Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (BT)/SEM-3/BT-302/2009-10

2009
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* the following : $10 \times 1 = 10$

   i) The following substances are used in Gram staining *except*

   a) iodine b) crystal violet

   c) alcohol d) congo red.

   ii) Fungi differ from bacteria in that the former

   a) are eukaryotic b) contain cell walls

   c) can reproduce sexually d) can form spores.

   iii) Which can often live in extreme environment ?

   a) Archae b) Molds

   c) Yeast d) Eubacteria.

iv) Bacteria that live in hot springs have DNA with a higher content of

a) A & G b) G & C

c) A & T d) C & T.

v) In swine flu, the virus is transmitted to human from

a) chicken b) duck

c) pig d) monkey.

vi) The smallest known agents of infectious disease is

a) bacteria b) viroids

c) virus d) algae.

vii) Tuberculosis producing bacteria shows staining as

a) gram positive b) gram negative

c) acid fast stain d) do not take stain.

viii) Fungi are commonly identified by

a) thickness of mycelia b) mode of reproduction

c) fruting structure d) gram staining.

ix) Palisade arrangement of cells is found in

a) coryne bacterium diphtheriae

b) bacillus subtilis

c) saprospira *sp*

d) none of these.

x) The spore produced during sexual reproduction of some fungi is

a) sporangiospore b) blastospore

c) arthrospore d) ascospore.

xi) A bacterium which can grow only in the total absence of oxygen is described as

a) facultative anaerobes b) anaerobes

c) obligate aerobe d) obligate anaerobe.

xii) Anaerobic respiration of nitrate is the example of

a) assimilatory nitrate reduction

b) dissimilatroy nitrate reduction

c) nitrogen fixation

d) none of these.

GROUP – B
(Short Answer Type Questions)

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

2. What are the extremophile microorgaisms ? Why are they important in biotechnological applications ? What is the evolutionary status of Archaea ? 1 + 2 + 2

3. What is peptidoglycan ? What is teichoic acid ? Write their presence and origins in Gram positive and Gram negative bacteria. 1 + 1 + 3

4. What is 16 *s r* RNA sequencing ? How is it helpful in taxonomy ?

5. What is enrichment of culture ? Differentiate between psychrophiles and thermophiles with example. 2 + 3

6. Give example of homofermentative and heterofermentative lactic acid bacteria. Write short notes on phosphoketolase. 2 + 3

GROUP – C
(Long Answer Type Questions)

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

7. Describe asexual and sexual process of reproduction of yeast with exception. Write down the use of common yeast S.cerevisae in different biotechnology and research (at least *five*). 5 + 10

8. Briefly discuss and illustrate with suitable diagram the process of non-symbiotic nigrogen fixation. What role does leghemoglobin play in nitrogen fixation ? What is heterocysts ? What is the function of heterocysts ? 7 + 3 + 2 + 3

9. a) State at least two categories of sulphur oxidizing bacteria.

   b) State at least two categories of sulphur reducing bacteria.

   c) What happen when sulphate acts as terminal electron acceptor ?

   d) Why some bacteria follow Entner-Doudoroff pathway ?

   e) What is mixed acid fermentation ? 2 + 2 + 4 + 3 + 4

10. Write a note on cyclic photophosphorylation. Give example of purple sulphur, purple non-sulphur, green sulphur and green non-sulphur bacteria. What is nitrification ? Give example of nitrifying bacteria. What is substrate level phosphorylation ? Give example. 4 + 4 + 2 + 2 + 2 + 1

11. Explain the glyoxylate cycle in detail with a specific example of bacteria that follows it. 15