(i)	Population	: 10,000
(ii)	Area	: 40 Hectares
(iii)	Per capita water supply	: 135 lpcd
(iv)	Sewage generation / water supply ratio	: 0.8
(v)	Peak factor	: 3.0
(vi)	Coefficient of runoff	: 0.55
(vii)	Critical design rainfall intensity	: 4 cm / hour
(viii)	General available ground slope	: 1 in 900
(ix)	Manning's coefficient of roughness (n)	: 0.013

(b) Distinguish between 'manhole' and 'drop manhole'. With the help of a neat sketch, explain various components of a manhole highlighting the considerations for its location and spacing.

(c) What are small bore sewer systems? Explain their principle of working and operation highlighting advantages in rural areas.

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ECE503

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

PAPER ID : 100503

Roll No.

B.Tech. (Civil Engineering) (Sem. V)

SPL. THEORY EXAMINATION, 2014-15

ENVIRONMENTAL ENGINEERING - I

Time : 2 Hours] *[Total Marks : 50*

Note: Attempt all the questions. Assume suitably any data, if required.

1. Answer any four parts of the following: (4×3.5=14)

(a) Define water demand. Briefly discuss various types of water demand in a water supply scheme to be implemented in a city.

(b) What is 'per capita water supply'? Discuss the basic needs and factors affecting the consumption of water in a city.

(c) Enumerate various kinds of water sources and their characteristics. Also mention the factors governing the selection of a source of water supply.

(d) Using logistic curve method, determine the water requirement of a city, to be provided with per capita water supply at the rate of 135 lpcd in the year 2031, whose census data are given in the following table:

Year	Population
1971	40,000
1991	1,90,000
2011	3,20,000

(e) What is the basic function of an intake? With the help of a diagram, explain the working of a single well type river intake.

(f) What is the function of an impounding reservoir in water supply? Explain the procedure for the determination of storage capacity of impounding reservoirs.

2. Attempt any two parts of the following: (6×2=12)

(a) Discuss the structural requirements of closed conduits used in water supply. Also explain the procedure to calculate change in pipe length and resulting longitudinal stress due to temperature induced expansion and contraction of such conduits.

(b) Enumerate the main advantages and limitations of PVC pipes. Briefly discuss the precautions in their handling and storage and laying and jointing procedure.

(c) Describe the importance and mode of working of scour valves, air release valves and check valves in a water supply system.

3. Attempt any two parts of the following: (6×2=12)

(a) Distinguish between 'service reservoirs' and 'balancing reservoirs'. Discuss the important considerations in providing balancing storage, breakdown storage and fire storage of distribution reservoirs.

(b) Explain Hardy-Cross method of pipe network analysis in water distribution system.

(c) Discuss the importance of plumbing system in buildings. With the help of a neat diagram, explain how ferrule, goose neck, service pipe, stop cock and water meter are arranged in a house water connection.

4. Attempt any two parts of the following: (6×2=12)

(a) Define 'self-cleansing velocity' in sewers.

Using Manning's equation, design a circular sewer running full for a residential colony for the following data: