

Total No. of Questions: 6

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Enrollment No.....



Faculty of Engineering
End Sem (Even) Examination May-2018
CE3CO02 Water & Waste Water Engineering

Programme: B.Tech.

Branch/Specialisation: CE

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. Capacity of soil to absorb moisture is called as: **1**
(a) Porosity (b) Permeability
(c) Infiltration Capacity (d) None of these
- ii. If P is Population of a town in thousands. Q is fire demand in **1**
litters/min, the Empirical formula: $Q=46040\sqrt{P}(1 - 0.01\sqrt{P})$ is
Suggested by:
(a) Freeman
(b) Kuichling
(c) National Board of fire under-writers
(d) None of these
- iii. Cast iron pipes are generally used in water lines because of: **1**
(a) Durability (b) Its longer life
(c) Easiness in jointing (d) All of these
- iv. When the reduced level of the source of water is at lower level **1**
than the R.L. of the treatment plant, water is generally supplied :
(a) By gravitational method (b) By pumping method
(c) Both (a) and (b) (d) None of these
- v. The chlorination of water removes : **1**
(a) Hardness (b) Sediments (c) Bacteria (d) Suspended solids
- vi. Cleaning of slow sand filter is normally done between: **1**
(a) 4 to 8 days (b) 8 to 15 days
(c) 25 to 35 days (d) 60 to 90 days

P.T.O.

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- vii. For the design of sewers in India. The % of sewage discharge is assumed as: **1**
 (a) 25-30% of water supplied from water works
 (b) 75-80% of water supplied from water works
 (c) 100% of water supplied from water works
 (d) None of these
- viii. The minimum and maximum diameter of sewers, generally adopted in the designs, may be: **1**
 (a) 15 cm and 100 cm (b) 15 cm and 300 cm
 (c) 25 cm and 450 cm (d) None of these
- ix. The most common method of waste water disposal is: **1**
 (a) Evaporation (b) Dilution in surface water
 (c) Rapid infiltration (d) Slow sand filtration
- x. BODs represents 5 days biochemical oxygen demand at a temperature of: **1**
 (a) 0°C (b) 20°C (c) 30°C (d) None of these

- Q.2 i. What is fire demand? **2**
 ii. What are the reasons of failures of tube-well and how it can be reduced? **3**
 iii. Explain in detail the methods of measurement of an open well yield? **5**
- OR iv. The following is the population data of a city, available from past census records. Determine the population of the city in 2011 by (a) arithmetical increase method (b) incremental increase method. **5**

Years	1951	1961	1971	1981	1991
Population (P)	26800	41500	57500	68000	74100

- Q.3 i. What do you mean by storage and distribution reservoirs? **2**
 ii. What are the selection criteria for the site of an intake structure and explain the working of lake and reservoir intake structure with neat sketch. ? **8**
- OR iii. Water has to be supplied to a town with one lakh populations at the rate of 150 lit/c/day from a river 2000 m away. The difference

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- in elevation between the lowest water level is the sump & reservoir is 36 m .If the demand has to be supplied in 8 hours .Determine size of main and B.H.P of the pumps required. Assume, maximum demand as 1.5 times of average demand, $f=0.0075$, velocity in pipe 2.4 m/sec & efficiency of pump 80 %.
- Q.4 i. Explain the various methods of disinfection in water for public water supply schemes. **3**
 ii. Explain working of slow sand gravity filter and rapid sand gravity filter with the help of neat sketch. **7**
- OR iii. Water has to purify for a town whose daily demand is 9×10^6 litres/day .Design a suitable sedimentation tank of the water work fitted with the mechanical sludge remover .Assume the velocity of flow in the sedimentation tank as 22 cm/min and detention period of 8 hours. Assume depth of water as 3.5 m. **7**
- Q.5 i. Describe conservancy system and water carriage system. **4**
 ii. What are the importance of sewer appurtenances and explain working of manhole and drop manhole with neat sketch? **6**
- OR iii. Write short notes on : **6**
 (a) Methods of designing of sewer (b) Self cleansing velocity
 (c) Maintenance of sewer
- Q.6 i. Explain **4**
 (a) Self purification capacity (b) Sewage sickness
 ii. What are the methods of waste water disposal, Explain the land treatment in detail? **6**
- OR iii. Why the examination of sewage is necessary and how physical & chemical examination of sewage is done? **6**

Marking Scheme

CE3CO02 Water & Waste Water Engineering

Q.1	<p>i. Capacity of soil to absorb moisture is called as: 1 (c) Infiltration Capacity</p> <p>ii. If P is Population of a town in thousands. Q is fire demand in litters/min, the Empirical formula: $Q=46040\sqrt{P(1 - 0.01\sqrt{P})}$ is Suggested by: 1 (c) National Board of fire under-writers</p> <p>iii. Cast iron pipes are generally used in water lines because of: 1 (d) All of these</p> <p>iv. When the reduced level of the source of water is at lower level than the R.L. of the treatment plant, water is generally supplied : 1 (b) By pumping method</p> <p>v. The chlorination of water removes : 1 (c) Bacteria</p> <p>vi. Cleaning of slow sand filter is normally done between: 1 (d) 60 to 90 days</p> <p>vii. For the design of sewers in India. The % of sewage discharge is assumed as: 1 (b) 75-80% of water supplied from water works</p> <p>viii. The minimum and maximum diameter if sewers, generally adopted in the designs, may be: 1 (b) 15 cm and 300 cm</p> <p>ix. The most common method of waste water disposal is: 1 (b) Dilution in surface water</p> <p>x. BODs represents 5 days biochemical oxygen demand at a temperature of: 1 (b) 20°C</p>			
Q.2	<p>i. Explanation fire demand 2</p> <p>ii. Reasons of failures of tube-well 2 marks How it can be reduced 1 mark 3</p> <p>iii. Methods of measurement of an open well yield 5 For each method 2.5 marks (2.5 marks * 2)</p>			
OR	<p>iv. For arithmetical increase method 2.5 marks For incremental increase method 2.5 marks. 5</p>			
Q.3	<p>i. For storage 1 mark Distribution reservoirs 1 mark</p> <p>ii. Selection criteria for the site of an intake structure 2 marks Working of lake and reservoir intake structure 4 marks Neat Sketch 2 marks</p>			2 8
OR	<p>iii. For size of main comes 0.65 cm 5 marks For BHP if Ans comes 822 HP 3 marks</p>			8
Q.4	<p>i. For each methods of disinfection in water 1 mark (1 mark * 3)</p> <p>ii. For working of slow sand gravity filter 2.5 marks Rapid sand gravity filter 2.5 marks Neat sketch. 2 marks</p>			3 7
OR	<p>iii. Capacity & length 3.5 marks Cross sectional area & width 3.5 marks</p>			7
Q.5	<p>i. Conservancy system 2 marks Water carriage system 2 marks</p> <p>ii. Importance of sewer appurtenances 1 mark Working of manhole 2.5 marks Drop manhole with neat sketch 2.5 marks</p>			4 6
OR	<p>iii. (a) Methods of designing of sewer 2 marks (b) Self cleansing velocity 2 marks (c) Maintenance of sewer 2 marks</p>			6
Q.6	<p>i. (a) Self purification capacity 2 marks (b) Sewage sickness 2 marks</p> <p>ii. Methods of waste water disposal 2 marks Explanation of the land treatment in detail 4 marks</p>			4 6
OR	<p>iii. Examination of sewage is necessary 2 marks Physical & chemical examination of sewage 4 marks.</p>			6
