Student Name :…….Student ID……

Mid-Term Exam-2, CE – 261 **Examiner : Mohammed Imran**

Environmental Microbiology **Date: 05/04/2019, Time : 1 Hour**

Instructions: Answer all questions **Total Marks-15**

Qn. No.1 (a) Read the statement below and writes down the TRUE/FALSE in the space.

Each question carries equal mark- (2.5 Marks)

(i) Biotransformation is **NOT** the complete biodegradation of toxic organic substances (true)

(ii) Fermentation and anoxic respiration are **NOT** anaerobic processes. (false)

(iii) Organic wastes such as plant litter, animal and human feces, and urine are the example of natural biodegraded substances. (true)

(iv) Lignin has a **fastest biodegradation** rate. (false)

(v) Nitrogen fixation is performed under anaerobic conditions by symbiotic and free-living nitrogen fixing bacteria. (true)

Qn. No.1 (b) Multiple Choice Questions (MCQ). Each question carries equal mark- (2.5 Marks)

(i) Which of the following can not be removed by reverse osmosis -

a. Cations
b. Anions
c. Colloidal particles
d. Organic matters

(ii) Which of the following is the foulants-

a. Colloidal matter
b. Biological matter
c. Organic matter
d. All of the above

(iii) Choose incorrect answer which states Biotransformation is -

Student Name :…….Student ID……

a. a biochemical process
b. either the addition of a functional group, or the replacement of one functional group
c. is the complete biodegradation of toxic organic substances
d. **oxidation/reduction** of several carbon atoms in the compound

(iv) Which of the following source of water pollution is not the part of agricultural water pollution –

a. Fertilizers
b. Sulfur oxides
c. Pesticides
d. Biological pollutants

(v) Which of the following step is not the step of biogeochemical cycle of nitrogen-

a. Nitrogen fixation
b. Ammonification
c. Nitrification
d. Mineralization

Qn. No. 2 (a) Fill in the blank- Each question carries equal marks- (Total- 2.5 Marks)

(i) Biodegradation is a …biochemical.. Process in which complex compounds are broken down into simpler ones.

(ii) Mineralization is the complete ……biodegradation……..…of organic compounds to CO_2.

(iii) Biotransformations are preliminary and ……intermediate….. steps of biodegradation.

(iv) Prevention of biodeterioration, biocorrosion, and biofouling of materials used in civil and …environmental….. Engineering.

(v) ……reverse osmosise… removes cations and anions, as well as organics from water.

Qn. No. 2 (b) Match the following-Each question carries equal marks- (Total- 2.5 Marks)

Student Name :…….Student ID……

Question	Write correct **number** here ↓	**Answer**
Storage polysaccharides	iii	**(i)** Dead biomass of microorganism
Fermentation	v	**(ii)** Ammonium oxidizing bacteria
Natural biodegraded substance	i	**(iii)** Fastest biodegradation rate
Nitrosomonas	ii	**(iv)** Membrane treatment
Reverse osmosis	iv	**(v)** Anaerobic process

Qn. No.3 (a) Discuss the biogeochemical carbon cycle (2.5)

- The biogeochemical cycle of carbon includes assimilation of CO_2 from atmosphere, for example, by oxygenic photosynthesis
  $CO_2 + H_2O$ + energy of light $\rightarrow$ CH_2O (organic matter) $+ O_2$
  and mineralization of organic matter, for example, by aerobic oxidation
- $CH_2O + O_2 \rightarrow CO_2 + H_2O$

Photosynthetic organisms are called as primary producers.

Student Name :…….Student ID……

Qn. No.3 (b) What are the main sources of water pollution (2.5)

- *Agriculture*: fertilizers, pesticides, solid wastes, and chemical and biological pollutants from soil
- *Entertainment*: golf courses surrounding reservoirs and lakes—fertilizers and pesticides used to grow grass, which are washed out into reservoirs
- *Farms*: wastewater, manure, and insects
- *Wild life*: biowaste and dead biomass
- *Domestic wastewater*: organic and inorganic pollutants, viruses, and microorganisms
- *Industrial effluent*: organic and inorganic pollutants
- *Solid wastes*: organic and inorganic pollutants if not properly managed and disposed of
- *Air*: sulfur oxide, nitrogen oxide, and dust

Student Name :…….Student ID……