

1. The minimum recommended diameter of sewers, is

- [A.5 cm](#)
- [B.10 cm](#)
- [C.15 cm](#)**
- [D.20 cm.](#)

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2. Aerobic bacterias

- [A.flourish in the presence of free oxygen](#)
- [B.consume organic matter as their food](#)
- [C.oxidise organic matter in sewage](#)
- [D.All the above.](#)**

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3. The rate of accumulation of sludge in septic tanks is recommended as

- [A.30 litres/person/year](#)**
- [B.25 litres/person/year](#)
- [C.30 litres/person/month](#)
- [D.25 litres/person/month.](#)

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4. If 2% solution of a sewage sample is incubated for 5 days at 20°C and depletion of oxygen was found to be 5 ppm, B.O.D. of the sewage is

- [A.200 ppm](#)
- [B.225 ppm](#)
- [C.250 ppm](#)**
- [D.None of these.](#)

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5. If D is the diameter of upper circular portion, the overall depth of a standard egg shaped section, is

- [A. \$D\$](#)
- [B. \$1.25 D\$](#)
- [C. \$1.5 D\$](#)**
- [D. \$1.75 D\$](#)
- [E. \$2 D\$.](#)

6. If the diameter of sewer is 225 mm, the gradient required for generating self cleansing velocity, is

- [A.1 in 60](#)
- [B.1 in 100](#)
- [C.1 in 120](#)**
- [D.none of these.](#)

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7. Pick up the correct statement from the following :

- [A.](#) pH value indicates acidity and alkalinity of sewage
- [B.](#) In acidic sewage, the pH value is less than 7
- [C.](#) In alkaline sewage, the pH value is more than 7
- [D.](#) Fresh sewage is generally alkaline

[E.](#) All the above.

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8. The non-clog pump which permits solid matter to pass out with the liquid sewage, is

- [A.](#) centrifugal pump**
- [B.](#) reciprocating pump
- [C.](#) pneumatic ejector
- [D.](#) none of these.

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9. Assertion (A) : Discharging the effluents from the oxidation ponds just up stream of lakes or reservoirs is undesirable.

Reason (R) : The discharged algae get settled in the reservoirs and cause anaerobic decomposition and other water qualities.

[A.](#) Both A and R are true and R is the correct explanation of A

[B.](#) Both A and R are true but R is not a correct explanation of A

[C.](#) A is true but R is false

[D.](#) A is false but R is true.

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10. The width of a rectangular sewer is twice its depth while discharging 1.5 m/sec. The width of the sewer is

[A.](#) 0.68 m

[B.](#) 0.88 m

[C.](#) 1.36 m

[D.](#) 1.76 m.

11. Pick up the correct statement from the following :

[A.](#) In treated sewage, 4 PPM of D.O. is essential

[B.](#) Only very fresh sewage contains some dissolved oxygen

[C.](#) The solubility of oxygen in sewage is 95% that is in distilled water

[D.](#) All the above.

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12. In olden days the type of section adopted in trunk and out fall sewers was

[A.](#) parabolic shaped

[B.](#) horse shoe shaped

[C.](#) egg shaped

[D.](#) circular shaped.

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13. For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed

[A.3 PPM](#)

[B.4 PPM](#)

[C.5 PPM](#)

[D.10 ppm.](#)

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14. In a fully mechanised composting plant, involves

[A.mechanized receipt](#)

[B.mechanized segregation](#)

[C.mechanized pulverising of refuse](#)

[D.all of these.](#)

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15. Self-cleansing velocity is

[A.velocity at dry weather flow](#)

[B.velocity of water at flushing](#)

[C.velocity at which no accumulation remains in the drains](#)

[D.velocity of water in a pressure filter.](#)

16. If the over land flow from the critical point to the drain is 8 km and the difference in level is 12.4 m, the inlet time is

[A.2 hours](#)

[B.3 hours](#)

[C.4 hours](#)

[D.5 hours.](#)

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17. An inverted siphon is designed generally for

[A.one pipe](#)

[B.two pipes](#)

[C.three pipes](#)

[D.four pipes.](#)

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18. A rainfall may be classified as acidic if its pH value is less or equal to

[A.6](#)

[B.7](#)

[C.5](#)

[D.6.5](#)

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19. When drainage to sewage ratio is 20, the peak dry weather flow is

[A.20% of the design discharge](#)

[B.slightly less than 5% of the design discharge](#)

[C.slightly more than 5% of the design discharge](#)

[D.none of these.](#)

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20. For treating the sewage of a large city, you will recommend
- [A.](#) **a sedimentation tank and an activated sludge treatment plant**
 - [B.](#) a plant consisting of Imhoff tanks with low rate trickling filters
 - [C.](#) sedimentation tanks with high rate trickling filters
 - [D.](#) none of these.

21. The detention time of a circular tank of diameter d and water depth H , for receiving the sewage Q per hour, is

[A.](#) $\frac{d^2 (0.011d + 0.785H)}{Q}$

[B.](#) $\frac{d (0.022d + 0.085H)}{Q}$

[C.](#) $\frac{d (0.785d + 0.011H)}{Q}$

[D.](#) $\frac{d (0.285d + 0.011H)}{Q}$

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22. The dimensions of a rectangular settling tank are : length 24 m, width 6 m and depth 3 m. If 2 hour detention period for tanks is recommended, the rate of flow of sewage per hour, is

[A.](#) 204 cu m

[B.](#) 208 cu m

[C.](#) 212 cu m

[D.](#) **216 cu m**

[E.](#) 220 cu m.

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23. The screens are fixed

[A.](#) perpendicular to the direction of flow

[B.](#) parallel to the direction of flow

[C.](#) **at an angle 30° to 60° to the direction of flow**

[D.](#) none of these.

