

GANPAT UNIVERSITY**B. Tech. Semester: VI (CIVIL) Engineering****Regular Examination April – June 2016****2CI605 ENVIRONMENTAL ENGINEERING-II****Time: 3 Hours / As per Scheme****Total Marks: 70**

- Instruction:**
- 1 This Question paper has two sections. Attempt each section in separate answer book.
 - 2 Figures on right indicate marks.
 - 3 Be precise and to the point in answering the descriptive questions.
 - 4 Assume Suitable data if required.

Section - I**Que. – 1 Attempt the following Question**

- (A) Define: F/M ratio, Mean cell residence time 2
- (B) Assume Suitable Design Criteria Design a Screen Chamber to treat a maximum flow of $0.18\text{m}^3/\text{s}$ of domestic sewage. (Assume dimension of approach channel are $2\text{m} \times 0.6\text{m} \times 0.4\text{m}$) 10

OR**Que. – 1 Attempt the following Question**

- (A) Determine the liquid volume before and after digestion and percentage reduction for 1000 kg (dry basis) of the primary sludge having following characteristics. 8

Characteristics	Primary	Digested
Solids (%)	7	11
Volatile matter (%)	70	66(destroyed)
Specific gravity of fixed solids	2.5	2.5
Specific gravity of volatile solids	1	1

- (B) Differentiate the attached growth process and suspended growth process 4

Que. – 2 Attempt the following Question

- (A) Design a Trickling Filter Unit with rotary system for treating 10MLD of wastewater having a 5 day BOD of 250 mg/L. Assume suitable design criteria wherever required. (excluding Under Drainage System) 11

OR**Que. – 2 Attempt the following Question**

- (A) An ASP is to be designed for 10 MLD domestic wastewater flow to operate at 10 days MCRT and 6 hrs of HRT. Assuming BOD_5 20°C as 175mg/L in influent to the aeration tank, sludge wasting flow equal to $70\text{m}^3/\text{d}$ and returned sludge concentration equal to 8000mg/L , determine the concentration of MLVSS to be maintained in the aeration tank to achieve effluent BOD_5 of 30mg/L . Also determine the recirculation ratio at which plant should be operated. Assume the recirculation ratio at which plant should be operated. Assume the kinetic coefficients $K_d = 0.06\text{d}^{-1}$ and $Y = 0.6$. 11

Que. - 3 Attempt the following Question

- (A) Explain microbial growth pattern with a neat sketch. 4
- (B) The following test results were obtained for a waste water sample size of 100ml. Determine the concentration of total and volatile solids. 5
- Tare mass of evaporating dish = 22.6445 g
Mass of evaporating dish plus residue after evaporation at 105°C = 22.6832g
Mass of evaporating dish plus residue after ignition at 550°C = 22.6795 g
- (C) Explain Sludge Dewatering and Sludge Conditioning. 3

Section - II

Que. - 4 Attempt the following Question

- (A) Describe manholes and drop manholes with neat sketches. 6
- (B) Describe the zones of pollution in river streams. 6

Que. - 4 Attempt the following Question

- (A) Explain crown corrosion and measures taken to reduce its occurrence. 6
- (B) Explain shortly sewage sickness and eutrophication. 6

Que. - 5 Attempt the following Question

- (A) A city discharged 1500 liters per second of sewage into a stream whose minimum rate of flow is 6000 liters per second. The temperature of sewage as well as water is 20° C. the 5 day BOD at 20° C for sewage is 200 mg/l and that of river water is 1 mg/l. The DO content of sewage is zero, and that of stream is 90% of the saturation DO. If the minimum DO to be maintained in the stream is 4.5 mg/l. find out the degree of treatment required. Assume the de-oxygenation coefficient as 0.1 and re-oxygenation coefficient as 0.3. [saturation DO at 20° C is 9.17mg/l] 6
- (B) Define the following terms : 5
- Aerosol, Point Source, Line Source, Area Source, Primary Air Pollutant.

OR

Que. - 5 Attempt the following Question

- (A) Describe oxygen deficit, de-oxygenation and re-oxygenation curve. 6
- (B) Define Air Pollution. Also enlist the different source of Different air pollutant. 5

Que. - 6 Attempt the following Question

- (A) What is solid waste & classified them? 4
- (B) Explain different solid waste collection system in detail. 4
- (C) Describe the important factors to be considered while selection of sewer pipe material. 4

END OF PAPER