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CT-506/EE/5th Sem/2018/M

## ENVIRONMENTAL ENGINEERING

Full Marks – 70

Pass Marks – 28

Time – Three hours

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

### PART – A

All the questions are compulsory.

1×25=25

1. (i) A Check valve is also known as \_\_\_\_\_.
- (ii) The devices which are used for measuring rainfall are called \_\_\_\_\_.
- (iii) The devices, installed for drawing water from different water sources are called \_\_\_\_\_.
- (iv) The most commonly adopted pumps in water supplies are \_\_\_\_\_.

[Turn over

- (v) The waste water coming from kitchen and bathroom is popularly known as \_\_\_\_\_.
- (vi) Cast iron pipes having plain ends are joined by a joint called :
- (a) Flanged joint
  - (b) Spigot and socket joint
  - (c) Dresser coupling
  - (d) None of these
- (vii) The type of rain gauge, which is installed at hilly and inaccessible areas, is :
- (a) Weighing type
  - (b) Tipping bucket type
  - (c) Symon's type
  - (d) None of these
- (viii) Hand pumps make use of :
- (a) centrifugal pumping
  - (b) reciprocating pumping
  - (c) rotary pumping
  - (d) None of the above

(ix) The major quantity of rain comes to India as :

- (a) convective precipitation
- (b) cyclonic precipitation
- (c) orographic precipitation
- (d) None of these

(x) Which sources of water, among the following, is not a subsurface source ?

- (a) spring
- (b) well
- (c) storage reservoir
- (d) infiltration gallery

(xi) Branch and main sewers are widely made of :

- (a) RCC
- (b) PCC
- (c) cast iron
- (d) glazed stoneware

(xii) An intercepting trap is provided at the junction of :

- (a) A house sewer and a municipal sewer
- (b) an unfoul house drain and a foul house drain
- (c) any two house drains
- (d) None of these.

(xiii) In single stack drainage system in houses, we provide :

- (a) one soil pipe only
- (b) one soil pipe and one vent pipe
- (c) one sullage pipe only
- (d) one soil pipe and one sullage pipe

(xiv) The pipe in building through which human excreta flow is called :

- (a) soil pipe
- (b) waste pipe
- (c) vent pipe
- (d) None of these

(xv) A flowing well is essentially \_\_\_\_\_.

(xvi) The gas which is generally present in sewers is :

- (a)  $H_2S$                       (b)  $CO_2$   
(c)  $CH_4$                       (d) All of these

(xvii) Manholes are generally located :

- (a) at all changes of direction of sewer  
(b) at all changes of gradient of sewer  
(c) at all junctions of different sewers  
(d) All of the above

(xviii) Asbestos cement pipes are normally joined by using :

- (a) bell and spigot joint  
(b) simplex joint  
(c) lock joint  
(d) None of these

(xix) Sewers are generally laid starting from their :

- (a) off take point
- (b) outfall point
- (c) mid-point
- (d) any point along the alignment

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

- (a) compressive force
- (b) tensile force
- (c) bending force
- (d) All of these

(xxi) Laying of sewer is usually done with the help of :

- (a) a theodolite
- (b) a compass
- (c) a plane table
- (d) sight rails and boning rods

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

- (a) domestic sewage
- (b) combined sewage
- (c) sanitary sewage
- (d) None of these

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

- (a) 10 ppm
- (b) 25 ppm
- (c) 20 ppm
- (d) Nil

(xxiv) Blue baby syndrome is caused by the contamination of water due to

- (a) Nitrates
- (b) Phosphates
- (c) Arsenic
- (d) Sulphur

(xxv) In rapid sand filters the ratio of length to diameter of the lateral, should not exceed

- (a) 10
- (b) 15
- (c) 60
- (d) 40

PART - B

Answer *all* the questions.

2. (a) Explain the important consideration while finalizing alignment and bed line of sewer. 5
- (b) Derive an expression for discharge for a well in confined aquifer. 5
3. Describe in brief various tests conducted for physical examination of water. 10
4. (a) 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 = 180 litres per capita per day, Runoff coefficient = 0.4, Time of concentration = 40 mins. Assume 80% of this water supply will be reaching the sewer as sanitary sewage. 5
- (b) Discuss briefly the necessity of replacing the conservancy system by the water carriage system of sanitation. 5



5. (a) Predict the population for the year 2012 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

- (b) Derive an expression for discharge for a well in confined aquifer. 5

Or

What is meant by design period and population forecast? Why the population forecast is necessary in the design of public water supply scheme? Discuss the different methods employed for the purpose and their comparative merits and demerits. 10

6. Define sewage, sullage, and sewerage. 5