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24. In primary sedimentation, the 0.2 mm inorganic solids get separated if specific gravity is

[A.](#) 2.25

[B.](#) 2.50

[C.](#) 2.55

[D.](#) **2.65**

[E.](#) 2.75

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25. Pick up the in-correct statement from the following :

[A.](#) Manholes are provided in sewer pipes at suitable intervals

[B.](#) Catch basins are generally provided in sewers for carrying drainage discharge

[C.](#) **Inlets are generally provided in all sewers**

[D.](#)None of these.

26. Clogging of sewers, is caused due to

[A.](#)silting

[B.](#)low discharge

[C.](#)greasy and oily matters

[D.](#)domestic wastes thrown in manholes

[E.](#)all the above.

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27. A sewer pipe contains 1 mm sand particles of specific gravity 2.65 and 5 mm organic particles of specific gravity 1.2, the minimum velocity required for removing the sewerage, is

[A.](#)0.30 m/sec

[B.](#)0.35 m/sec

[C.](#)0.40 m/sec

[D.](#)0.45 m/sec

[E.](#)0.50 m/sec.

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28. The coagulant widely used for sewage treatment, is

[A.](#)alum

[B.](#)ferric chloride

[C.](#)ferric sulphate

[D.](#)chlorinated copperas.

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29. House connections to the laterals is generally made by

[A.](#)R.C.C.

[B.](#)P.C.C.

[C.](#)Cast iron

[D.](#)Glazed stonewares.

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30. The ratio of maximum sewage flow to average sewage flow for mains up to 1 m in diameter, is

[A.](#)1.5

[B.](#)2.0

[C.](#)3.0

[D.](#)4.0

31. Dilution method of disposing off sewage, is not preferred to

[A.](#)when sewage is fresh

[B.](#)when diluting water has high dissolved oxygen content

[C.](#)when diluting water is used for water supply near the point of sewage disposed

[D.](#)when the diluting water is having flow currents

[E.](#)none of these.

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32. For house drainage minimum gradient is

A.1 in 60

B.1 in 80

C.1 in 10

D.1 in 400

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33. If the side of a square sewer is 1000 mm, the diameter of a hydraulically equivalent circular section, is

A.1045 mm

B.1065 mm

C.1075 mm

D.1095 mm.

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34. The ratio of minimum hourly flow to the average flow of sewage is

A.1/4

B.1/3

C.1/2

D.3/4

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35. Bio-chemical oxygen demand (BOD) for the first 20 days is generally referred to

A.initial demand

B.first stage demand

C.carbonaceous demand

D.all of these.

36. Flocculated particles do not change their

A.size

B.shape

C.weight

D.none of these.

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37. For non-scouring velocity 5 m/sec, the type of sewers generally preferred to, is

A.cast iron sewers

B.cement concrete sewers

C.glazed bricks sewers

D.stone ware sewers.

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38. Disposal to sewage in large cities, is done in

A.irrigation

B.dilution

C.oxidation

D.putrifaction.

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39. For the COD test of sewage, organic matter is oxidised by $K_2Cr_2O_7$ in the presence of

[A.](#) H_2SO_4

[B.](#) HNO_3

[C.](#) HCl

[D.](#) none of these.

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40. In R.C. sewer pipes, the percentage longitudinal reinforcement to the cross-sectional area of concrete is kept

[A.](#) 10.0

[B.](#) 5.0

[C.](#) 2.0

[D.](#) 0.25

41. The asbestos cement pipes are generally laid

[A.](#) horizontally

[B.](#) vertically

[C.](#) at an angle of 30°

[D.](#) at an angle of 60° .

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42. Chlorination of water is done for the removal of

[A.](#) bacterias

[B.](#) suspended solids

[C.](#) sediments

[D.](#) hardness.

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43. For evaporation and measurement of settleable solids, the apparatus used, is

[A.](#) a jar

[B.](#) a breaker

[C.](#) a test tube

[D.](#) an Imhoff cone.

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44. In SI units the power of sound is represented in

[A.](#) kgs

[B.](#) joules

[C.](#) neutons

[D.](#) watts.

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45. A rain sanitary sewer is constructed to carry

[A.](#) sanitary sewage

[B.](#) storm sewage

[C.](#) surface water

[D.](#) ground water

[E.](#) all the above.

46. The sewage is pumped up

- [A.](#)from low lying areas
- [B.](#)from flat areas
- [C.](#)from basements
- [D.](#)across a high ridge
- [E.](#)all the above.

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47. Removal of oil and grease from sewage, is known

- [A.](#)screening
- [B.](#)skimming
- [C.](#)filtration
- [D.](#)none of these.

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48. The gas which may cause explosion in sewers, is

- [A.](#)carbondioxide
- [B.](#)methane
- [C.](#)ammonia
- [D.](#)carbon monoxide.

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49. In sewers the effect of scouring is more on

- [A.](#)top side
- [B.](#)bottom side
- [C.](#)horizontal side
- [D.](#)all sides.

Part 2

1. The most dangerous pollutant in vehicular emissions is

- [A.](#)CO
- [B.](#)SO₂
- [C.](#)CO₂
- [D.](#)O₃.

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2. If the depletion of oxygen is found to be 2.5 mg/litre after incubating 2.5 ml of sewage diluted to 250 ml for 5 days at 20°C, B.O.D. of the sewage is

- [A.](#)50 mg/l
- [B.](#)100 mg/l
- [C.](#)150 mg/l
- [D.](#)200 mg/l
- [E.](#)**250 mg/l.**

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3. The clarigesters are

- [A.](#)circular septic tanks

- [B.](#)rectangular septic tanks
- [C.](#)circular Imhoff double tanks with bottom hoppers
- [D.](#)circular Imhoff double storey tanks without bottom hoppers.**

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4. Rate of flow of sewage is generally assumed

- [A.](#)more than the rate of water supply
- [B.](#)equal to the rate of water supply
- [C.](#)less than the rate of water supply
- [D.](#)at 150 litres per capita.**

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5. Maximum permissible velocity 1.5 m/sec, is adopted in drains

- [A.](#)with beds of rocks and gravels
- [B.](#)lined with stones
- [C.](#)both (a) and (b)**
- [D.](#)neither (a) nor (b).

