2018/EVEN/12/31/AE–605/291

2 0 1 8

B.Tech Even Semester (CBCS) Exam., May—2018

AGRICULTURAL ENGINEERING

(6th Semester)

Course No. : AEEL–10

(Environmental Engineering Fundamentals)

Full Marks : 50
Pass Marks : 15

Time : 2 hours

Note :
1. Answer *any* **five** questions.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the margin indicate full marks for the questions.

1. *(a)* With a neat sketch, explain a typical sewage treatment system in detail. 4

(b) What are meant by *(i)* environment and *(ii)* environmental studies? 3+3=6

2. *(a)* What is soil pollution? Explain different sources of soil pollution and suggest remedies. 4

(b) What are meant by *(i)* eutrophication, *(ii)* waterlogging and *(iii)* salinity of soil? 2+2+2=6

3. *(a)* State and explain air pollution. What are the WHO standards for different air pollutants? 4

(b) What is the significance of sustainable development? 6

4. *(a)* What is bioremediation? Explain different sources of water pollution and its safe limits in drinking water. 4

(b) State the environmental laws relating to *(i)* water, *(ii)* air and *(iii)* wildlife. 2+2+2=6

5. *(a)* Write notes on *(i)* Chipko Movement and *(ii)* Silent Valley Movement. 2+2=4

(b) Design a storage silo for soda ash for a water treatment plant with a design average day capacity of 0·23 m^3/s. The maximum dose is estimated to be 106 mg/L as Na_2CO_3. The local supplier has current contracts with other municipalities that specify 99% purity and an average bulk density of

800 kg / m^3. Shipping time is normally 10 working days. Provide a dimensioned drawing of the silo with recommended appurtenances. 4+2=6

6. *(a)* Write notes on the following : 2+2+2=6

(i) Asbestosis

(ii) Silicosis

(iii) Byssinosis

(b) Calculate the bicarbonate and carbonate alkalinities in mg/L as $CaCO_3$ of water having a total alkalinity of 233·0 mg/L as $CaCO_3$ and a pH of 10·47. 2+2=4

7. *(a)* List the various laws of equilibrium. State and give the expression for Raoult's law. 4

(b) The atmospheric pressure in a lab is 102·4 kPa. The temperature of the water sample is 25 °C with pressure as 23·76 torr. If we use a 250 ML beaker to collect hydrogen from the water sample, what is the pressure of the hydrogen and the moles of hydrogen using the ideal gas law? 6

8. *(a)* Explain the significance of alkalinity in lime-soda softening. 4

(b) Analysis of a water sample from a pond gave the following results :

Volume of sample = 2L
Concentration of suspended solids in the sample = 15 mg/L
Concentration of dissolved chemical = 0·01 mol/L
Concentration of the chemical adsorbed onto the suspended solid = 400 g/g solid

If the molecular weight of the chemical is 125, determine the total mass of the chemical in the sample. 6

★ ★ ★