B. Tech.

(SEM. VI) THEORY EXAMINATION 2010-11

RURAL WATER SUPPLY AND SANITATION

Time : 3 Hours   *Total Marks : 100*

Note :— (1) Attempt **ALL** questions.

(2) Assume suitably any data not given.

1. Attempt any **two** parts :   **(2×10=20)**

   (a) How will environmental awareness support sustainable development of the environment ?

   (b) What are the problems of rural water supply and sanitation ?

   (c) Write short notes on :

      (i) Human rights and environment

      (ii) National policy.

2. Attempt any **two** parts :   **(2×10=20)**

   (a) What is water demand ? Briefly discuss various types of demands to be covered in a water supply scheme.

   (b) What are the two major types of sources of water supply ? Discuss the comparative merits and demerits of both these types of sources.

(c) A gravity well has a diameter of 60 cm. The depth of water in the well is 50 meter before pumping is started, when pumping is being done at the rate of 2000 *l*/min the drawdown in a well 15 meter away is 4 m and in another well 20 m away is 2·50 m. Determine :

(i) Radius of zero drawdown

(ii) Coefficient of permeability

(iii) Drawdown in the well.

Attempt any **two** parts : $(2×10=20)$

(a) Describe the following methods of water distribution highlighting their advantages with figure :

(i) gravitational system

(ii) combined gravity and pumping system.

(b) What are different materials which are commonly used for water supply pipe ? Discuss their comparative merits and demerits.

(c) Discuss the factors for site selection of water treatment plant. Draw the flow sheet showing the different treatment units of water purification plant.

4. Attempt any **four** parts : $(4×5=20)$

(a) What are the factors considered while estimating the quantity of sewage of a small town ?

(b) Discuss the comparative merits and demerits of the separate system and combined system of sewerage.

(c) A 30 cm dia sewer with an invert slope of 1 in 400 is flowing 1/3rd of full depth. Calculate the velocity and rate of flow in the sewer. Is it self cleaning velocity ? Use n = 0·015.

(d) Design a circular sewer for providing a residential colony in a town, having the following data :

Area of the colony = 36 hectares

Population = 6500

Per-capita water consumption = 150 lphd

Critical design rainfall intensity = 4 cm/hr

General available groundslope = 1 in 800

Assume any other data, not given, and if needed.

(e) Describe the laying of a sewer line in a trench.

(f) Design a septic tank for 30 users.

5. Attempt any **two** parts : **(2×10=20)**

(a) What are specific issues and problems encountered in rural sanitation ?

(b) Describe briefly sanitary landfill method of refuge disposal.

(c) Write short note on any **two** of the following ;

(i) Controlled dumping

(ii) Composting

(iii) Excreta disposal.