5C

[30/52/A-6]

SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
M. Sc. FOURTH SEMESTER EXAMINATION
DATE: 20-03-2019, Wednesday
PS04C MIC02/ BIT02: ENVIRONMENTAL BIOTECHNOLOGY
TIME: 10.00 TO 1.00 P.M. MAX.MARKS: 70

Q-1 Select most appropriate answer from the given choices. (8)

1. In activated sludge process, sludge bulking can be reduced by .....
   a)Using aerobic selectors. c)Addition of iron salts
   b)Addition of chlorine d) All of the above
2. Which of the following is a protein responsible for intracellular sequestration of heavy metal ions?
   a) Siderophore b) Metallothioneins c) Melanin d). All of the above
3. Under anaerobic conditions, *Acinetobacter calcoaceticus* accumulates _____ in cytoplasm during A/O process.
   a) Organic phosphates c) Poly 3- hydroxybutyrate
   b) Polyphosphates d) All of the above
4. The meta cleavage of catechol biodegradation generates _____ end products.
   a)Acetaldehyde and pyruvate c) Acetyl-CoA and succinic acid
   b) Fumaric acid and pyruvic acid d) Succinic acid and malic acid
5. A biotechnological process which removes the arsenopyrite from gold ore to produce a higher grade concentrated gold ore is called .....
   a)Bioleaching b)Bioaccumulation c)Biobeneficiation d) All
6. In anaerobic digesters, conversion of volatile fatty acids into to methane requires _____.
   a)Low partial pressure of hydrogen c) Low partial pressure of nitrogen
   b)High partial pressure of hydrogen d)High partial pressure of nitrogen
7. Methanogens can be detected by fluorescence microscopy owing to the presence of....
   a)F430 b) F420 c)Co-M d) Pseudomurein
8. Which of the following microbial metabolites can reduce the viscosity of oil during MEOR.
   a) Solvents c) Gases
   b) Biosurfactants d) All of the above

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

a) How does heavy metals affect biological processes in waste water treatment plant?
b) What is phytovolatilization? Explain with example.
c) Enlist the benefits of using *Azotobacter* sp. as bioferilizer
d) Differentiate between bioscrubber and biofilters.
e) Explain biomagnification with suitable example.
f) Give four reasons for poor settling of sludge in activated sludge process
g) Enlist the merits of vermicomposting over composting..
h) Enlist the adverse effects of inorganic nitrogen rich discharges in freshwater reservoirs?
i) What are occlusion derived baculoviruses?

(P.T.O.)

Q-3A	Explain the operational parameters used in activated sludge process and discuss their influence on performance of the process.	(6)
Q-3B	Briefly describe following aerobic waste water treatment processes and list their merits. a) Fluidized bed b) Rotating biological contactors OR Explain the biological mechanisms of nitrogen removal from waste water and describe any one process for efficient nitrogen removal.	(6) (6)
Q-4A	Discuss the advantages of anaerobic treatment of waste water and explain in detail UASB process.	(6)
Q-4B	Answer the following a)Explain the applications of rapid microbial assays for toxicity testing in waste water treatment plant b) Explain the basis of any two rapid microbial assays used in toxicity testing. OR Write in detail on objectives, fundamental aspects and processes for composting.	(3+3) (6)
Q-5A	What is bioremediation? Discuss the biostimulation approach for bioremediation of polluted sites with suitable examples.	(6)
Q-5B	Write in detail on biodegradation of lignin by white rot fungi and mention the applications of lignin degrading enzymes. OR Explain the role of oxygenases in hydrocarbon degradation and write in detail on biodegradation of alkanes.	(6) (6)
Q-6A	Write in detail on structure and function of insecticidal toxins of *B. thuringiensis* and write their applications.	(6)
Q-6B	Describe the mechanisms involved in removal of organic and inorganic sulfur from coal. OR Write in detail on microbes involved in bioleaching of sulfidic ores and mechanisms of bioleaching.	(6) (6)

(2)