

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. Which is the correct statement regarding per capita demand?
 - a) Daily water required by an individual
 - b) Water required for various purposes by a person
 - c) Water required by an individual in a year
 - d) Annual average amount of daily water required by one person
2. Consider the following statements.
 - i. Capacity of the pump
 - ii. Number of pump units
 - iii. Discharge conditionThe selection of a particular type of pump depends on which of the following?
 - a) i, ii, iii
 - b) i only
 - c) ii, iii
 - d) i, iii
3. Which of the following statement is wrong regarding filtration?
 - a) It removes fine particle
 - b) It removes suspended solids not removed by sedimentation
 - c) It does not remove turbidity
 - d) It removes color
4. In Electro-dialysis, the electric energy which required is _____
 - a) Directly proportional to cation permeable membrane
 - b) Directly proportional to anion permeable membrane
 - c) Directly proportional to salt concentration
 - d) Inversely proportional to salt concentration
5. Recommend acceptable quality standards as per BIS 10500 : 1983 for fluoride and nitrates.
6. What are the external forces acting on water transmission main if the pipe is laid under heavy traffic?
7. Recommend various processes required to remove the various types of impurities.
8. Compare gravity system of distribution and pumping system of distribution.

PART B - (4 X16 = 64 marks)

09. (a) (i) The population of a town panchayat as per past census records are furnished (16)
below. Calculate the population in the year 2031 and 2041 using the following
methods.

(i) Arithmetical increase method (5)

(ii) Geometrical increase method (6)

(iii) Incremental increase method (5)

| | | | | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|-------|--------|
| Census year | 1941 | 1951 | 1961 | 1971 | 1981 | 1991 | 2001 | 2011 |
| Population | 44642 | 50487 | 56816 | 63859 | 71458 | 78543 | 88131 | 100290 |

(OR)

- (b) (i) Prepare a list of factors which are to be considered in the selection of source for a (8)
water supply scheme? How does the quality of ground water differ from surface
water?
- (ii) Explain the factors that affect the rate of water demand. (8)
10. (a) (i) Classify the different types of intakes based on source and also explain with a (16)
neat sketch.

(OR)

- (b) (i) Estimate roughly the sizes of supply conduits leading to an adequate service (16)
reservoir serving,
- (a) a relatively small town of 25,000 population
- (b) a relatively large city with industrial establishments having a
population of 5 lakh people.

Also find the hydraulic gradients of which the pipelines are proposed to be
laid. Assume any suitable data according to Indian conditions, where required.

11. (a) (i) A new township is to have a population of 6,00,000 and 90 Lpcd of water supply. (16)
Analyse and design a rapid sand filter unit with details of under drainage and
water washing including gutter arrangement. Limit the maximum spent backwash
water as 3.5%.

(OR)

- (b) (i) Explain the sedimentation by coagulation process using alum and state the merits (8)
and demerits of using alum.
- (ii) What are the methods of disinfection and state the quality requirements of a (8)
disinfectant?

12. (a) (i) Explain the techniques involved in defluoridation. (16)

(OR)

- (b) (i) Identify the flow in each pipe in the loop shown in fig. use Hardy cross method for analyzing the loop. Consider C_H as 110 for all pipes. (16)

