B. Construction Engg. 4th Yr 1st Semester Exam. 2018

Environmental Engineering
(Part – I)

Time : Three hours Full Marks : 100

Answer Q.no.1 and any two from the rest.

1. (CO1)
(A) Choose the correct answer from the following questions: 1x 6

(a) The solid earth and its interior is known as
(i) Hydrosphere (ii) Lithosphere (iii) Atmosphere
(iv) Hydrosphere.

(b) The Environment (Protection) Act was promulgated in
(i) 1983 (ii) 1986 (iii) 2001 (iv) 2007

(c) 'Mathemoglobinemia' disease to children is caused due to presence of excess
(i) Nitrites (ii) Free ammonia (iii) Nitrates (iv) Albuminoid N_2

(d) The pH value of drinking water should lie between

(i) 4.5 to 6 (ii) 6.5 to 8 (iii) 8.5 to 9 (iv) None of the above.

(e) Versenate method is used to determine
(i) Turbidity (ii) Total solids (iii) Taste & odour (iv) Hardness.

(f) Carbonate hardness (CH) is equal to
(j) Alkalinity (ii) Total hardness (TH) (iii) Alkalinity or total hardness (TH) whichever is less (iv) Alkalinity or total hardness (TH) whichever more.

2. (CO4) (a) What do you mean by alkalinity? Illustrate.
(b) The result of chemical analysis of a sample of raw water is given below:

Ca^{++} = 80 mg/L as $CaCO_3$
Na^{+} = 2.5 meq/L
Total alkalinity = 90 mg/L as $CaCO_3$
Total hardness = 120 mg/L as $CaCO_3$
SO_4^{--} = 20 mg/L as $CaCO_3$
Cl^{-} = 130 mg/L as $CaCO_3$
NO_3^{-} = 5 mg/L as $CaCO_3$.

(i) Prepare a bar diagram for raw water
(ii) Estimate the quantity in kg/day of CaO (80% pure) and soda ash (90% pure) required to soften 4ML/day of this water. 4 + 18

3. (CO3) (a) State and explain disinfection by chlorine giving necessary equations and neat sketch.
(b) Results of chlorine demand test on a raw water are given below:

Sample No.	Chlorine dosage, mg/L	Residual chlorine after 10 min. contact, mg/L
1)	0.2	0.19
2)	0.4	0.36
3)	0.6	0.50
4)	0.8	0.48
5)	1.0	0.20
6)	1.2	0.40
7)	1.4	0.60
8)	1.6	0.80

(i) Sketch a chlorine demand curve.
(ii) What is the 'breakpoint dosage' and what is the 'chlorine demand at dosage of 1.4 mg/L'? 5+12+5

4. (CO4)
(a) Write a short note on slow sand filter and rapid sand filter.
(b) The maximum daily demand at a water purification plant has been estimated as 16 million litres per day. Design the dimensions of a suitable sedimentation tank (fitted with mechanical sludge removal arrangement) for the raw supplies. Assume a detention period of 6 hours and the velocity of flow as 30 cm per minute. 10 + 12

CO1: To enumerate sources of pollution and name of pollutants with limits. (K1)
CO2: To construct flow sheets for conventional primary & secondary treatment methods for groundwater and surface water. (K2)
CO3: To analyse chlorination method and illustrate wastewater treatment methods like activated sludge, trickling filter etc. (K4)
CO4: To develop design methods for sedimentation tanks and establish various water pollution causes. (K5)

Bachelor of Construction Engineering 4th year 1st semester

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PART - II

Environmental Engineering

1.CO1: i)Define pollution. CO_2 -an element is present in normal air but it is not defined as pollutant – why ? 2+3=5

2.CO2: i) Discuss physical, chemical & biological treatment processes? Draw primary & secondary Treatment flowsheet 4+6= 10

3. CO3 i).Give a brief note on activated sludge treatment process with neat sketch. 8

4. CO1: i) Discuss on the sources of air pollution . Classify them with examples 3+4

5 CO2: ii)Define MINAS? Give MINAS values of air quality parameter as per latest norms for vehicles. 2+4

6.CO3: i) Define hazardous waste. What are the four characteristics of hazardous waste. Explain them briefly. 2+5

ii) Define through flowchart- the identification process of hazardous waste. 7