Total No. of printed pages = 8

19/4th Sem/UCH 401

2022

ENVIRONMENTAL SCIENCES

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks for the questions.

Question No. 1 is mandatary. Answer any *four* from the rest.

1. Choose the correct answer : 1×20=20

   (a) The pollutant which reduces the oxygen carrying capacity of hemoglobin is

   (i) Ammonia

   (ii) Hydrogen sulfide

   (iii) Carbon monoxide

   (iv) PAN

   (b) The part of sun's radiation which is absorbed by stratospheric ozone layer is

   (i) Gamma radiation

   (ii) UV radiation

[Turn over

(iii) IR radiation

(iv) Microweb radiation

(c) Which of the following gas absorbs IR radiation ?

(i) Oxygen (ii) Carbon dioxide

(iii) Nitrogen (iv) Helium

(d) The main gaseous component of the troposphere is

(i) N_2 (ii) O_3

(iii) CO_2 (iv) He

(e) The abnormal growth and activities of a cell may cause

(i) Malaria (ii) Typhoid

(iii) Cancer (iv) Cholera

(f) The value of earth's albedo is

(i) 0.5 (ii) 0.1

(iii) 0.2 (iv) 0.3

(g) The main product of Photochemical smog is

(i) O_3 (ii) PAN

(iii) H_2SO_4 (iv) NH_4Cl

(h) Environmental pollution is mainly due to

(i) Animal activities

(ii) Fungal activities

(iii) Bacterial infection

(iv) Human activities

(i) Minamata disease is associated with

(i) Mercury (ii) Arsenic

(iii) Cadmium (iv) Lead

(j) All the living components around the earth form

(i) Biotic component

(ii) Abiotic component

(iii) Ecosystem

(iv) Climate

(k) The organisms at the base of the food chain is

(i) Carnivores (ii) Consumers

(iii) Producers (iv) Decomposers

(l) Non-hazardous solid waste can be best disposed by

(i) Open dumping (ii) Composting

(iii) Incineration (iv) Sanitary landfill

(m) In BOD test, the BOD bottles are stoppered to

(i) Prevent mixing oxygen

(ii) Prevent mixing carbon dioxide

(iii) Prevent mixing microorganisms

(iv) Prevent mixing biodegradable materials

(n) Temporary hardness of water is due to the presence of

(i) Cl^- (ii) HCO_3^-

(iii) NO_3^- (iv) SO_4^{2-}

(o) Eutrophication means

(i) Accumulation of solid waste in a particular area

(ii) Thermal change in water

(iii) Filling up of water bodies with algae and aquatic plants due to extra nourishment

(iv) Dumping non-biodegradable materials

(p) Which one of the following is true for a waste water sample ?

(i) BOD > COD (ii) COD > BOD

(iii) BOD = COD (iv) BOD = 1/COD

(q) Sound web is

(i) Longitudinal web

(ii) Electromagnetic web

(iii) Transverse web

(iv) Radioactive web

(r) "Activated sludge process" is applied for

(i) Waste water treatment

(ii) Solid waste treatment

(iii) Treatment to reduce noise pollution

(iv) Reducing air pollutant in industrial area

(s) The unit of intensity of sound is

(i) Watt/m^2 (ii) N/m^2

(iii) Decibel (iv) Bel

(t) Hydrosphere consists of

(i) Various water bodies and oceans

(ii) Soil

(iii) Rocks

(iv) Air layers.

2. (a) Why dissolved oxygen in water is very important for aquatic animals and plants ? What are the factors which affect dissolved oxygen level in water bodies ? 4

(b) Define BOD or Biological Oxygen Demand. How will you conduct and calculate BOD_5 or five days BOD ? 5

(c) What is COD ? What are the main differences between BOD and COD ? 5

(d) Write short notes on : 3+3=6

(i) Scrubber

(ii) Electrostatic Precipitator.

3. (a) Write a short note on "Aquifer". 5

(b) What is Hydraulic Gradient ? Write down and explain Darcy's law. 5

(c) What is lake eutrophication ? How it can be controlled ? 4

(d) What are primary and secondary pollutants ? Give examples. 2

(e) Write down the environmental social impact of global warming. 4

4. (a) What are the different types of solid wastes ? What are the best ways to manage municipal solid waste ? 5

(b) Write short note on any *one* : 4

(i) Sanitary landfilling

(ii) Incineration.

(c) What is noise pollution ? What are the effects of noise pollution ? 4

(d) Write down the formula to measure the intensity of noise pollution. 3

(e) What are the ways to control the noise pollution ? 4

5. (a) (i) Describe the different components of ecosystem with flow diagram.

(ii) What are the different types of ecological pyramid ? Discuss with diagram. 3+3=6

(b) How the energy flow takes place in the ecosystem ? Describe with flow diagram. 4

(c) Graphically represent the different layers of atmosphere with altitude and composition. 5

(d) What is black body radiation ? By considering earth as a black body calculate average temperature of earth. 1+4=5

6. (a) Describe the sources and effects of SO_2. 4

(b) Write down the mechanism of formation of photochemical smog (PAN). 4

(c) Describe the mechanism of greenhouse effect. 4

(d) What are the limitations of exponential population growth ? 3

(e) Explain logistic growth rate of population with diagram and mathematical equation. 5