

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 3131407****Date: 3/12/2019****Subject Name: Basic Microbiology****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Figures to the right indicate full marks.
3. Draw neat illustrated diagrams wherever necessary.
4. Write scientific names as per the norms

MARKS

- Q.1** (a) Draw a flowchart to depict the scheme of five kingdom classification based on characteristics. **03**
- (b) Tabulate the differences between eukaryotic and prokaryotic cell alongwith diagram and also give examples. **04**
- (c) Describe the difference between gram +ve and gram –ve bacteria, staining reaction, and diagram of respective cell wall. Give example of gram +ve rod, gram +ve cocci, gram –ve rod, gram –ve cocci **07**
- Q.2** (a) Write a short note on chemical and physical methods to control microorganisms **03**
- (b) Draw a flowchart to depict Koch postulates. What is the significance of Koch postulates? **04**
- (c) Draw a diagram depicting steps of ELISA. Explain a) ELISA is a semiquantitative assay, b) application of ELISA c) types of ELISA **07**
- OR**
- (c) Justify the statement “Louis Pasteur is aptly known as Father of Microbiology” **07**
- Q.3** (a) Draw a diagram to depict Holliday junction. How does it help in evolution? **03**
- (b) Microbial growth occurs is observed as sigmoidal curve. Describe each phase of the sigmoidal curve. During which phase the primary metabolites are formed? **04**
- (c) Describe PCR, its applications, advantages and disadvantages. Draw a diagram to depict PCR cycle and enlist the ingredients used for PCR **07**
- OR**
- Q.3** (a) Enlist the significance of microorganisms in agricultural microbiology **03**

- (b) Write a descriptive note on IMViC Test. Write the IMViC reaction for any two microorganisms **04**
- (c) A butcher, asymptomatic carrier of *Salmonella*, minced meat without wearing gloves. As consequence, the meat was contaminated with 25 cells of *Salmonella* spp. and 32 cells of *S. enterica*. Taking into account that the generation time of *Salmonella* spp. is 30 minutes and its lag phase is 3 h, and that the specific growth rate constant of *S. enterica* using meat as substrate is 0.17 h^{-1} and its lag phase lasts 5 h, calculate the number of *Salmonella* cells that will be present in the meat 10 hours after being prepared. **07**
- Q.4** (a) Explain the formation of HFr and F' strains formed during bacterial conjugation. Also write about the significance of "Merozygote" **03**
- (b) In a picnic, the paella was contaminated with 46 cells of *Propionibacterium acnes*. If *P. acnes* has a generation time of 90 minutes and a lag phase of 1.5 h, how many cells of this bacterium will be present in the paella after 10 h? **04**
- (c) Bacteria change from non-pathogenic strain to pathogenic strain. Explain the concept with experiment conducted by Griffith. Also suggest an application in reference to food industry. **07**
- OR**
- Q.4** (a) Draw a diagram to depict parts of compound bright field microscope. **03**
- (b) Give example of microorganisms 1) acid fast bacteria 2) photoautotrophic bacteria 3) bacteria producing bacteriocin 4) fungi used for commercial production of penicillin **04**
- (c) Explain DNA replication. Why lagging strand is named as such? Enlist the name and functions of all enzymes and proteins involved in DNA replication. **07**
- Q.5** (a) Explain replica plating method for isolation of auxotroph. Explain the term bradytrophic bacteria. **03**
- (b) Draw labelled diagram to depict arrangement of flagella in bacteria **04**
- (c) Draw a diagram to depict transduction. What is lytic and lysogenic cycle? Explain the term specialized transduction. **07**
- OR**
- Q.5** (a) A blue cheese sample was crushed in saline and serially diluted upto 10^{-7} . The last dilution when spread plated resulted in 200 colonies. What should be interpreted by the analyst regarding the cell count in terms of log cfu/ml? Can you speculate the results in plates treated similarly for 10^{-6} and 10^{-8} dilutions **03**

- (b) Explain biosafety levels in terms of lethality of pathogenicity and availability of cure. Name any 4 centers in India where biosafety level-4 can be handled. Give examples of ways/ organisms used for bioterrorism during ancient times/ currently **04**
- (c) Give reason for the following (briefly; *diagram not required*) **07**
- Swan neck experiment was the ultimate proof for biogenesis
 - The credit for vaccination goes to Edward Jenner and not Lady Mary Wortley Montagu
 - Acid fast staining is a differential staining method
 - Conventional DNA polymerase cannot be used for PCR
 - Even after being heat treated bacteriocin results in antimicrobial effect
 - 70% methanol is more effective in killing microorganisms than 100% methanol
 - Oil immersion is necessary when 100X objective lens is used during microscopy

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