



PRACTICE QUESTIONS

for SSC-JE : CBT-2

Irrigation Engineering

Civil Engineering



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Irrigation Engineering

- Q.1** Which of the following is known as 'feeding bottle technique'?
- Drip irrigation
 - Sprinkler irrigation
 - Furrow irrigation
 - None of the above
- Q.2** In border strip method of irrigation, the width of strip is
- 5 - 10 m
 - 10 - 20 m
 - 20 - 30 m
 - 25 - 30 m
- Q.3** The salt concentration in irrigation water should not exceed.
- 2000 ppm
 - 3000 ppm
 - 2500 ppm
 - 5000 ppm
- Q.4** A sprinkler irrigation system is suitable when,
- the land gradient is steep and the soil is easily erodible
 - the soil is having low permeability
 - the water table is low
 - the crops to be grown have deep roots.
- Q.5** The top of the capillary zone:
- lies below the water table at every point.
 - lies above the water table at every point.
 - coincides the water table at every point.
 - None of the above
- Q.6** In a well drained soil, the useful soil moisture for plant growth essentially comes from
- Gravity water
 - Capillary water
 - Hygroscopic water
 - Water of adhesion
- Q.7** Consider the following statement with respect to crop period and base period:
- S1:** Total time from sowing of crop to its harvesting is known as base period.
- S2:** Total time between the first watering of a crop at the time of its sowing to its last watering before harvesting is known as crop period.
- Choose the correct option using the codes given below:
- Both S1 and S2 true
 - S1 true, S2 false
 - Neither S1 nor S2 true
 - S1 false, S2 true
- Q.8** If y is the average numerical deviation in depth of water stored from the average depth of water ' d ' stored in the root zone during irrigation water distribution efficiency (η_d) is given by
- $\left(1 - \frac{d}{y}\right)$
 - $\left(1 - \frac{y}{d}\right)$
 - $\left(\frac{d}{y} - 1\right)$
 - $\left(\frac{y}{d} - 1\right)$
- Q.9** Which of the following is not a cash crop?
- Jute
 - Tea
 - Rice
 - Sugarcane

- Q.10** For supplying water to Rabi crops, Kharif crops and Sugarcane, the canal is design for a capacity equal to the greater of the water requirement of
- (a) Rabi or Kharif
 - (b) Rabi and Kharif or Sugarcane
 - (c) Rabi and Sugarcane or Kharif and Sugarcane
 - (d) Rabi or Kharif or Sugarcane
- Q.11** Duty is largest:
- (a) On the field
 - (b) At the head of main canal
 - (c) Same at all places
 - (d) None of the above
- Q.12** The field irrigation requirement is computed as:
- (a) Consumptive use + Field application losses
 - (b) Net irrigation requirement + Field application losses
 - (c) Net irrigation requirement + Conveyances losses
 - (d) Consumptive use + Conveyance losses
- Q.13** Which of the following is not an estimate for consumptive use?
- (a) Blaney-Criddle formula
 - (b) Manning's equation
 - (c) Hargreaves class A pan evaporation method
 - (d) Penman's equation
- Q.14** A lysimeter is used to measure:
- (a) Infiltration
 - (b) Evaporation
 - (c) Evapotranspiration
 - (d) Radiation
- Q.15** A characteristics feature of a barrage is:
- (a) the provision of a raised crest
 - (b) the creation of a storage reservoir on the upstream side
 - (c) the provision of a series of gate across the river for flow regulation
 - (d) that it is built in delta areas only
- Q.16** Mean water training means:
- (a) Training for discharge
 - (b) Training for depth
 - (c) Training for sediment
 - (d) Training for flood
- Q.17** Groynes are adopted for river bank protection works when it is placed inclined downstream in the direction of flow in the river, it is designated as which one of the following?
- (a) Repelling groyne
 - (b) Attracting groyne
 - (c) Neither Repelling nor attracting groyne
 - (d) Fixed groyne
- Q.18** The Lacey's regime velocity is proportional to:
- (a) $R^{1/2} S^{3/4}$
 - (b) $R^{3/4} S^{1/3}$
 - (c) $R^{2/3} S^{1/3}$
 - (d) $R^{2/3} S^{1/2}$
- Q.19** The narrow strip of land at the ground level between the inner toe of the bank and top edge of cutting is known as:
- (a) Free board
 - (b) Dowala
 - (c) Spoil bank
 - (d) Berm
- Q.20** Lining of irrigation canals:
- (a) Increases water logging
 - (b) Increases channel cross-section
 - (c) Increases command area
 - (d) Increases chances of breaching
- Q.21** Which one of the following does not contribute to water logging?
- (a) Inadequate drainage
 - (b) Seepage from unlined canals
 - (c) Frequent flooding
 - (d) Excessive tapping of ground water

