

**2012**

**PRINCIPLES OF MICROBIOLOGY**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following :

10x1 = 10

- i) The primary stain used in acid-fast staining is
  - a) crystal violet b) methylene blue
  - c) carbol fuchsin d) safranin.
- ii) Moist heat kills all of the following *except*
  - a) *Brucella abortus*
  - b) *Mycobacterium tuberculosis*
  - c) *Salmonella typhi*
  - d) *Coxiella burnetii*.
- iii) Causative agent of food poisoning is
  - a) *Clostridium perfringens*
  - b) *Clostridium tetani*
  - c) *Clostridium botulinum*
  - d) none of these.
- iv) Which of the following is not true for lysogenic bacteria ?
  - a) Remain integrated with bacterial genome
  - b) Replicate with the host

- c) Bring about host lysis
- d) A virulent phage.
- v) The micro-organism which uses light energy and carbon dioxide as their carbon source is
- a) Photo-lithotrophs b) Photo-organotrophs
- c) Chemo-lithotrophs d) Chemo-organotrophs.
- vi) Which of the following is bactericidal ?
- a) Membrane filtration b) Ionizing radiation
- c) Deep freezing d) All of these.
- vii) Archaea and bacteria are placed in separate domains because
- a) bacteria lacks cell membrane
- b) bacterial cell wall contains amino acids
- c) archaea have peptidoglycan
- d) their *r*RNA sequences are different.
- viii) HEPA filters are
- a) high efficiency particulate air
- b) high efficiency particular air
- c) high efficacy particulate air
- d) high efficient particulate air.
- ix) The unit of capsids is called
- a) capsomere b) capsule
- c) nucleoid d) none of these.
- x) In most of the Gram-positive bacteria, peptidoglycan is associated with acidic polymers containing phosphorus called
- a) acetic acid b) teichoic acid
- c) glutamic acid d) nitric acid.

- xi) The genome of a tobacco mosaic virus is a
- a) monopartite b) dipartite
  - c) polypartite d) none of these.
- xii) The acid present in the endospore of the bacteria is known as
- a) picric acid b) muramic acid
  - c) dipicolinic acid d) diphenyl acid.

### **GROUP – B**

#### **( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

2. Differentiate chromophore from auxochrome. Classify stain according to its charge with proper examples. Why is counter stain necessary for differential staining ?  $1 + 2 + 2$
3. Define biogenesis and abiogenesis. Discuss some experiments which favour biogenesis.  $2 + 3$
4. How do sterilization and disinfection differ ? What is pasteurization ? Describe the process of fractional sterilization or tyndalization ?  $2 + 1 + 2$
5. How do photoautotrophs and photoheterotrophs differ ? Give examples.  $3 + 2$
6. a) Give the postulates of “Germ Theory of Diseases”.  
b) State few characteristics of viruses.  $2 + 3$

### **GROUP – C**

#### **( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. Classify bacteria according to their oxygen requirement. Describe numerical taxonomy in brief. Define simple matching coefficient ( $S_{SM}$ ) and Jaccard coefficient ( $S_J$ ).

What is a dendogram and how can dendogram be interpreted ? 4 + 2 + 2 + 3 + 4

8. Classify virus according to its physical and chemical structures. Discuss in brief the structures of Tobacco Mosaic Virus. What is a bacteriophage ? Differentiate lytic from lysogenic cycle. 5 + 4 + 1 + 5

9. What are the differences between depth filter and membrane filter ? Give the advantages and disadvantages of UV and ionizing radiation as sterilizing agent. Write the Koch's postulate. What are the contributions of Joseph Lister ? 3 + 3 + 4 + 5

10. What are the adaptations that help halophilic microorganisms to thrive in extreme salinity ? What is eclipse phase and latent phase in virology ? Describe with graphs. What are the stages of viral growth cycle ? Give diagrams. What do you mean by systematics of bacteria ?

3 + 4 + 4 + 4

11. a) Write down the principle behind Ziehl-Neelsen staining.

b) Why is *Mycobacterium tuberculosis* called acid fast bacteria ?

c) Describe the contribution of scientists for the theory of abiogenesis.

d) What is pasteurization ? 5 + 2 + 5 + 3

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