6. The digested sludge from septic tanks, is removed after a maximum period of

- [A.](#)3 years**
- [B.](#)3.5 years
- [C.](#)4 years
- [D.](#)5 years.

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7. For providing an Indian type W.C., the R.C.C. slabs in the toilet portion

- [A.](#)should be sunk by 20 cm
- [B.](#)should be kept 20 cm above the adjacent portion
- [C.](#)should be sunk by 50 cm**
- [D.](#)need not be sunk.

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8. The gradient of sewers depends upon

- [A.](#)velocity of flow
- [B.](#)diameter of the sewer
- [C.](#)discharge
- [D.](#)all the above.**

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9. The settling velocity of the particles larger than 0.06 mm in a settling tank of depth 2.4 is 0.33 m per sec. The detention period recommended for the tank, is

- [A.](#)30 minutes
- [B.](#)1 hour
- [C.](#)1 hour and 30 minutes
- [D.](#)2 hours**
- [E.](#)3 hours.

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10. The drop man holes are generally provided in sewers for
- [A.](#) industrial areas
 - [B.](#) large town ships
 - [C.](#) hilly town ships**
 - [D.](#) cities in plains.

11. Sewer ventilating columns are generally placed at
- [A.](#) distances 150 m to 300 m
 - [B.](#) upper ends of branch sewers
 - [C.](#) every change in the size of sewers
 - [D.](#) all the above.**

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12. In case of Imhoff tanks,
- [A.](#) the shape is rectangular
 - [B.](#) detention period is 2 hours
 - [C.](#) the velocity of flow is restricted to 0.30 m/minute
 - [D.](#) surface loading is limited to 30, 000 litres/m of plan area per day
 - [E.](#) All the above.**

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13. If the depth of partial flow in a sewer of diameter 2 m, is 50 cm, its wetted perimeter is
- [A.](#) π
 - [B.](#) $\frac{\pi}{2}$
 - [C.](#) $\frac{\pi}{3}$
 - [D.](#) $\frac{2\pi}{3}$**
 - [E.](#) $\frac{3\pi}{2}$

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14. A drop manhole is provided if
- [A.](#) a sewer drops from a height
 - [B.](#) a branch sewer joins the main sewer at higher level**
 - [C.](#) a lamp is inserted to check obstruction
 - [D.](#) none of these.

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15. In a city the ratio of the drainage to sewage is 20, the percentage discharge passing through non-monsoon periods, is
- [A.](#) 5
 - [B.](#) 10
 - [C.](#) 15
 - [D.](#) 20**

16. Pick up the correct statement from the following :

- [A.](#)Indore method of composting involves decomposition under aerobic conditions
- [B.](#)Bangalore method of composting involves decomposing under anaerobic conditions
- [C.](#)Fully stabilised refuse by the Bangalore method of composting is a powdery mass called humus
- [D.](#)all of these.**

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17. The liquid wastes from kitchens, bath rooms and wash basins, is not called

- [A.](#)liquid waste
- [B.](#)sullage
- [C.](#)sewage**
- [D.](#)none of these.

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18. The presence of free ammonia in sewage, is detected by

- [A.](#)boiling**
- [B.](#)adding pottassium permanganate
- [C.](#)adding sulphuric acid
- [D.](#)phenol-di-sulphuric acid.

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19. The amount of oxygen consumed by the aerobic bacterias which cause the aerobic biological decomposition of sewage, is known

- [A.](#)Bio-Chemical Oxygen Demand (B.O.D.)
- [B.](#)Dissolved Oxygen (D.O.)**
- [C.](#)Chemical Oxygen Demand (C.O.D.)
- [D.](#)None of these.

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20. The standard B.O.D. of water is taken for

- [A.](#)1 day
- [B.](#)2 days
- [C.](#)3 days
- [D.](#)5 days**
- [E.](#)10 days.

21. To prevent settling down of sewage both at the bottom and on the sides of a large sewer, self-cleaning velocity recommended for Indian conditions, is

- [A.](#)0.50 m/sec
- [B.](#)0.60 m/sec
- [C.](#)0.70 m/sec
- [D.](#)0.75 m/sec**
- [E.](#)1.0 m/sec.

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22. Pick up the correct statement from the following :
- [A.](#) Turbidity is more in strong sewage
 - [B.](#) The black colour indicates septic sewage
 - [C.](#) The fresh sewage is practically odourless
 - [D.](#) The sewage omits offensive odours after four hours
 - [E.](#) **All the above.**

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23. In sewers the gas generally found, is

- [A.](#) Hydrogen sulphide (H₂S)
- [B.](#) Carbon dioxide (CO₂)
- [C.](#) Methane (CH₄)
- [D.](#) Petrol vapours
- [E.](#) **All the above.**

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24. A sewer running partially full and hurried with back filled, fails in compression due to

- [A.](#) weight of the pipe
- [B.](#) weight of the back fill
- [C.](#) superimposed traffic loads
- [D.](#) **all the above.**

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25. A manhole is classified as shallow if its depth is between

- [A.](#) 0.4 to 0.5 m
- [B.](#) 0.5 to 0.7 m
- [C.](#) **0.7 to 0.9 m**
- [D.](#) 0.9 to 1.20 m
- [E.](#) 1.2 to 1.50 m.

26. For a circular sewer of diameter D running partially full with central angle α ,

[A.](#) $\frac{d}{D} = \frac{1}{2} \left(1 - \cos \frac{\alpha}{2} \right)$

[B.](#) $\frac{a}{A} = \left[\frac{\pi}{360^\circ} - \frac{\sin \alpha}{2\pi} \right]$

[C.](#) $\frac{p}{P} = \frac{\alpha}{360^\circ}$

[D.](#) $\frac{r}{R} = \left[1 - \frac{360^\circ \sin \alpha}{2\pi\alpha} \right]$

- [E.](#) **all the above.**

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27. For design purposes, the normal rate of infiltration of ground water into the sewer, is

- [A.](#) 500 litres/km/cm

- [B.](#) 1000 litres/km/cm
- [C.](#) 1500 litres/km/cm
- [D.](#) 2000 litres/km/cm**
- [E.](#) 2500 litres/km/cm.

