Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrolment No.....

Faculty of Engineering

End Sem Examination May-2023

CE3CO20 Environmental Engineering -I

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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. The average quantity of water (in lpcd) required for domestic purposes according to IS code is- **1**

(a) 100 (b) 135 (c) 70 (d) 120

ii. In which type of water demand, minimum average consumption of water takes place? **1**

(a) Domestic water demand

(b) Fire demand

(c) Institutional and commercial water demand

(d) Industrial water demand

iii. The method of distribution of water is divided into how many types- **1**

(a) 1 (b) 2 (c) 3 (d) 4

iv. In which of the following distribution system, the clean water flows entirely under gravity? **1**

(a) Gravity system (b) Pressure system

(c) Pumping system (d) Both (a) & (d)

v. What is the most common used coagulant? **1**

(a) Alum (b) Ferric sulphate

(c) Limestone (d) Coal

vi. The treatment which are generally given to treat raw water supplies, follow the sequence: **1**

(a) Screening, Sedimentation, Disinfection, Filtration

(b) Screening, Sedimentation, Filtration, Disinfection

(c) Disinfection, Screening, Sedimentation, Filtration

(d) Sedimentation, Filtration, Disinfection, Screening

P.T.O.

vii. What is noise? **1**
(a) Desirable sound
(b) Desirable and unwanted sound
(c) Undesirable and unwanted sound
(d) Undesirable and wanted sound

viii. What is the permissible ambient noise pollution level in the residential zone during night-time as per CPCB standard? **1**
(a) 40 dB (b) 45 dB (c) 50 dB (d) 55 dB

ix. The 'Municipal Solid Waste' is the term used to describe which kind of solid waste? **1**
(a) Hazardous (b) Toxic
(c) Non-hazardous (d) Less toxic

x. Identify the following ones which can be recycled many times? **1**
(a) Plastic (b) Wood
(c) Organic materials (d) Aluminium

Q.2 i. Define galleries. **2**

ii. Explain ground water velocity. **2**

iii. Explain various methods for population forecasting. **6**

OR iv. The following data have been noted from census department: **6**

Census (year)	Population
1940	10000
1950	15000
1960	20000
1970	18000

Forecast population for the year 1980 and 1990 by arithmetic increase method and geometric increase method?

Q.3 i. What is leak detection? **2**

ii. Explain the types of different water distribution system. **3**

iii. What are the various types of valves and pipes used in conveying water in water supply scheme? **5**

OR iv. Explain hardy cross method with expression. **5**

Q.4 i. Write down names of various water borne deceases. **4**

ii. Explain the methods of coagulation & slow send filtration. **6**

OR iii. Prepare a flow chart of water treatment scheme with a short explanation. **6**

Q.5 i. What are the different sources of noise pollution? **3**

ii. Define noise pollution. Also write down different methods of measurement of noise pollution. **7**

OR iii. What are the different control methods of noise pollution? **7**

Q.6 Attempt any two:

i. Discuss in detail about energy recovery and its process. **5**

ii. Write in detail about the characteristics of solid waste management. **5**

iii. What are the various methods of disposal of solid waste? Discuss any one in detail. **5**

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Scheme of Marking

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Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	b)135	**1**
	ii)	b) Fire demand	**1**
	iii)	d) 4	**1**
	iv)	a) Gravity system	**1**
	v)	a) Alum	**1**
	vi)	~~d) Sedimentation, Filtration, Disinfection, Screening~~	**1**
	vii)	c) Undesirable and unwanted sound	**1**
	viii)	b) 45 dB	**1**
	ix)	c) Non-hazardous	**1**
	x)	d) Aluminium	**1**
Q.2	i.	2 marks for correct definition.	**2**
	ii.	2 marks for correct definition.	**2**
	iii.	2 marks for each method (Any 3)	**6**
OR	iv.	3 marks for calculation by each method.	**6**
Q.3	i.	2 marks for correct definition.	**2**
	ii.	1 mark for each system.	**3**
	iii.	2.5 mark each for valves & pipes.	**5**
OR	iv.	2 marks for statement, 3 mark for explanation & ~~1 mark for~~ expression.	**5**
Q.4	i.	1 mark for each disease.	**4**
	ii.	~~1 mark for~~ each characteristic.	**6**
OR	iii.	2 marks for flow chart & 4 marks for ~~correct schemes~~.	**6**
Q.5	i.	1 mark for each source.	**3**
	ii.	2 marks for definition & 5 mark for each method (any 5).	**7**
OR	iii.	1 mark for each method.	**7**
Q.6			
	i.	2 marks for definition & 3 mark for process.	**5**
	ii.	1 mark for each characteristic.	**5**
	iii.	3 marks for methods & 2 marks for explanation.	**5**

Q → 2 IV (or) Solution → First Solution

* Arithmatic Increase Method

Year	Population	Diff	%
1940	10000	5000	$\frac{5000}{10000}\times 100 = 50\%$
50	15000	5000	$\frac{5000}{15000}\times 100 = 33.33\%$
60	20000	2000	$\frac{2000}{20000}\times 100 = 10\%$
70	18000		

$$\bar{x} = \frac{5000+5000+2000}{3} = 4000 \qquad \bar{y} = \frac{50+33.33+10}{3} = 31.11\%$$

$$P_n = P_0 + \bar{x}n.$$

$$P_{1980} = 18000 + 4000 \times 1$$

$$= 22000 \text{ Ans}$$

$$P_{1990} = 18000 + 4000 \times 2$$

$$= 26000 \text{ Ans}$$

* Geometric Increase Method

$$P_n = P\left[1 + \frac{\bar{y}\%}{100}\right]^n$$

$$P_{1980} = 18000\left[1 + \frac{31.11}{100}\right]^1 \Rightarrow 18000 \times 1.311$$

$$= 23599.8 \text{ Ans}$$

$$P_{1990} = 18000\left[1 + \frac{31.11}{100}\right]^2 = 18000 \times (1.311)^2$$

$$= 30936.978 \text{ Ans}$$

(II^nd Possibilities)

Year	Population	Increamental (Diff)	a/o
1940	10000	⊕ 5000	(5000/10000)×100 = +50 %
50	15000	⊕ 5000	(5000/15000)×100 = +33.33 %
60	20000	⊖ 2000	(-2000/20000)×100 = +10 %
70	18000		

$$\bar{x} = \frac{5000+5000-2000}{3} = 2666.67$$

$$\bar{y} = \frac{50+3333-10}{3}$$

$$\bar{y} = 24.44$$

Arithmatic

$$P_n = P_0 + \bar{x}n$$

$$P_{1980} = 18000 + 2666.67 \times 1$$

$$= 20666.67 \quad \text{Ans}$$

$$P_{1980} = 18000 + 2666.67 \times 2$$

$$= 23333.34 \quad \text{Ans}$$

Geometric

$$P_{1980} = P\left[1+\frac{24.44}{100}\right] = 18000\left[1.244\right]^1$$

$$= 22399.2$$

$$P_{1990} = 18000\left[1.244\right]^2 = 27855.64$$