

8. What is a balancing tank ? State its importance in the distribution system. Explain how the capacity of a balancing tank is determined, when pumping is done between 6 am and 6 pm, using mass curve method. 15

(Compulsory Question)

9. Write briefly on the following :
- (a) Define per capita demand. How is it useful in water supply scheme planning ?
 - (b) Differentiate between shallow and deep wells. Compare the two from the quantity and quality point of view.
 - (c) What are intakes ? What are the essential components of an intake structure ?
 - (d) Derive the basic equation to find out the break horse power (BHP) of the pump required to pump water at rate of $Q \text{ m}^3/\text{s}$ against a dynamic head of $H \text{ m}$.
 - (e) “Although conductivity does not have a water quality standard, it is considered as a parameter to assess water quality.” Why ?

J-21-0005

B. Tech. EXAMINATION, 2021

Semester V (CBCS)

ENVIRONMENTAL ENGINEERING-I

CE-505

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. 9 is compulsory.

Section A

1. A 30 cm gravity well is being pumped at a rate of 1,200 lpm. Measurements made in nearby test wells 5 m and 25 m away yielded drawdown 4.5 m and 1.0 m, respectively. The distance of the water table

above the bottom of the well is 80 m. Determine :
(i) the drawdown in the well during pumping (ii) the specific yield of the well. 15

2. (a) What are the various factors needed to be considered for selection of water supply sources ? 7.5
(b) Derive the equation for determining the storage capacity and yield of reservoir. 7.5

Section B

3. (a) What are the common impurities found in natural water ? Explain its effect on the quality. 7.5
(b) Distinguish clearly between water quality criteria and standards. Critically examine the use of MPN as bacteriological water quality standard. 7.5
4. Compute the population of the year 2000 and 2006 for a city whose population in the year 1930 was 25,000 and in the year 1970 was 47,000. Make use of geometric increase method. 15

Section C

5. Describe the different methods of measurement of PH value. Discuss the advantages and disadvantages of pressure filters over rapid gravity filters. 15
6. Write short notes clearly differentiating the following terms as applied to water treatment :
(a) Lime soda process and zeolite process of softening of water 7.5
(b) Double Filtration and Indepth Filtration. 7.5

Section D

7. (a) List the suitability and criteria for choosing different types of pumps used in water supply pumps. Define rotary pumps and also describe the advantages and disadvantages of rotary pumps. 7.5
(b) Clearly differentiate between continuous and intermittent supply systems of water. Compare the merits and demerits. 7.5

- (f) Differentiate between available head and residual head.
- (g) What is coagulation ? What is the action of coagulants when added to raw water ?
- (h) What is the biological purification mechanism involved in a slow sand filter ?
- (i) Calculate the amount of bleaching powder of 30 percent available chlorine to be used to disinfect a flow of 3 lakh litres/d at a chlorine dose of 1 mg/l.
- (j) What is the basic principle in the base-exchange process of water softening ? **1.5×10=15**