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28. The effluent of a septic tank is
- [A.](#) fit for discharge into any open drain**
 - [B.](#) foul and contains dissolved and suspended solids
 - [C.](#) as good as that from a complete treatment
 - [D.](#) none of these.

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29. The drainage area of a town is 12 hectares. Its 40% area is hard pavement ($K = 0.85$), the 40% area is unpaved streets ($K = 0.20$) and the remaining is wooded areas ($K = 0.15$). Assuming the time of concentration for the areas as 30 minutes and using the formula

$$P_s = \frac{900}{t + 60}$$

the maximum run off is

- [A.](#) 0.10 cumec
- [B.](#) 0.12 cumec
- [C.](#) 0.15 cumec**
- [D.](#) 0.20 cumec.

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30. The detention period for plain sedimentation water tanks, is usually

- [A.](#) 4 to 8 hours**
- [B.](#) 8 to 16 hours
- [C.](#) 16 to 24 hours
- [D.](#) 24 to 36 hours.

31. Fresh sewage may become stale in

- [A.](#) one hour
- [B.](#) two to three hours
- [C.](#) three to four hours**
- [D.](#) six hours.
- [E.](#) ten hours.

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32. The small sewers are cleaned by

- [A.](#) flushing**
- [B.](#) cane rodding
- [C.](#) wooden pills
- [D.](#) none of these.

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33. Dry water flow in a combined sewer, is

[A.industrial sewage](#)

[B.domestic sewage](#)

[C.storm water](#)

[D.inclusive of domestic and industrial sewage but excludes storm water.](#)

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34. Which one of the following tests is used for testing sewer pipes :

[A.water test](#)

[B.ball test](#)

[C.mirror test](#)

[D.all of these.](#)

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35. Nitrogen cycle of sewage, is

[A.Liberation of ammonia-formation of nitrites-formation of nitrates-liberation of nitrogen](#)

[B.Liberation of nitrogen-liberation of ammonia-formation of nitrites- formation of nitrates](#)

[C.Liberation of nitrogen-formation of nitrates-formation of nitrites-liberation of ammonia](#)

[D.Formation of nitrates-formation of nitrites-liberation of nitrates-liberation of nitrates](#)

[E.None of these.](#)

36. In sewers the highest non-scouring velocity is achieved in

[A.glazed bricks sewers](#)

[B.cast iron sewers](#)

[C.cement concrete sewers](#)

[D.stone ware sewers.](#)

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37. In sewage having fully oxidised organic matter, the nitrogen exists in the form of

[A.nitrites](#)

[B.nitrates](#)

[C.free ammonia](#)

[D.aluminoid nitrogen](#)

[E.none of these.](#)

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38. It is customary to design a sewer for D.W.F. on the basis of

[A.average demand](#)

[B.twice the average demand](#)

[C.thrice the average demand](#)

[D.four times the average demand.](#)

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39. During preliminary treatment of a sewage

[A.Oil and grease are removed from skimming tanks](#)

[B.Floating materials are removed by screening](#)

C. Grit and sand are removed by grit chambers

D. All the above.

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40. Pick up the correct statement from the following :

A. The larger the sewer in size, more will be velocity

B. The smaller the sewer in size, less will be velocity

C. The larger the sewer in size, no deposition will take place

D. The larger the sewer in size, deposition will take place.

41. In septic tanks,

A. free board of 0.3 m may be provided

B. the baffles or tees are extended up to top level of scum

C. the clear space between the baffle top and covering slab is about 7.5 cm

D. the inlet is kept 30 cm below the sewage line and outlet is kept at a level 40% depth of the sewage

E. all the above.

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42. The sewer pipe which carries sewage from a building for immediate disposal is

A. house sewer

B. lateral sewer

C. intercepting sewer

D. main sewer.

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43. The algae dies out in the zone of

A. degradation

B. active decomposition

C. recovery

D. cleaner water.

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44. The recommended detention period for grit chambers is

A. 1 minute

B. 2 minutes

C. 3 minutes

D. 5 minutes.

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45. Pick up the correct statement from the following :

A. The materials separated by screens, is called screenings

B. The screenings are disposed off either by burning or by burial or by dumping

C. The process of burning the screenings, is called incineration

D. The process of burning the screenings, is known as composting

E. All the above.

46. The ratio of the diameter of a circular section and the side of a square section hydraulically equivalent, is

A.1.095

B.1.085

C.1.075

D.1.065

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47. Pick up the correct statement from the following :

A.The maximum rate of storm run off is called peak drainage discharge

B. Rational method of estimating peak run off, may be used precisely for areas less than 50 hectares

C. The period after which the entire area starts contributing to the run off, is called the time of concentration

D. The time required by water to reach the outlet of a catchment from the most remote point, is called time of concentration

E. All the above.

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48. For trunk and out-fall, the type of sewers generally used, is

A. standard egg shaped

B. circular shaped

C. horse shoe shaped

D. parabolic shaped

E. semi-elliptical shaped.

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49. Pick up the incorrect statement from the following :

A. Septic tanks are horizontal continuous flow type of sedimentation tanks

B. Septic tanks are generally provided a detention period of 12 to 36 hours

C. Septic tanks are completely covered and high vent shafts are provided for the escape of foul gases

D. Septic tanks are generally classified as tanks which work on the principle of anaerobic decomposition

E. None of these.

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50. Hydraulic mean radius is

A. mean radius of sewer

B. difference in heads between two points in circular pipes

C. mean of radii in a pipe line of varying cross-sections

D. cross-sectional area/wetted perimeter.

Section 3

1. The pH value of fresh sewage is usually

- [A.](#) equal to 7
- [B.](#) more than 7**
- [C.](#) less than 7
- [D.](#) equal to zero.

