Total No. of printed pages = 8

END SEMESTER EXAMINATION – 2021

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. *All* questions of PART – B are compulsory..

PART – A

Marks – 25

1. Choose the correct answers : 1×15=15

(i) B.O.D. of treated water should be

(a) 10 ppm (b) 25 ppm

(c) 20 ppm (d) Nil

[Turn over

(ii) The permissible amount of nitrites present in potable water, is

(a) 10 ppm (b) 15 ppm

(c) 45 ppm (d) Nil

(iii) Dental fluorosis is caused by the overexposure of

(a) Nitrates (b) Fluoride

(c) Sodium (d) Sulphur

(iv) To test the turbidity of water sample in the field _____ is used.

(a) Jackson turbidimeter

(b) Turbidity rod

(c) Baylis turbidimeter

(d) pH meter

(v) For a city developed haphazardly, the layout of distribution pipes preferred to, is

(a) Ring system

(b) Radial system

(c) Grid iron system

(d) Dead end system

(vi) Distribution of wash water is provided in

(a) Sedimentation tank

(b) Slow sand filter

(c) Rapid gravity filter

(d) All of the above

(vii) Among the following which is considered as the purest form of water ?

(a) spring water (b) ground water

(c) rainwater (d) snow

(viii) The most prominent force, acting on the underground sewer pipes, would be

(a) compressive force

(b) tensile force

(c) bending force

(d) All of the above

(ix) The pathogen can be killed by

(a) Chlorination (b) Nitrification

(c) Filtration (d) Oxidation

(x) The period of cleaning slow sand filters is about

(a) 24 months (b) 10-12 days

(c) 24-48 hours (d) 2-3 months

(xi) As compare to cast iron pipes, steel pipes are

(a) Stronger

(b) Costlier

(c) Heavier

(d) Less prone to corrosion

(xii) The liquid wastes originating from residential and industrial buildings, are collectively called

(a) domestic sewage

(b) combined sewage

(c) sanitary sewage

(d) None of the above

(xiii) The pH value represents the stronger acid

(a) 14 (b) 2

(c) 4 (d) 7

(xiv) The standard B.O.D. at 20°C, is taken in

(a) 2 days (b) 3 days

(c) 4 days (d) 5 days

(xv) The distribution mains are designed for

(a) Maximum hourly demand

(b) Maximum daily demand

(c) Average daily demand

(d) Maximum hourly demand on maximum day

2. Write true or false : 1×5=5

(i) Rotary pumps are most commonly adopted pumps in water supplies.

(ii) During the treatment of water, sedimentation is done before filtration.

(iii) Unconfined aquifer is the one in which a water table serves as the upper surface the zone of saturation.

(iv) Permanent hardness can be removed simply by boiling.

(v) Screening is adopted to remove all the floating matter from the surface water.

3. Fill in the blanks : 1×5=5

(i) The types of valve which allows the water to flow in one direction but prevents its flow in the reverse direction is _____.

(ii) Most important source of water for public water supply is from _____.

(iii) The devices, installed for drawing water from different water sources are called _____.

(iv) The addition of chemical in raw water at the point of high turbulence is known as _____.

(v) The minimum dissolve oxygen which should always be present in the water in order to save the aquatic life is _____.

PART – B

Marks – 45

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

   (b) Explain the conservancy and water carriage system. 5

2. (a) Discuss in brief about the layout of water distribution system. 6

   (b) Distinguish between unit operations and unit processes. 4

3. (a) What is the significance of aeration process in water treatment ? 4

   (b) What is meant by disinfection ? Explain break point chlorination. 6

4. (a) Compare the working of slow and rapid gravity filters. 5

   (b) Describe in brief the various types of screens used for screening water. 5

Or

Design rapid sand for treating water required for a population of 50,000, rate of supply being 180 litres per day, rate of filtration 5200 litres per m^2, assumed 5% of filtered water is used every day for backwashing and 30 minutes are lost every day during backwashing. 10

5. Explain the dry feeding methods of coagulant. 5

Or

A city has a population of 1,00,000 with an average rate of demand of 200 litres per head per day. Find the size of rapid sand filter. 5