

SC

SEAT No. _____

No. of Printed Pages : 02

[754A-27]

SARDAR PATEL UNIVERSITY
M. Sc. THIRD SEMESTER EXAMINATION

Date: 03-11-2017

PS03CMIC02: ENVIRONMENTAL MICROBIOLOGY AND SYSTEMATICS

TIME: 2.00 TO 5.00 P.M.

MAX.MARKS: 70

Q-1 Select most appropriate answer from the given choices. (08)

1. *Anabaena azollae* is anitrogen fixing organism.
a) Associative b) Symbiotic c) Asymbiotic d) Free living
2. Fluidity of cell membrane in psychrophiles is maintained by
a) Increase in fatty acyl chain length c) Decrease in branched chain fatty acids
b) Increase in unsaturated fatty acids d) All
3. Function of bacteriorhodopsin in halophilic archaea is
a) To maintain osmotic balance membrane c) Photosynthesis
b) To generate a proton gradient d) All
4. Which of the following process release Dinitrogen?
a) Anammox b) DNRA c) Nitrification d) All
5. ----- first declared that the archaea represented a third domain of life.
a) Norman Pace c) Carolus Linneaus
b) Watson and crick d) Carl Woese
6. Rhizospheric microorganisms in soil solubilize inorganic phosphates by production of ---
a) Phytases b) Phosphatases c) Organic acids d) All
7. Which of the following fungi is a basidiomycete causing white rot in wood ?
a) *Aspergillus niger* c) *Penicillium notatum*
b) *Coriolus versicolor* d) *Cladosporium sp.*
8. The ability of RNA to catalyze biochemical reactions suggests a precellular RNA world, a term coined by -----in 1986.
a) James Ferris b) Thomas cech c) Norman Pace d) Walter Gilbert

Q-2 Answer any seven short questions. (14)

- a) Name two fungal enzymes involved in degradation of plant cell walls and mention their function.
- b) Explain the term: Molecular chronometer.
- c) What is acid mine drainage? Enlist the effects of acid mine drainage.
- d) Explain the function of Nod D protein in rhizobia.
- e) Mention any two mechanisms to survive in extremely acidic conditions in acidophiles.
- f) Explain the mechanism of ozone depletion.
- g) Define: PGPR and list their functions .
- h) Explain the term: Polyphasic taxonomy
- i) Define alkaliphiles and enlist their habitats.

Q-3 A Write in detail on microbially influenced corrosion and its control. (06)

Q-3B Write a note on adverse effects of inorganic plant nutrient rich discharges on lakes. (06)

OR

Explain the causes, effects and control measures of Acid rain. (06)

Q-4A Explain the nitrification and denitrification processes in soil. (06)

Q-4B Explain in detail genetic regulation of nitrogenase biosynthesis in *Klebsiella pneumoniae*. (06)

OR

Explain the mutualistic interactions between plant roots and fungi. (06)

Q-5A Define Extreme halophiles. Write in detail on habitats and mechanisms to tolerate salt stress in halophiles. (06)

Q-5B Explain with suitable examples homeostasis and secondary succession in microbial communities. (06)

OR

Define hyperthermophiles. Explain physiological and molecular adaptations in hyperthermophiles. (06)

Q-6A Explain the endosymbiotic hypothesis of the origin of mitochondria and chloroplast. (06)

Q-6B Write notes on following explaining their role in microbial taxonomy. (3+3)

1) Genomic fingerprinting

2) Nucleic acid base composition

OR

Explain in detail numerical taxonomy. (06)