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2. The moisture content of a sludge is reduced from 90% to 80% in a sludge digestion tank. The percentage decrease in the volume of sludge, is

- [A.](#) 25%
- [B.](#) 50%**
- [C.](#) 10%
- [D.](#) 5%.

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3. Inter-distance between ventilation columns in a sewer line is kept

- [A.](#) 25 to 50 m
- [B.](#) 50 m to 100 m
- [C.](#) 100 m to 150 m
- [D.](#) 150 m to 300 m.**

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4. If q is the average sewage flow from a city of population P , the maximum sewage flow

- [A.](#) $Q = \frac{4 + \sqrt{P}}{18 + \sqrt{P}} q$
- [B.](#) $Q = \frac{18 + P}{4 + \sqrt{P}} q$
- [C.](#) $Q = \frac{18 + \sqrt{P}}{4 + \sqrt{P}} q$
- [D.](#) $Q = \frac{5 + \sqrt{P}}{15 + \sqrt{P}} q$

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5. The factor responsible for purification of sewage in river is

- [A.](#) Hydrology
- [B.](#) Dissolved oxygen in water
- [C.](#) Temperature
- [D.](#) Turbulence
- [E.](#) All the above.**

6. If the peak discharge of a storm water drain (S.W. Drain) is expected to exceed 150 cumecs, the free board to be provided, is

- [A.](#) 100 cm**
- [B.](#) 90 cm
- [C.](#) 80 cm
- [D.](#) 50 cm.

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7. P_H value of sludge during alkaline regression stage, is

[A.more than 7](#)

[B.less than 7](#)

[C.less than 6](#)

[D.more than 6.](#)

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8. Depletion of ozone layer in the outer atmosphere may cause

[A.lung cancer](#)

[B.skin cancer](#)

[C.bronchitis](#)

[D.heart disorder.](#)

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9. The spacing of bars of perforations of fine screens used for the treatment of sewage, is

[A.2 to 3 mm](#)

[B.3 to 5 mm](#)

[C.5 to 8 mm](#)

[D.8 to 10 mm.](#)

10. The self-cleansing velocity of water flowing through pipe lines, is

[A.2 metres/sec](#)

[B.1 metre/sec](#)

[C.0.5 metre/sec](#)

[D.0.25 metre/sec.](#)

11. Ventilating shafts are provided to a sewer line at every

[A.100 m](#)

[B.150 m](#)

[C.200 m](#)

[D.300 m](#)

[E.500 m.](#)

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12. Which one of the following part of human body withstands minimum radiation

[A.thyroid](#)

[B.kidneys](#)

[C.eyes](#)

[D.ovaries/testis.](#)

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13. The water carried sewerage system removes

[A.domestic sewage](#)

[B.industrial sewage](#)

[C.storm sewage](#)

D.all the above.

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14. Stoneware sewers are available in size

[A.10 cm](#)

[B.15 cm](#)

[C.20 cm](#)

[D.25 cm](#)

E.all the above.

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15. The sludge does not contain waste water from

[A.bath rooms](#)

[B.wash basins](#)

[C.kitchen sinks](#)

D.toilets.

16. If the depth of flow in a circular sewer is 1/4th of its diameter D , the wetted perimeter is

[A. \$\frac{\pi D}{2}\$](#)

[B. \$\frac{\pi D}{4}\$](#)

[C. \$\frac{\pi D}{3}\$](#)

[D. \$\pi D\$.](#)

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17. The maximum diameter of sewers adopted in the designs is

[A.1.0 m](#)

[B.2.0 m](#)

C.3.0 m

[D.4.0 m.](#)

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18. Sluge banks are formed if sewage is disposed of in

[A.rivers](#)

B.seas

[C.lakes](#)

[D.none of these.](#)

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19. Design period of 40 to 50 years is adopted for

[A.branch sewers](#)

[B.main sewers](#)

[C.trunk sewers](#)

D.all the above.

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20. The pH value of sewage is determined with the help of
- [A.](#) Imhoff Cone
 - [B.](#) turbidimeter
 - [C.](#) potentiometer**
 - [D.](#) none of these.

21. Lead caulked joints are used for laying
- [A.](#) stone ware pipes
 - [B.](#) earthen ware pipes**
 - [C.](#) C.I. pipes
 - [D.](#) G.I. pipes.

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22. Pick up the correct statement from the following :
- [A.](#) The water supply pipes carry pure water free from solid particles**
 - [B.](#) The water supply pipes get clogged if flow velocity is less than self cleansing velocity
 - [C.](#) The sewers may be carried up and down the hills and valleys
 - [D.](#) The sewer pipes are generally laid along level hills
 - [E.](#) None of these.

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23. For trunk sewers more than 1.25 m in diameter, the ratio of the maximum daily sewage flow to the average daily sewage flow is assumed
- [A.](#) 1.5**
 - [B.](#) 2.0
 - [C.](#) 2.5
 - [D.](#) 3.0
 - [E.](#) 3.5

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24. At the junction of sewers
- [A.](#) top of smaller sewer is kept lower
 - [B.](#) top of larger sewer is kept lower
 - [C.](#) tops of both the sewers are at the same level
 - [D.](#) none of these.**

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25. Primary treatment of sewage consists of removal of
- [A.](#) large suspended organic solids**
 - [B.](#) oil and grease
 - [C.](#) sand and grit
 - [D.](#) floating materials
 - [E.](#) none of these.

26. The rainfall at any place may be determined by

- [A.its intensity](#)
- [B.its direction](#)
- [C.its frequency](#)
- [D.all the above.](#)**

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27. In trickling filter, B.O.D. is reduced to

- [A.30 to 40%](#)
- [B.40 to 60%](#)
- [C.60 to 80%](#)**
- [D.80 to 90%](#)
- [E.95%.](#)

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28. Which one of the following gases is most significant as air pollutant

- [A.Carbondioxide](#)
- [B.Oxygen](#)
- [C.Nitrogen](#)
- [D.Sulphurdioxide.](#)**

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29. Which one of the following statements regarding septic tanks is wrong :

- [A.](#) a gap of 7.5 cm between the bottom of the covering slab and the top level of scum is provided
- [B.](#) the outlet invert level is kept 5 to 7.5 cm below the inlet invert level
- [C.](#) the minimum width of septic level is 90 cm
- [D.the depth of tank is kept equal to its width.](#)**

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30. In circular sewers if depth of flow is 0.2 times the full depth, the nominal gradient,

- [A.](#)is only provided
- [B.is doubled](#)**
- [C.](#)is trebled
- [D.](#)is not enough.

