again prepare the pure culture of this bacterial strain from the contaminated mixed culture plate. Explain how will you complete this task? Give proper justification. Mention the media type that you will use. **(4)**

**(b)** Draw a well-labelled diagram depicting movements of a peritrichous bacterium in response to nutrients in its surrounding medium. **(3)**

**Q4.** Write scientific justification/ explanation for the following statements:

**(a)** Most of the eukaryotic peptidases could not degrade the peptidoglycan cell wall of gram-positive bacteria. **(4)**

**(b)** Spread-plate method is better than pour-plate method for the isolation of bacteria from environmental samples. **(4)**

**(c)** Bacterial strains can be identified using virus. **(4)**

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