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Exam. Code: 0001  
Sub. Code: 17060

2115  
B.A./B.Sc. (General) First Semester  
Microbiology  
MIC-101: Fundamentals of Microbiology - I

Time allowed: 3 Hours

Max. Marks: 33

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following:-

- (a) Name the scientist who discovered penicillin.
- (b) What is the primary function of bacterial flagella?
- (c) Give two examples of commonly used vectors in genetic engineering.
- (d) What is the role of *Rhizobium* in agriculture?
- (e) Define the term 'Biopesticide'. (5x1)

UNIT - I

- II. a) Discuss the significant contributions of Robert Koch to medical microbiology. Explain the concept of 'abiogenesis' and how it was disproved.  
b) List five emerging areas where microbiology plays a crucial role. (2x3½)
- III. a) Describe the streak plate method for obtaining isolated bacterial colonies. Differentiate between a defined and a complex culture medium.  
b) Explain how dry heat sterilization is achieved and mention its limitations. (2x3½)
- IV. a) Write a short note on the development of microbiology as a scientific discipline.  
b) Explain the difference between the generation time of *E. coli* and *M. tuberculosis*.  
Why are viruses considered to be on the boundary between living and non-living? (2x3½)
- V. a) Explain the landmark discoveries of the "Golden Era of Microbiology".  
b) What is the purpose of using an incubator in a microbiology laboratory? Compare the cellular organization of algae with that of bacteria. (2x3½)

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UNIT - II

- VI. a) Describe the fluid mosaic model of the bacterial cell membrane. Write a short note on the structure and economic importance of yeast.  
b) What are bacterial endospores? How they are formed? Name two endospore-forming genera. (2x3½)
- VII. a) Differentiate between the structure of Gram-positive and Gram-negative cell walls.  
b) What are bacterial cysts? How do they differ from endospores? Briefly describe the morphology of a typical bacterial colony. (2x3½)
- VIII. a) Outline the basic steps involved in the process of recombinant DNA technology.  
b) What is a cloning vector? List the essential features of a good vector. How do restriction enzymes facilitate gene cloning? (2x3½)
- IX. a) Explain the term 'Nitrogen Fixation' and its importance in the ecosystem. What are biofertilizers? Discuss their advantages over chemical fertilizers.  
b) Write a short note on the microorganisms found in the Rhizoplane .What is their importance. (2x3½)