Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Sc/SEM-2/MSGEN-201/2012

2012

PRINCIPLES 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 : 10 × 1 = 10

   i) An organism has an optimal growth rate when the hydrogen ion concentration is very high. The organism is a/an

   a) osmotolerant b) acidophile

   c) neutrophile d) alkalophile.

   ii) When 5-bromuracil is inducing a mutation, it takes

   a) one b) two

   c) three d) four.

   iii) An organism that has lost its ability to synthesize its own histidine is called a/an

   a) auxotroph b) donor cell

   c) prototroph d) revertant.

iv) The vegetative body of algae is

a) gametophyte b) mycelium

c) plasmodium d) thallus.

v) Frustules made of silica are characteristic of

a) euglenoids b) diatoms

c) desmids d) kelp.

vi) A culture of bacteria produces 5 generations in 2 hours. What is the generation time for this bacterium under those conditions ?

a) 15 minutes b) 24 minutes

c) 1 hour d) 0.75 hour.

vii) Which of the following procedures uses a photocell to measure absorbance of a culture to regulate the flow of culture media ?

a) Chemostat

b) Coulter counter hemostat

c) Petroff-Hausser chamber

d) Trubidostat.

viii) The ability of *Vibrio fischeri* to produce bioluminescence chemicals only when a certain population density has been reached is an example of

a) Liebig's Law of the minimum

b) Shelford's law of tolerance

c) the second law of thermodynamics

d) quorum sensing.

ix) 5-Bromuracil induces mutations because it

a) replaces a *T* and binds to *G* rather than *A*

b) replaces a *G* and binds to *A* rather than *C*

c) changes the binding affinity of *G*

d) changes the binding affinity of *T*.

x) Antibiotics is considered as

a) primary metabolite b) secondary metabolite

c) amino acid d) hormone.

xi) Plasmids exists for all of the following *except*

a) drug resistance

b) conjugation

c) bacteriocin production

d) β lactum production.

xii) *T* 7 phage has it's own

a) RNA polymerase b) DNA polymerase

c) endonuclease d) all of these.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. State the role of Par proteins and Muk proteins in bacterial DNA. 3 + 2

3. What are viroids and prions ? 2 + 3

4. Name one Nanoarcheae and explain its characteristics.

5. Write short note on gliding bacteria.

6. Give an outline of Oxygen sensitivity in Nitrogen fixation.

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Why deuteromycetes are called imperfect fungi ?
   b) Which two forms in hyphae can exist ?
   c) What are homothalic and heterothalic fungi ?
   d) What are the differences between rhizopus and mucor ?
   e) What is dolipore septum ? 2 + 2 + 4 + 5 + 2

8. a) Describe the molecular mechanism of conjugation in *E.coli.*
   b) What are bacterial topoisomerases ?
   c) Name the bacterial proteins needed for bacterial DNA replication initiation. 8 + 3 + 4

9. Briefly describe the endospore formation in gram positive bacteria. What are the role of Ca dipicolinate and SASP in endospore formation ? State the mechanisms of endospore germination. 8 + 4 + 3

10. A restriction endonuclease might play role in resistance to phage infection — justify. What are the significances in early and late genes of bacteriophages. Describe the mechanism of T4 DNA replication. How does Lamda virus choose lysogeny or lytic condition of its growth after entry in the *E.coli.* 3 + 3 + 5 + 4

11. Define antibiotic spectrum. How can you assay the potentiality of an antibiotic ? Now-a-days why drug resistant microbes are a serious problem ? Write about the mechanisms by which microorganisms can acquire multiple drug resistance. 2 + 3 + 2 + 8