- Q.22** Alkaline soils are best reclaimed by
- (a) leaching
 - (b) addition of gypsum to soil
 - (c) providing good drainage
 - (d) addition of gypsum to soil and leaching
- Q.23** In case of non-availability of space due to topography, the most suitable spillway is
- (a) Straight drop spillway
 - (b) Shaft spillway
 - (c) Chute spillway
 - (d) Ogee spillway
- Q.24** Earthen dams are:
- (a) Rigid dams
 - (b) Non-rigid dams
 - (c) Overflow dams
 - (d) Diversion dams
- Q.25** The axis of a gravity dam is the:
- (a) Line of the crown of the dam on the downstream side.
 - (b) Line of the crown of the dam on the upstream side.
 - (c) Centre line of the top width of the dam.
 - (d) Line joining mid points of the base.
- Q.26** For smooth entry of water in a canal, the angle between head regulator and water is generally kept.
- (a) 60° to 80°
 - (b) 90° to 110°
 - (c) 110° to 130°
 - (d) 120° to 140°
- Q.27** In a syphon Aqueduct:
- (a) Drainage passes over the canal and FSL of the canal is below the bottom of the drainage trough.
 - (b) Drainage passes over the canal and FSL of the canal is above the bottom of the drainage trough.
 - (c) Canal passes over the drainage and HFL of drainage is above the bottom of the canal trough.
 - (d) Canal passes over the drainage and HFL of drainage is below the bottom of the canal trough.
- Q.28** In a sarda type fall, the rectangular crest, may be used for discharge upto
- (a) 6 cumec
 - (b) 10 cumec
 - (c) 14 cumec
 - (d) 20 cumec
- Q.29** The process of making unfertile barren land as fertile land is called.
- (a) Soil conservation
 - (b) Land reclamation
 - (c) Gully erosion
 - (d) Afforestation
- Q.30** The precipitation is measured in terms of
- (a) Intensity of pressure
 - (b) Depth of water
 - (c) Quality of water
 - (d) Volume of water

Answer Keys

1. (a)	2. (b)	3. (a)	4. (a)	5. (b)	6. (b)	7. (c)
8. (b)	9. (c)	10. (c)	11. (a)	12. (b)	13. (b)	14. (c)
15. (c)	16. (c)	17. (b)	18. (c)	19. (d)	20. (c)	21. (d)
22. (d)	23. (b)	24. (b)	25. (b)	26. (b)	27. (c)	28. (c)
29. (b)	30. (b)					

Detailed Solutions

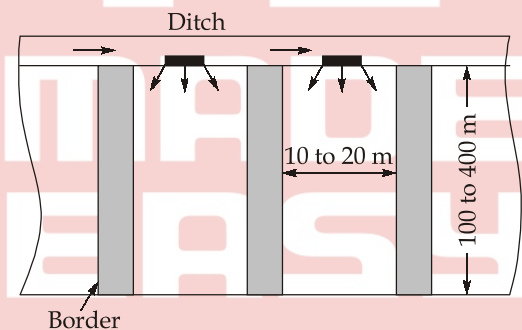
1. (a)

Drip irrigation also known as trickle irrigation, water is applied in the forms of drops directly near the base of plant.

This technique is also known as 'feeding bottle technique' whereby the soil is maintained in the most congenial form by keeping the soil-water air proportions in the optimum range.

2. (b)

In border strip method of irrigation, the land is divided into a number of strips separated by low levees called borders. The land areas confined in each strip is of the order of 10 to 20 m in width, and 100 to 400 m in length



3. (a)

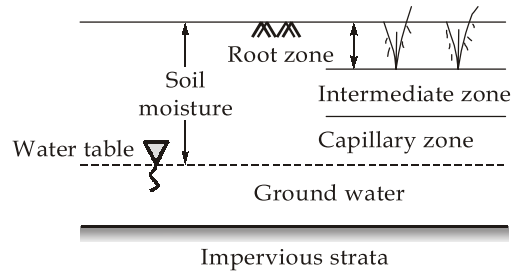
The critical salt concentration in the irrigation water depends upon many factors, yet however, amounts in excess of 700 ppm are harmful to some plants and more than 2000 ppm are injurious to all crops.

4. (a)

The condition favouring the adoption of sprinkler irrigation method:

- (i) When the land topography is irregular and hence unsuitable for surface irrigation.
- (ii) When the land gradient is steeper, and soil is easily erodible.
- (iii) When water table is high.
- (iv) When the water is available with difficulty and is scarce.

5. (b)



From figure capillary zone lies above the water table at every point.

6. (b)

The field capacity water consist of two parts, one part is that which is attached to the soil molecules by surface tension against gravitational forces, and can be extracted by plants by capillarity. This water is called capillary water. The other part is that which is attached to the soil molecules by loose chemical bonds. This water which cannot be removed by capillarity is not available to the plants, and is called the hygroscopic water.

