Printed Pages : 3

ECE602

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 100602

Roll No.

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15

ENVIRONMENTAL ENGINEERING - 2

Time : 3 Hours] [Total Marks : 100

Note: Attempt all Questions. Assume any missing data suitably.

1 Attempt any four parts of the following : (5×4=20)

(a) Discuss advantages & disadvantages of BOD & COD tests.

(b) How are the organic content measured in wastewater sample? Discuss any one method in detail,

(c) Why are some diseases called "Waterborne"? Explain any one disease in detail.

(d) The BOD of sewage incubated for 5 days at 30°C is 130mg/l. Calculate the BOD at 20°C. Assume K20=0.1

(e) Give the maximum acceptable limits of TDS, turbidity, colour, hardness & pH in drinking water.

(f) Deduce an expression for BOD with curve.

2 Attempt any two parts of the following : (10×2=20)

(a) Derive Stokes law for the settling velocity of a discrete particle in dilute sample suspension. Discuss the limitations.

(b) Differentiate between coagulation & flocculation used in water treatment plant.

(c) At a water treatment plant, 12 million litres of water is treated daily,using alum dosage of 16 mg per litre. Find total quantity of alum used daily.

3 Attempt any two parts of the following : (10×2=20)

(a) Design a rapid sand filter to treat 10 million litres of raw water per day allowing 0.5% of filtered water for backwashing.Half hour per day is used for backwashing.Assume necessary data.

(b) Differentiate between slow sand & rapid sand filters.

(c) In a water treatment plant, raw water is passed through a filter bed of uniform sand at a velocity of 5m/hour. The filter is made of sand grains of diameter =0.4mm, shape factor=0.85 & specific gravity =2.65, the depth of the bed is 0.67m & porosity is 0.4. Determine the head loss through the bed. (Take density of water = 968kg/m^3 & dynamic viscosity =1.0 × 10^{-3} kg/m)

4 Attempt any two parts of the following : (10×2=20)

(a) Differentiate between activated sludge process & trickling filter process.

(b) Determine the size of high rate trickling filter for the following data:

Flow = 4 Mld, Recirculation ratio =1.4,BOD of raw sewage=250mg/l,BOD removed in primary clarifier=25%,Final effluent BOD desired = 50mg/l.

(c) Design a facultative aerated lagoon to serve 50,000 people.For sewage flow @ 180 lpcd=7200cu.m/day.Raw BOD_5 = 275mg/l & final BOD_5 is not exceed 30mg/l in winter.Ambient air temperature in January is 20°C and in summer 37°C.

5 Attempt any four parts of the following : (5×4=20)

(a) What is septic tank. Discuss advantages & disadvantages of centralised & decentralised wastewater treatment.

(b) What is sludge thickening ? Give detail of gravity thickening.

(c) What is UASBR? Discuss its features.

(d) Differentiate between anaerobic fixed bed reactor,fluidized bed reactor,expanded bed reactor.

(e) What is anaerobic digestion? Explain in detail.

(f) Design a septic tank for 300 users.Water allowance is 120 litres per head per day. Detention period may be taken as 8 hours.Draw a neat sketch of a septic tank.