

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Backlog), May 2019

B. Tech in Civil Engineering, Semester IV

Roll No.....

CE407: ENVIRONMENTAL ENGINEERING-I

Time: 3 hours

Max. Marks: 100

Instructions to students:

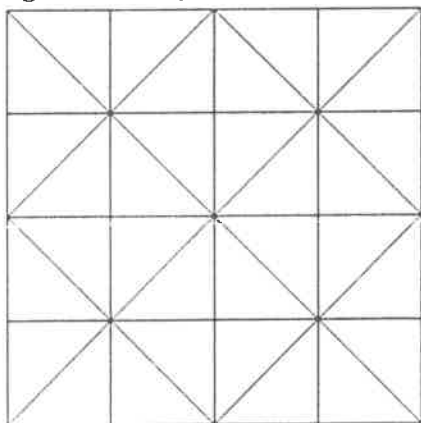
1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. As per IS : 1172-1963, water required per head per day for average domestic purposes, is
 - (a) 50 litres
 - (b) 65 litres
 - (c) 85 litres
 - (d) 135 litres
- ii. Water distribution system suitable for old cities and towns having no definite pattern of roads :
 - (a) Tree system
 - (b) Ring system
 - (c) Radial system
 - (d) Grid iron system
- iii. C.I. Pipes cannot be used for pressure greater than :
 - (a) 9 Kg/ Cm²
 - (b) 7 Kg/ Cm²
 - (c) 5 Kg/ Cm²
 - (d) 10 Kg/ Cm²
- iv. According to Kuichling's formula, fire demand in litres per minute for a population of P thousands, is:
 - (a) $3182 \sqrt{P}$
 - (b) $1136.5 \left[\frac{P}{10} + 10 \right]$
 - (c) $4637\sqrt{P} [1 - 0.01 P]$
 - (d) $5663 \sqrt{P}$
- v. According to Indian Standard (IS:458-1961), "the Reinforced concrete , heavy duty pipes " are classified in :

- (a) NP 2 Class
 - (b) P3 Class
 - (c) NP 3 Class
 - (d) P2 Class
- vi 1 NTU is equal to :
- (a) 0.53 JTU
 - (b) 0.0013 JTU
 - (c) 0.053 JTU
 - (d) 0.035 JTU
- vii Unit of color measurement:
- (a) TPU
 - (b) TCU
 - (c) JTU
 - (d) NTU
- viii Biochemical Oxygen Demand (B.O.D.) of safe drinking water must be:
- (a) Nil
 - (b) 5
 - (c) 10
 - (d) 15
- ix Distribution mains (Generally for population over 50,000) of any water supply, is normally designed for its average daily requirement:
- (a) 100%
 - (b) 150%
 - (c) 200%
 - (d) 225%
- x For a network of distribution pipes of a proposed township shown in the below figure, the layout of distribution system, is:



- (a) dead end system
- (b) grid-iron system
- (c) ring system
- (d) radial system

Q.2 Short answer type questions (4 questions @ 2.5 marks)

10

Briefly describe the following pipes :

- i. Asbestos pipes
- ii. Plastic pipes

Briefly explain the following terms:

i. Type-II Settling

ii. Pathogen Indicator in water

- Q.3A Define Disinfection. Explain the following questions w.r.t. disinfection: 05
i. Reactive species of chlorine (Primary disinfectant)
ii. Why Cl_2 gas preferred for disinfection purpose?
- Q.3B Analyze the following physical water quality parameters under the 05
subheadings i.e. (a) Sources (b) Impacts (c) Measurement
i. Taste and odor
ii. Color
- Q.4A Evaluate the performance of Effluent Treatment Plant (ETP) that you have 05
observed in Jaipur Integrated Text Craft Park Private Limited RIICO industrial
area Bagru Jaipur, during your recent Industrial visit. Also draw the process
flow chart of ETP operational units.
- Q.4B Write the differences between Slow sand filter and Rapid Sand filter. 05
- Q.5A Draw the generalized curve of the "Break Point Chlorination" and also discuss 05
the same in detail.
- Q.5B Draw a neat sketch of water supply system for a small community having 5000- 05
10000 inhabitants. Write a short note on water supply needed for potable and
flushing water.
- Q.6A Write the short note on the following : 05
i. Jet pump
ii. Air lift pump
- Q.6B Derive the Stokes Equation during settling process of discrete particles in dilute 05
suspension.
- OR
- Q.6B Find the terminal settling velocity of a spherical particle with diameter 0.5 mm 05
and specific gravity of 2.65 settling through water at 20°C.
Given : Density of water = 998.2 kg/m³
Dynamic viscosity of the water = 1.002×10^{-3} N.s/m² at 20°C.
- Q.7A Draw a neat sketch of the layout of a conventional water treatment plant. 05
- Q.7B Define water demand. How will you categorize the water requirements for 05
different usage?
- OR
- Q.7B Prepare a questionnaire for establishing the feasibility of community based RO 05
system in the context of technology, capacity, public acceptability and project
feasibility.
- Q.8A In water treatment plants, chemical coagulation is usually accomplished by the 10
addition of metallic salts, then explain the various theories behind this
coagulation process.

Q.9A Explain the different "Multiple Pump System" in order to achieve variable discharge at maximum efficiency. 10

Q.9B Explain in detail with proper diagram showing the position of main pipe, branches, sub-mains, different valves and also direction of flow of water in the network the various "Water distribution Systems " adopted for different kinds of cities. 10

OR

Q.9B a) Discuss the logistic curve method for determining the future populations of a locality. 10

b) In two periods each of 20 years, a city has grown from 40,000 to 1, 60,000 and then 2, 80,000. Determine:

(i) Saturation population

(ii) Equation of logistic curve and

(iii) Expected population after the next 15 years