7. (c)

The time period that elapses from the instant of its sowing to the instant of its harvesting is called crop period. The time between the first watering of a crop at the time of its sowing to its last watering before harvesting is called the base period.

8. (b)

Water distribution efficiency, $\eta_d = \left(1 - \frac{y}{d}\right)$

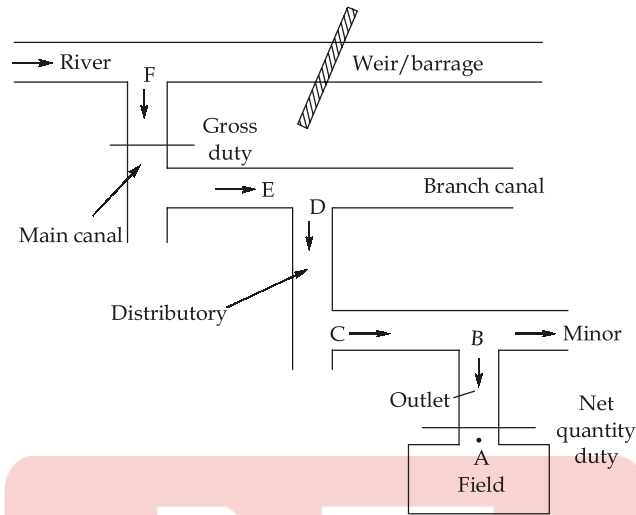
9. (c)

Cash Crop: A cash crop may be defined as a crop which has to be encashed in the market for processing etc. as it cannot be consumed directly by the cultivators. All non-food crops are thus, included in cash crop. Crops like Jute, Tea, Cotton, Tobacco, Sugarcane etc.

10. (c)

Since Sugarcane is perennial crops, requiring water throughout the year. Hence, the canal may be designed for a capacity equal to the greater of the water requirement of Rabi and Sugarcane or Kharif and Sugarcane.

11. (a)



As one moves from head of the canal to the field, the duty of water increases.

$$[D_A > D_B > D_C > D_D > D_E > E_F]$$

12. (b)

Field irrigation requirement (FIR): It is defined as the amount of water required to meet the net irrigation requirement plus the amount of water lost as surface runoff and through deep percolation.

$$FIR = \frac{NIR}{\eta_a}$$

13. (b)

Estimation of consumptive use:

- (i) Blaney criddle formula
- (ii) Hargreaves class A pan evaporation method
- (iii) Penman's equation

14. (c)

Lysimeter is used to measure evapotranspiration.

15. (c)

If most of the ponding is done by gates and a smaller or nil part is done by the raised crest, the barrier is known as barrage, a barrage gives less afflux and a better control upon the river flow, because the inflow and outflow can be controlled to a much greater extent by suitable manipulation of its gates.

16. (c)

Depending upon the purpose for which a river training programme is under taken the river training work may be classified into the following three categories.

- (i) High water training: Undertaken with the primary purpose of flood control.
- (ii) Low water training: It is undertaken with the primary purpose of providing sufficient water depth for navigation during lower water periods.

(iii) Mean water training: It aims at efficient disposal of suspended load and bed load and thus to preserve the channel in good shape.

17. (b)

Attracting groyne: A groyne pointing downstream tends to attract the river flow towards the bank on which it is provided.

18. (c)

Lacey's after analyzing huge data on regime channels has produced a general regime flow equation stating that,

$$V = 10.8R^{2/3} S^{1/3}$$

Hence,

$$V \propto R^{2/3} S^{1/3}$$

19. (d)

Berm is the horizontal distance left at ground level between the toe of the bank and the top edge of cutting.

20. (c)

Advantages of Lining:

Seepage control:

- Prevention of water logging
- Increase in channel capacity
- Increase in command area
- Reduction in maintenance cost
- Elimination of flood dangers

21. (d)

Causes of water logging:

- Over and intensive irrigation
- Seepage of water from adjoining high lands.
- Seepage of water through the canals.
- Impervious obstruction.
- Inadequate surface drainage
- Inadequate natural drainage
- Excessive drains
- Submergence due to floods
- Irregular or flat topography

22. (d)

Alkali soils are best reclaimed by cationic exchange i.e., replacement of alkali from soil colloids by calcium ions. Application of gypsum in the soil reduces alkalinity to a great extent and makes the soil fertile. Good drainage leaches away the by-product of reaction.

23. (b)

A shaft spillway can often be used where there is inadequate space for other types of spillways. It is generally not desirable to use a spillway over or through an earth dam. Thus, on earth dam

location, if there is no enough space or if the topography prevents the use of a chute or side channel spillway, the best alternative would be to use shaft spillway.

24. (b)

Rigid dam and Non-rigid dams: Rigid dams are those which are constructed of rigid material like masonry, concrete, steel, timber etc. While non-rigid dams are constructed of earth and rockfill.

