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RETEST EXAMINATION - 2019

Semester : 5th

Subject Code : CT 506

ENVIRONMENTAL ENGINEERING

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* questions of PART – A are compulsory.
2. Answer *all* questions from PART – B.

PART – A

Marks – 25

1. Choose the correct answer : 1×25=25

   (i) The fire demand of a city may be worked out by

   (a) Kuichling's formula

   (b) Freeman formula

   (c) Under Writers formula

   (d) All of the above

[Turn over

(ii) The prescribed hardness limit of potable water ranges between

(a) 50 to 75 ppm

(b) 75 to 115 ppm

(c) 100 to 150 ppm

(d) 150 to 200 ppm

(iii) After cleaning a slow sand filter, the filtered water is not used for

(a) 6 hours to 12 hours

(b) 12 hours to 18 hours

(c) 18 hours to 24 hours

(d) 24 hours to 36 hours

(iv) Hard water contains

(a) Calcium

(b) Magnesium bicarbonates

(c) Magnesium sulphate

(d) All of the above

(v) In a well-planned city, the layout of distribution pipes generally adopted, is

(a) Grid-iron system

(b) Interlaced system

(c) Reticulation system

(d) All of the above

(vi) When gravity and pumping systems of water distribution are adopted, the type of distribution reservoir, is

(a) Elevated tank

(b) Ground source reservoir

(c) Intz tank

(d) Stand pipe

(vii) The best process of disinfection of public water supply, is by

(a) Boiling

(b) Chlorination

(c) Adding lime

(d) Adding ozone

(viii) The dilution ratio at which the odour is hardly detectable is generally called threshold odour number and for public supplies it should not exceed

(a) 3 (b) 5

(c) 7 (d) 9

(ix) Normal values of overflow rate for plain sedimentation tanks in litres/hr/m2, generally range between

(a) 100 to 250 (b) 250 to 500

(c) 500 to 750 (d) 750 to 1000

(x) Pick up the correct statement from the following :

(a) Due to boiling, the bacteria present in water can be destroyed.

(b) Lime may be used for softening hard water.

(c) Excess lime when added to water, raises the pH value of water.

(d) All of the above.

(xi) According to Buston's formula, fire demand in litres per minute for a population of P thousands, is

(a) $3182\ P^{1/2}$

(b) $1136.5\ [(P/10) + 10]^{1/2}$

(c) $4637\ P\ (1 - 0.01\ P)^{1/2}$

(d) $5663\ P^{1/2}$

(xii) For maximum alkalinity of water, pH value should be

(a) zero

(b) less than 7

(c) more than 7

(d) 14

(xiii) The population growth curve is

(a) S-shaped curve

(b) Parabolic curve

(c) Circular curve

(d) Straight line

(xiv) The bacteria which may survive with or without free oxygen, are called

(a) Aerobic bacteria

(b) Anaerobic bacteria

(c) Facultative bacteria

(d) None of the above

(xv) Aeration of water is done to remove

(a) Odour (b) Colour

(c) Bacteria (d) Turbidity

(xvi) Turbidity of water is expressed

(a) in ppm

(b) in numbers in an arbitrary scale

(c) by pH value

(d) by colour code

(xvii) Quality of water is said to be good if it is

(a) free from suspended matter

(b) colourless

(c) free from pathogenic organism

(d) All of the above

(xviii) Biochemical Oxygen Demand (BOD) of safe drinking water must be

(a) Nil (b) 5

(c) 10 (d) 15

(xix) At break point of chlorination,

(a) chlorine is used to oxidized

(b) residual chloride is zero

(c) residual chloride is maximum

(d) residual chlorine reappears

(xx) By boiling water, hardness can be removed if it is due to

(a) Calcium sulphate

(b) Magnesium sulphate

(c) Calcium nitrate

(d) Calcium bicarbonate

(xxi) Rapid gravity filters can remove bacterial impurities upto a maximum of

(a) 50% (b) 60%

(c) 70% (d) 80%

(xxii) Pick up the incorrect statement from the following. The source of surface water is from

(a) streams and rivers

(b) storage reservoirs

(c) springs

(d) ponds and lakes

(xxiii) Water supply includes

(a) collection, transportation and treatment of water

(b) distribution of water to consumers

(c) provision of hydrants for fire fighting

(d) All of the above

(xxiv) Acidity in water is caused due to

(a) Mineral acids

(b) Free CO_2

(c) Iron sulphate

(d) All of the above

(xxv) The maximum permissible nitrites in public water supplies, is

(a) Nil (b) 0.5 ppm

(c) 1.0 ppm (d) 1.5 ppm

PART – B

Marks – 45

2. State the various factors that affect the quantity of storm water for the design of storm sewer. 5

Or

What do you understand by continuous and intermittent supply system of water ? 5

3. For a small town having projected population of 40,000 residing over an area of 30 hectares, find the design discharge for the combined sewer for the following data :

Rate of water supply = 150 litres per capita per day, Runoff coefficient = 0.4, Time of concentration = 30 min. 5

Or

Design a plain sedimentation basin to treat 3mld so as to settle at least 75% of the particles of grain size 0.002cm or more. Assume any suitable data required. 5

4. Explain briefly the important test conducted for chemical examination of water. 15

Or

(i) Explain in brief the different methods used for prediction of future population of a city. 10

(ii) Explain the method of calculating reservoir capacity for a specified yield from the mass inflow curve. 5

5. (i) What is an intake structure? Discuss in details any one of them. 5

(ii) Predict the population for the year 2008 from the following census figures of a town by Geometric increase method : 5

Year	1932	1942	1952	1962
Population : (thousands)	72	85	110	144

Year	1972	1982	1992	2002
Population : (thousands)	184	221	250	320

Or

Classify the various types of filter. Differentiate between the slow sand filter and rapid sand filter. 10

6. What is meant by turbidity ? Explain how turbidity can be determined using any one method. What is its importance in the water analysis ? 10

Or

Explain briefly the various water demands of a typical town or a city. What are the factors affecting per capita demand ? 10