

**Microbiology (LS3103) End-semester exam on Dec. 6, 2018**

**Full Marks: 50, Time: 3 hours**

**SECTION A (Answer All Questions, total 35 marks)**

**USE the MAIN ANSWER SCRIPT FOR ANSWERING SECTION A**

1. What are probiotics and how do they work? Explain why cystic fibrosis patients are susceptible to lung infections? 2 + 3
2. What do you understand by antibiotic resistance? What are the possible mechanisms by which an antibiotic resistance gene might function? Antibiotic resistance gene existed in nature much before people started to use antibiotics for treating infectious diseases – explain with brief justification if this statement true or false. 1 + 2 + 2
3. How *Mycobacterium tuberculosis* evade phagocytic defense? What is latent infection? Why such infections are difficult to treat? 2 + 1 + 2
4. What are most important characteristics of an ideal drug against an infectious pathogen. Explain point-wise. What is a 'drug target'? What is the target for  $\beta$ -lactum antibiotics? 3 + 1 + 1
5. Explain why mutation in the TLA and NADPH oxidase genes result in susceptibility to variety of infections? 2.5 + 2.5
6. Describe the replication strategies of positive and negative strand RNA viruses. Why reverse transcriptase is an attractive drug target for treating HIV infection? 3 + 2
7. What are siderophores, how do they function? Can siderophores be exploited as drug target? Explain logically. 2 + 3

**SECTION B (Answer Any One of the Following Questions, total 15 marks)**

**USE the SUPPLEMENTARY SHEET FOR ANSWERING SECTION B**

8. Define enrichment bias. How it can be largely overcome? What factors should be taken into consideration for obtaining a pure bacterial culture? What is difference between ectomycorrhizae and endomycorrhizae? [3+5+3+4]
9. Why some bacteria form endospore? How dipicolinic acid facilitate endospore formation? What is the major difference between terminal and central spore? How sporulation occur within endospore forming bacteria? [5+4+2+4]
10. Bacteria lacking WTAs grow slower than wild and clump in solution- explain this statement. What is the role of PBP4 during bacterial cell wall biosynthesis? How teichuronic biosynthesis is regulated in *B. subtilis*? [7+4+4]

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