31. The maximum spacing of manholes specified by Indian standard in sewers upto 0.3 m diameter is

- [A.](#)20 m
- [B.](#)30 m
- [C.45 m](#)**
- [D.](#)75 m.

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32. The design period in years for pumping plants, is

- [A.](#)1
- [B.](#)2 to 3
- [C.](#)3 to 5
- [D.5 to 10](#)**

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33. The Chezy's constant C in the formula $V = C \ r s$ depends upon

- [A.](#) size of the sewer
- [B.](#) shape of the sewer
- [C.](#) roughness of sewer surface
- [D.](#) hydraulic characteristics of sewer
- [E.](#) all the above.**

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34. A five day B.O.D. at 15°C of the sewage of a town is 100 kg/day. If the 5 day B.O.D. per head at 15°C for standard sewage is 0.1 kg/day, the population equivalent is

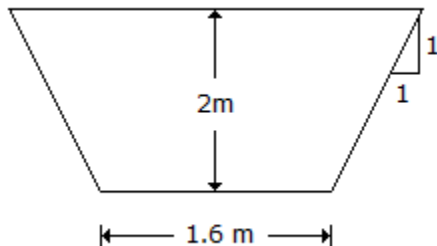
- [A.](#) 100
- [B.](#) 1000
- [C.](#) 5000
- [D.](#) 10000**

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35. The density of population over 40 hectares is 250/hectare. If water supply demand per day is 200 litres and sewage discharge is 80% of water supply, the sewage flow in sewers of separate system, is

- [A.](#) 0.05552 cumec
- [B.](#) 0.05554 cumec
- [C.](#) 0.05556 cumec**
- [D.](#) 0.0556 cumec
- [E.](#) 0.0558 cumec.

36. For the open drain ($N = 0.025$) shown in the below figure, the discharge is



- [A.](#) 26.88 cumecs
- [B.](#) 27.88 cumecs
- [C.](#) 28.88 cumecs**
- [D.](#) 29.88 cumecs.

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37. If the diameter of a sewer is 150 mm, the gradient required for generating self cleansing velocity, is

- [A.](#) 1 in 60
- [B.](#) 1 in 100**
- [C.](#) 1 in 120

[D.](#)none of these.

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38. The average temperature of sewage in India, is

[A.](#)10°C

[B.](#)15°C

[C.](#)20°C

[D.](#)25°C

[E.](#)30°C.

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39. The most widely used pump for lifting sewage is

[A.](#)centrifugal pump

[B.](#)reciprocating pump

[C.](#)pneumatic ejector

[D.](#)air pressure pump.

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40. The sewer which resists sulphide corrosion, is

[A.](#)Brick sewer

[B.](#)Cast iron sewer

[C.](#)R.C.C. sewer

[D.](#)Lead sewer

[E.](#)None of these.

41. For large sewers, maximum distance between manholes may be

[A.](#)50 m

[B.](#)100 m

[C.](#)200 m

[D.](#)300 m

[E.](#)400 m.

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42. The first stage of neutral process of sludge digestion, is

[A.](#)acid fermentation

[B.](#)acid regression

[C.](#)alkaline fermentation

[D.](#)none of these.

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43. Lead acetate test in sewer manhole is done to test the presence of

[A.](#)Methane gas

[B.](#)Hydrogen sulphide

[C.](#)Carbondioxide gas

[D.](#)Diesel vapours.

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44. Dried sewage after treatment is used as

A.fertilizer

B.building material

C.chemical for lowering B.O.D.

D.base material for paints.

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45. The use of coarse screens for the disposal of sewage, may be dispensed with by

A.comminutor

B.shredder

C.both (a) and (b)

D.neither (a) nor (b).

46. Sewer pipes are designed for maximum discharge with 25% to 33% vacant cross-sectional area for

A.unexpected large scale infiltration of stream water

B.unexpected increase in the population

C.under estimates of maximum and average flows

D.All of the above.

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47. 5 days-biochemical oxygen demand (BOD₅) is taken at a temperature of

A.0°C

B.15°C

C.20°C

D.25°C.

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48. Water content of sewage is about

A.90%

B.95%

C.99%

D.9.9%.

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49. Imhoff cone is used to measure

A.total organic solids

B.total solids

C.total in organic solids

D.settleable solids.

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50. For a grit chamber, if the recommended velocity of flow is 0.2 m/sec and detention period is 2 minutes, the length of the tank, is

A.16 m

B.20 m

C.24 m

D.30 m.

Section 4

1. A nuisance is experienced in diluting water if dilution factor is less than

- [A.100](#)
- [B.60](#)
- [C.40](#)
- [D.20](#)
- [E.10](#)

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2. Traps

- [A. are water seals which prevent the entry of foul gases](#)
- [B. are used to trap the rats entering sewers](#)
- [C. dissolve the foul gases](#)
- [D. create syphonic action to increase the quick disposal of sewerage.](#)

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3. For estimating the peak run off the rational formula $Q = 0.0278 KpA$ was evolved by

- [A. Kinchling](#)
- [B. Lloyd Davis](#)
- [C. Frubling](#)
- [D. all the above.](#)

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4. Pick up the correct statement from the following :

- [A. Inlets are provided on the road surface at the lowest point for draining rain water](#)
- [B. Inlets are generally provided at an interval of 30 m to 60 m along straight roads](#)
- [C. Inlets having vertical openings, are called curb inlets](#)
- [D. Inlets having horizontal openings, are called horizontal inlets](#)
- [E. All the above.](#)