Diversion dam: A diversion dam is generally called a weir or barrage

Overflow dams: They are often called spillways.

25. (b)

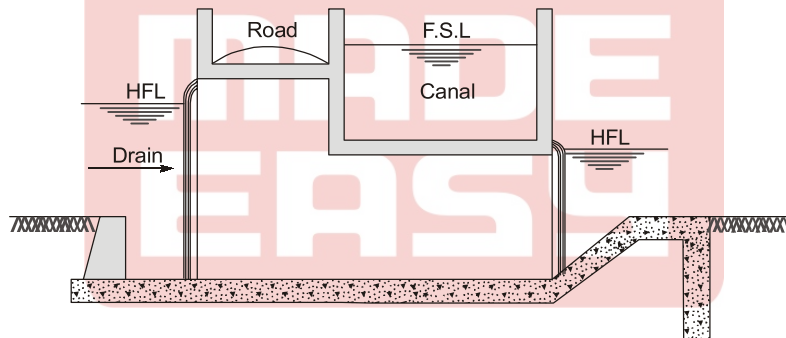
The line of the upstream face of the dam, or the line of the crown of the dam, if the upstream face in sloping is taken as the reference line for layout purposes etc. and is known as the base line of the dam or the axis of the dam.

26. (b)

A canal head regulator is provided at the head of the offtaking canal. The regulator is generally aligned at right angle to the weir, but slightly larger angles (between 90° to 110°) are considered preferable for providing smooth entry of water into the regulator.

27. (c)

Syphon Aqueduct: In this type of cross drainage work canal is taken over the natural drain. Also the HFL of the drain is higher than the canal bed.



Syphon aqueduct

28. (c)

For design of sarda type fall. A rectangular crest with both faces vertical has been suggested for discharge under 14 cumec.

29. (b)

Land reclamation is a process by which an uncultivable land is made fit for cultivation.

30. (b)

Precipitation is expressed in terms of the depth to which rainfall water would stand on an area if all the rain were collected on it.





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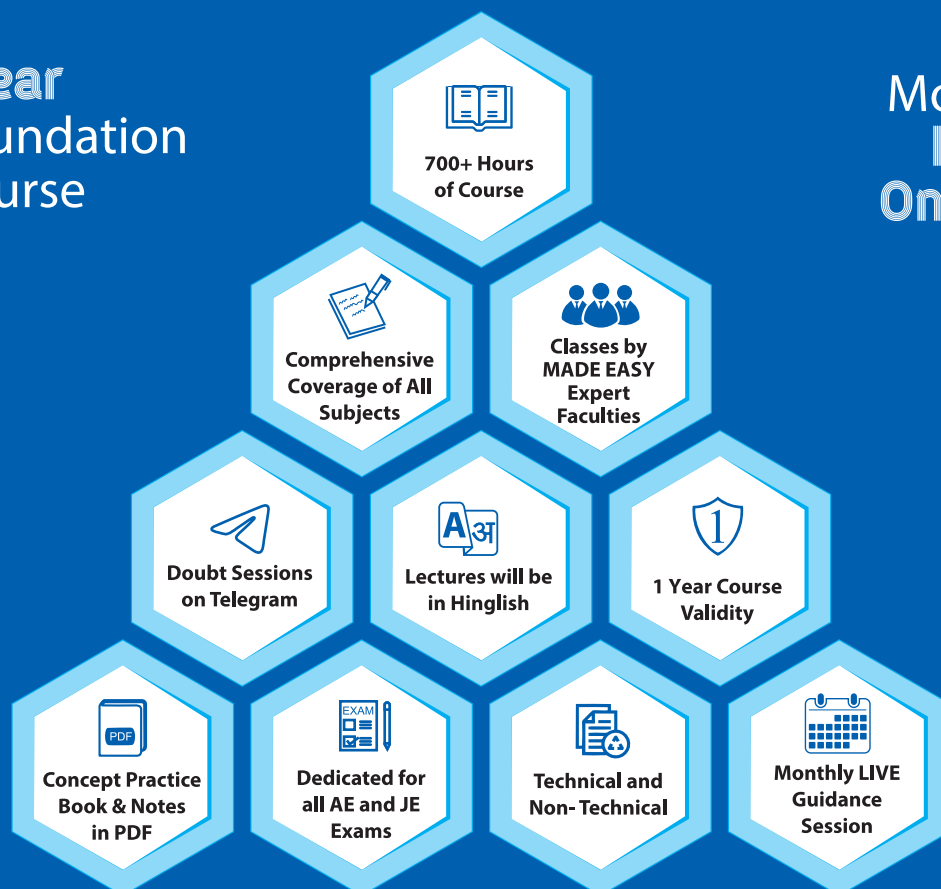
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