Roll No. 3322155

24381

B. Tech. 6th Semester (Civil Engg.)

Examination – May, 2014

Sewrage & Sewage Treatment

Paper : CE-308-F

Time : Three hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all. Question No.1 is ***compulsory*** and solve ***one*** question from each section. Draw neat diagrams and drawings with designs. All questions carry equal marks. Assume suitable data if missing and wheresoever's necessary.

1. (i) Distinguish /State between the following :

(a) Colloidal solids pose fewer problems for removal than suspended solids during sewage treatment.

(b) Aerobic treatment is common & easier than anaerobic treatment of sewage.

(c) Performance of oxidation ponds are majorly influenced by surface area of ponds and climate changes.

(d) Sample collection of dissolved oxygen estimation requires sufficient care.

(e) Flow through velocity in grit chamber is purpose-fully kept very large.

(ii) Describe the following statements :

(f) Describe factors effecting quantity of sanitary sewage.

OR

(g) Name the methods adapted on self purification process of streams.

(h) Write short notes on noise pollution and its control.

(i) What are the main classes of air pollutants ?

(j) What are the noise standards for occupational health and safety ?

OR

(k) Briefly explain the types, sources and control of air pollution.

(l) What is oxygen deficit ? Explain oxygen sag curve. $10 \times 2 = 20$

SECTION – A

2. (i) What is partially combined system of sewerage ? Explain its suitability for Indian conditions.

(ii) State various kinds of sections of sewer used in sewerage system giving their sketches. Comment on their hydraulic properties.

(iii) Explain intercepting trap, master trap, ventilation of sewer. 7 + 7 + 6 = 20

3. (i) A 25 cm sewer has to be constructed inside trenches. Explain with the help of sketches the process of fixing sewer grading & timbering in sewer excavation 3 m below ground level.

(ii) Determine fill load on a 1200 mm i/d NP3 class concrete pipe installed in a trench of 2.8m width and 4 m depth 12 + 8 = 20

SECTION – B

4. (i) Describe in detail the procedure for collection of sewage sample and its BOD estimation.

(ii) Explain difference between BOD & COD .

(iii) Explain self purification of natural stream and dissolved oxygen sag curve. 7 + 7 + 6 = 20

5. (i) The BOD for one day of sewage at 30°C has been found to be 150 mg/l. What will be the BOD after 3 days at 25°C ? Assume KD = 0.15 at 25°C.

(ii) Design a grit chamber for a city of 2.8 lakhs population with a combined sewerage system. Water Supply rate is 135 lpcd; Grit concentration in 50 mg/liter; Grit of 0.2 mm size & above with specific gravity of 2.60 is to be removed at a Temperature of 20 degree C. 8 + 12 = 20

SECTION – C

6. (i) Design an anaerobic filter to treat an average flow of 5 MLD of waste water with the following assumption.

COD of waste water = 400 mg/ltr

Design COD loading = 1.0 kg COD/m3 d

Depth of media = 1.2 m

(ii) Design an oxidation pond for treating domestic sewage of 15000 person supplied with 200 liters per capita per day. The BOD and the suspended solids are each 250 mg/liter. 10 + 10 = 20

7. (i) Differentiate between

(a) Oxidation ditch and oxidation pond

(b) Septic tank and Imhoff tank

(c) Stabilization pond and Anaerobic stabilization

(d) Suspended solids and Dissolved solids remits.

(ii) Write short notes on the following :

(a) Sewage Sickness

(b) Sludge Bulking

(c) Dissolved oxygen sag curve

(d) Effluent irrigation

(e) Gully trap and Strap

(f) Ventilation of house sewers 8 + 12 = 20

SECTION – D

8. (i) Design a septic tank for a listed with the data

Number of user = 125

Discharge = 170 liter per minute

Dislodging period = 1 year

(ii) State whether the statements are true or false.

(a) Noise is unwanted noise.

(b) Noise is measured in hertz.

(c) The maximum sound level beyond which it is certainly regarded as a pollutant is 80 dB.

(d) The unit of measuring the frequency of sound is hertz.

(e) Homan can been sound between 20 to 20000 Hz and is sensitive at 500 to 5000 Hz.

(f) Acceptable noise level for residential and business urban area as per IS 4954-1968 is 40-50 dB or 50 to 60 dB. 13 + 7 = 20

9. (i) Differentiate between

(a) Ln, Leq and Ldn in relation to expression of sound levels.

(b) Continuous noise, intermittent noise and impulse noise

(c) Octane band analysis of noise and noise spectrum.

(d) Noise & Noise rating systems.

OR

(e) Noise levels and their specified Indian standards.

(f) RSPM and TSPM

(ii) Explain in brief the following statements :

(a) How does air pollution affects the different zones of the atmosphere.

(b) Difference between RSPM & TSPM in relation to the air pollution.

(c) How does air pollution affects human's health.

(d) How do winds impact dispersion of pollutants into the ambient air Environment. What is double inversion ?

(e) How does ELR & ALR affect dispersion of an air pollutant into the atmosphere\. Draw various possible behaviours of the emitted plume.

OR

(f) How does the existing atmospheric pressure and moisture prevalent in the atmosphere affect the dispersion of air pollutants into the ambient air atmosphere. 10 + 10 = 20