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5. Pick up the correct statement from the following :

- [A. The boning rod is used for checking the levels of the sewer inverts](#)
- [B. Manhole covers are made circular for the convenience of the cleaning staff](#)
- [C. A manhole is classified as deep manhole if its depth is more than 1.5 m](#)
- [D. A manhole is classified as shallow manhole if its depth is. less than 0.9 m](#)
- [E. All the above.](#)

6. 3.0 ml of raw sewage is diluted to 300 ml. The D.O. concentration of the diluted sample at the beginning of the test was 8 mg/l. After 5 day-incubation at 20°C, the DO. concentration was 5 mg/l. The BOD of raw sewerage is

- [A. 100 mg/l](#)
- [B. 200 mg/l](#)
- [C. 300 mg/l](#)
- [D. 400 mg/l.](#)

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7. The arrangement made for passing the sewer line below an obstruction below the hydraulic gradient lines called

[A.](#)inverted syphon

[B.](#)depressed sewer

[C.](#)sag pipe

[D.](#)all of these.

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8. The angle subtended by the surface of sewer water with partial flow, at sewer centre is 120° , the depth of sewerage is

[A.](#)20 cm

[B.](#)25 cm

[C.](#)40 cm

[D.](#)50 cm

[E.](#) 60 cm.

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9. Imhoff cone is used to determine

[A.](#)settlable solids

[B.](#)suspended solids

[C.](#)dissolved solids

[D.](#)none of these.

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10. The sewage discharge in a detritus tank of a treatment plant is 576 litres/sec with flow velocity of 0.2 m/sec. If the ratio of width to depth is 2, the depth is

[A.](#)100 cm

[B.](#)110 cm

[C.](#)120 cm

[D.](#)150 cm.

11. The sewer which received discharge from two or more main sewers, is known as

[A.](#)a trunk sewer

[B.](#)an outfall sewer

[C.](#)a main sewer

[D.](#)an intercepting sewer.

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12. A well oxidized sewage contains nitrogen mainly as

[A.](#)nitrates

[B.](#)nitrites

[C.](#)free ammonia

[D.](#)none of these.

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13. A safety lamp when inserted in the upper portion of a manhole causes flames. It indicates the

presence of

- [A.](#) Carbondioxide gas
- [B.](#) Hydrogen sulphide gas
- [C.](#) Methane gas**
- [D.](#) Petrol vapours.

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14. Assertion (A) : A free board of 0.3 m is provided above the top sewage line in septic tanks.

Reason (R) : It helps to accommodate the scum in the septic tank.

- [A.](#) Both A and R are true and R is the correct explanation of A**
- [B.](#) Both A and R are true but R is not a correct explanation of A
- [C.](#) A is true but R is false
- [D.](#) A is false but R is true.

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15. If D is the diameter of upper circular portion, the area of cross-section of a standard egg shaped sewer, is

- [A.](#) $\frac{(18 + 5\pi)}{32} D^2$
- [B.](#) $\frac{(12 + 5\pi)}{32} D^2$
- [C.](#) $\frac{(18 + 5\pi)}{16} D^2$
- [D.](#) $\frac{(82 + 5\pi)}{32} D^2$

16. Drop manholes at the junctions of sewer lines, are provided if

- [A.](#) invert level of a branch sewer is more than 60 cm that of the main sewer**
- [B.](#) sewer line runs along a main road
- [C.](#) ordinary manhole cannot be built
- [D.](#) two sewer lines intersect.

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17. The most effective arrangement for diverting excess storm water into a natural drainage, is

- [A.](#) leaping weir
- [B.](#) overflow weir
- [C.](#) siphon spill way**
- [D.](#) none of these.

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18. Large diameter sewers subjected to external pressure alone, are reinforced

- [A.](#) near the inner surface of the pipe
- [B.](#) near the outer surface of the pipe
- [C.](#) both (a) and (b)
- [D.](#) with elliptical cage**

[E. none of these.](#)

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19. Pick up the correct statement from the following :

[A.](#) The ratio of the quantity of the diluting water to that of the sewage, is known as dilution factor

[B.](#) The automatic purification of polluted water, is known self purification phenomenon

[C.](#) The photosynthesis is carried out in the presence of sun light

[D.](#) Grab sample is generally obtained from the surface where turbulence mixes the sewage particles

[E.](#) **All the above.**

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20. In sewage, the solids in mg per litre is

[A.](#) 100 to 500

[B.](#) **500 to 1000**

[C.](#) 1000 to 1500

[D.](#) 1500 to 2000

21. In a residential colony, sewers of diameters 100 mm, 150 mm and 225 mm were laid with a gradient 1 in 120. Which portion of the sewage system does not choke in due course of time

[A.](#) 100 mm dia.

[B.](#) 150 mm dia.

[C.](#) **225 mm dia.**

[D.](#) all of these.

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22. If D is the diameter of upper circular portion, the overall depth of New Egg shaped sewer section, is

[A.](#) $1.250 D$

[B.](#) $1.350 D$

[C.](#) $1.425 D$

[D.](#) **$1.625 D$.**

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23. During putrefaction process of sewage the gas given off, is

[A.](#) carbon dioxide

[B.](#) hydrogen

[C.](#) ammonia

[D.](#) methane

[E.](#) **all the above.**

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24. A circular sewer section is preferred to because

[A.](#) it is cheaper in construction

[B.](#) it provides maximum area for a given perimeter

C. it provides maximum hydraulic mean depth

D. all the above.

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25. Assertion (A) : The minimum self cleansing velocity in the sewer, at least once a day, must be generated.

