U.S.N | | | | | | | | | | |

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Fifth Semester, B.E. - Civil Engineering

Semester End Examination; Dec. -2014

Environmental Engineering - I

Time: 3 hrs *Max. Marks: 100*

***Note**: i) Answer any **FIVE** full questions, selecting at least **TWO** full questions from each part.*
ii) Assume suitable missing data if any.

PART - A

1. a. Briefly explain need of protected water supply. 5

   b. What is design period? List factors affecting design period of water supply scheme. 5

   c. From census data of town given below, find population after three decades by
   (i) Arithmetic increase method ii) Geometric increase method. 10

Year	1981	1991	2001	2011
Population	100000	109000	116000	128200

2 a. List different water Intake. Explain any one with neat sketch. 10

   b. For water supply of town, water is pumped from a river 2 km away into a reservoir. The maximum difference of levels of water in river and reservoir is 25 m, the population of town is 80000 and per capita water demand is 125 Lpcd. If the pumps are to operate for a total of 8 hours and the efficiency of pumps is 80%, determine the H.P. of the pumps. Assume friction factor (4f) as 0.03 and velocity of flow as 2m/s, and maximum daily demand as 1.5 times the average demand. 10

3 a. Define; i) wholesome water ii) potable water 4

   b. Write health significance of fluoride and nitrate in water. 6

   c. Write note on water borne diseases. 10

4 a. State necessity of aeration. Explain briefly different types of aerators. 10

   b. Write conventional water treatment units flow chart. Briefly bring out impurities removed in each of units. 10

PART - B

5 a. Define detention period and surface overflow rate for sedimentation tank. 4

   b. A water supply scheme requires daily peak demand of 15 MLD. Design a suitable rectangular sedimentation tank assuming the velocity of flow in the tank as 250 mm/min. and the detention period of 4 hours. Assume depth of tank as 4.0 m and free board of 0.5 m. 8

Contd….2

	c.	What do you mean by coagulation and flocculation?	4
	d.	List common coagulants used in water treatment.	4
6. a		Briefly write four phenomenons on which filtration process works for water treatment.	8
	b.	Compare slow and rapid sand filter.	6
	c.	Design rapid sand filter for treating water supplied to a town having population of one lakh assuming peak per capita demand as 270 Lpcd. The rate of filtration may be taken as 4500 lit/hour/sq.m. Assume three set of filter units.	6
7	a.	Explain in brief different methods of disinfection of water.	10
	b.	Explain removal of permanent hardness by Zeolite water softener process.	10
8	a.	List and explain different water distribution system types.	10
	b.	List and explain any two layout of water distribution to consumer.	10

* * * * *