Reason (R) : If certain deposition takes place and is not removed, it obstructs free flow and causes further deposition leading to complete blocking of the sewer.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not a correct explanation of A

C. A is true but R is false

D. A is false but R is true.

26. If the grit in grit chambers is 4.5 million litres per day, its cleaning is done

A. manually

B. mechanically

C. hydraulically

D. electrically.

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27. The gas evolved in sewers is

A. Carbondioxide

B. Hydrogen sulphide

C. Methane

D. All of these.

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28. The maximum depth of sedimentation tanks, is kept

A. 3 m

B. 3.5 m

C. 4 m

D. 4.5 m.

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29. The reduced levels of the string at the consecutive sight rails A and B are 203.575 m, 203.475 m respectively. If the difference of their R.D.s is 10 m, the gradient of the sewer line is

A. 1 in 100 upward

B. 1 in 500 upward

C. 1 in 100 downward

D. 1 in 503 upward.

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30. The detention time (t) of a settling tank, may be defined as the time required for

A. a particle to travel along its length

B. a particle to travel from top surface to bottom sludge zone

C. the flow of sewage to fill the tank

[D.](#)none of these.

31. Discrete or granular particles change their

[A.](#)size

[B.](#)shape

[C.](#)weight

[D.](#)none of these.

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32. For a peak discharge of 0.0157 cumec, with a velocity of 0.9 m/sec, the diameter of the sewer main, is

[A.](#)10 cm

[B.](#)12 cm

[C.](#)15 cm

[D.](#)18 cm

[E.](#)20 cm.

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33. For design of sewers, percentage of sewage discharge is assumed

[A.](#)65 to 70%

[B.](#)70 to 75%

[C.](#)75 to 80%

[D.](#)85%.

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34. In case of sewer lines

[A.](#)water test is carried out to check water tightness of the joints

[B.](#)test for straightness is carried out with the help of a lamp and mirror

[C.](#)obstruction test is carried out with the. help of smooth ball of diameter 13 mm

[D.](#)all the above.

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35. The sewerage system originates from

[A.](#)house sewers

[B.](#)lateral sewers

[C.](#)branch sewers

[D.](#)main sewers

[E.](#)out fall sewers.

36. In sewers the velocity of flow should not be

[A.](#)more than the self-cleansing velocity

[B.](#)less than the self-cleansing velocity

[C.](#)less than 10 m/sec

[D.](#)more than 20 m/sec.

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37. If D is the diameter of a circular sewer and D' is the top horizontal diameter of an equivalent egg shaped section, the relationship which holds good, is

[A.](#) $D' = 0.64 D$

[B.](#) $D' = 0.74 D$

[C.](#) $D' = 0.84 D$

[D.](#) $D' = 0.94 D$.

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38. If a paper moistened with lead acetate for five minutes when placed in manhole turns black. The sewer certainly contains

[A.](#) **Hydrogen sulphide**

[B.](#) Carbon dioxide

[C.](#) Methane

[D.](#) Oxygen

[E.](#) None of these.

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39. The design period of sewage treatment works is normally

[A.](#) 5 - 10 years

[B.](#) **15 - 20 years**

[C.](#) 30 - 40 years

[D.](#) 40 - 50 years.

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40. The porosity of sediments in sewer pipes, is usually taken as

[A.](#) 0.010

[B.](#) 0.011

[C.](#) 0.012

[D.](#) **0.013**

[E.](#) 0.020

41. In septic tanks, decomposition of organic bacteria, is done by

[A.](#) **anaerobic bacteria**

[B.](#) aerobic bacteria

[C.](#) both types of bacteria

[D.](#) none of these.

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42. The stone ware sewers

[A.](#) are used for carrying sewage and drainage from houses

[B.](#) are manufactured from clays and shales

[C.](#) after casting are dried and burnt at temperature 150°C, 700°C and 1200°C

[D.](#) are generally provided with a water proof cover by vaporising sodium chloride

[E.](#) **all the above.**

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43. 'Cowl' is provided at

- [A.lower end of ventilating column](#)
- B.upper end of ventilating column**
- [C.upper end of the manhole](#)
- [D.first step in manhole.](#)

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44. The sewer which transports the sewage to the point of treatment, is called

- [A.house sewer](#)
- B.out-fall sewer**
- [C.branch sewer](#)
- [D.lateral](#)
- [E.main sewer.](#)

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45. Kjeldahl nitrogen is a mixture of

- [A.ammonia and nitrogen](#)
- [B.nitrogen and organic nitrogen](#)
- [C.organic nitrogen and ammonia](#)
- D.all the above.**

46. Pick up the incorrect statement from the following :

- [A.](#) The process of decomposing the organic matter under controlled anaerobic conditions, is called sludge digestion
- [B.](#) Sludge digestion is carried out in sludge tank
- C.The gases produced in sludge digestion process, contain 75% carbon dioxide**
- [D.](#) The gases produced in sludge digestion process, contain 75% methane.

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47. Pick up the correct statement from the following :

- [A.](#) The circular section of sewers provides maximum hydraulic mean depth
- [B.](#) The circular sewers are provided for separate sewerage system
- [C.](#) The circular sewers work efficiently if the sections run at least half full
- [D.](#) Two sewers of different shapes are said to be hydraulically equivalent if they discharge at the same rate while running full on the same grade
- E.All the above.**

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48. You are asked to design sewer pipes of diameters 0.4 m to 0.9 m at maximum flow, you will assume the sewer flow running at

- [A.full depth](#)
- B.half full**
- [C.two third full](#)
- [D.three fourth full.](#)

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49. The ratio of depths at partial flow with central angle α and at full flow of a sewer, is

[A.](#) $1 - \sin \frac{\alpha}{\beta}$

[B.](#) $1 - \cos \frac{\alpha}{2}$

[C.](#) $\frac{1}{2} \left(1 - \cos \frac{\alpha}{2} \right)$

[D.](#) $\frac{1}{2} \left(1 - \sin \frac{\alpha}{2} \right)$

[E.](#) $\frac{1}{2} \left(1 - \tan \frac{\alpha}{2} \right)$

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50. For sewer mains of 0.5 to 1 m diameter, the ratio of maximum daily sewage flow to the average daily sewage flow is assumed

[A.](#)1.5

[B.](#)**2.0**

[C.](#)2.5

[D.](#)3.0

Section 5