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DEPARTMENT OF COMPUTER ENGINEERING

THIRD YEAR (TY)

SCHEME: I

SEMESTER: V

NAME OF SUBJECT: Water Resource Engineering

Subject Code: 22501

**UNIT WISE MULTIPLE CHOICE
QUESTIONS BANK**



Question Bank for Multiple Choice Questions

Program: Diploma in Civil Engineering	Program Code:- CE
Scheme:-I	Semester:- 5
Course:- Water Resource Engineering (WRE)	Course Code:- 22501

Unit 1. Introduction to Irrigation and Hydrology	Marks:-14
Content of Chapter:- 1.1 Irrigation and its Classification of irrigation on the basis of purpose and surface. 1.2 Hydrology definition and Hydrologic cycle. 1.3 Rain Gauge-Symons rain gauge, automatic rain gauge. 1.4 Method of calculating average rainfall, Arithmetic mean, Thiessons polygon, Isohytal method. 1.5 Runoff, Factors affecting Run off, Computation of run off. 1.6 Maximum Flood Discharge (MFD) measurement, Rational Method and Empirical method, Simple numerical problems. 1.7 Yield and Dependable yield of a catchment, determination of dependable yield	

Unit 1- Introduction to Irrigation and Hydrology

1. Irrigation is

- Water Supply
- Artificial Supply
- Artificial application of water to field
- None of these

Answer: - Option C

Explanation: - Irrigation is artificial application of water to the growth of crop.

2. Irrigation Engineering includes

- Planning of irrigation Structures
- Construction of irrigation structures.
- Artificial application of water to field
- All of the above.

Answer: - Option C

3. Waterlogging is

- Advantages of irrigation
- Disadvantages of Irrigation
- Ill effects of irrigation
- All of the above.

Answer: - Option C

4. A year in which annual rainfall is less than 80% of annual average rainfall, it is called as
- Normal year
 - Bad year
 - Good year
 - None of these

Answer: - Option b

5. Which of the following is the Non-recording Rain Gauge?

- Tipping bucket type
- Simon's rain gauge
- Steven's weighing type rain gauge
- Floating type rain gauge

Answer: - Option b

Explanation: - It requires manual operations.

6. A rain gauge should preferably fixed

- Near the building
- Under the tree
- In an open space
- In a closed space

Answer: - Option c

Explanation: - In open space errors minimized and gauge collect rainwater without obstacles.

7. Unit of runoff is

- Cubic metre/sec
- Metre/sec
- Cubic metre
- Square metre

Answer: - Option c

Explanation: - It is volume of water.

8. Which process included in hydrological cycle?

- precipitation
- runoff
- evaporation
- all of the above

Answer: - Option d

9. Which is the form of liquid precipitation?

- Snow
- Rain
- Sleet
- All of The Above

Answer: - Option b

Explanation: - Other two form are ice fall.

10. In India, rain fall is generally recorded at

- a. 8:00 AM
- b. 12 noon
- c. 4:00 PM
- d. 8:00 PM

Answer: - Option a

Explanation: - As per Indian Standards.

11. The runoff is affected by

- a. Type of precipitation
- b. Rain intensity and duration of rainfall
- c. Rain distribution and soil moisture deficiency
- d. All the above

Answer: - Option d

Explanation: - Above all factors responsible for runoff quantity.

12. Which of the following is true?

- a. $\text{Runoff} = \text{Evaporation} - \text{precipitation}$
- b. $\text{Precipitation} - \text{infiltration} = \text{Runoff}$
- c. $\text{Precipitation} - \text{evaporation} = \text{Runoff}$
- d. $\text{Evaporation} - \text{precipitation} = \text{Runoff}$

Answer: - Option b

13. Precipitation is usually expressed in which of the following units?

- a. g/m²
- b. mm
- c. ml
- d. grams

Answer: - Option b

Explanation: - it is depth of water so expressed in mm.

14. Isohyets are the imaginary lines joining the points of equal

- a. Pressure
- b. Height
- c. Humidity
- d. Rainfall

Answer: - Option d

Explanation: - line joining equal rainfall stations is isohyets. In line of isohyets everywhere same rainfall.

15. $\text{Runoff} = K \cdot P$, where k is called?

- a. Pressure coefficient
- b. Discharge coefficient
- c. Runoff coefficient
- d. None

Answer: - Option c

Explanation: - Slandered formula.

16. Maximum Flood Discharge is the discharge during

- a. Rainfall
- b. Runoff
- c. Maximum flow
- d. Flood

Answer: - Option c

Explanation: - It is measured during Maximum flow of water after precipitation.

17. Infiltration capacity of soil depends upon

- a. Number of voids present in soil
- b. Shape and size of soil particles
- c. Arrangements of soil particles
- d. All of above

Answer: - Option d

18. Annual rainfall is the total rainfall in a _____

- a. Day
- b. Year
- c. Week
- d. Month

Answer: - Option b

Explanation: - It is rainfall measured in year in a station.

19. Water Logging causes

- a. Infertility of soil
- b. Uncultivable land
- c. Dampness
- d. All of above

Answer: - Option d

Explanation:-

20. A year in which annual rainfall is 100% of annual average rainfall, it is called as

- a. Normal year
- b. Bad year
- c. Good year
- d. None of these

Answer: - Option b

Explanation:- It is optimum condition where rainfall equal to average annual rainfall (average of 35 year rainfall).

21. Which of following shape catchment having more discharge

- a. Fan
- b. Fern
- c. Leaf
- d. All of above

Answer: - Option a

Explanation:- Fan shape catchment area having More catchment area.

22. Which of following method giving more accurate result

- a. Arithmetic mean
- b. Isohyetal Method
- c. Both a and b
- d. None of above

Answer: - Option b

23. Which of following method more economical

- a. Flow irrigation
- b. Lift irrigations
- c. Both a and b
- d. None of above

Answer: - Option a

Explanation:- Flow irrigation maintenance and construction and operational cost is low.

24. Which of following is not advantages of irrigation

- a. Food production
- b. Fishing
- c. Mixed cropping
- d. Water logging

Answer: - Option D

25. The irrigation is necessary in an area..

- a. Where there is a scanty rainfall
- b. Where there is a non-uniform rainfall
- c. Where commercial crop require more water
- d. All of the above

Answer: - Option d

26. Irrigationthe chances of water logging.

- a. Increase
- b. Decreases
- c. Equals
- d. All of the above

Answer: - Option a

27. Hydrology helps in.

- a. Predicting maximum flows
- b. Deciding the minimum reservoir capacity
- c. Forecasting the availability of quantity of water at reservoir site
- d. All the above.

Answer: - Option D

28. Pick up the correct equation from the following :

- a. Run off = Surface run off + Ground water flow
- b. Run off = Surface run off - Ground water flow
- c. Run off = Surface run off / Ground water flow
- d. Run off = Surface run off x Ground water flow.

Answer: - Option A

29. A recording type rain gauge

- a. produces a mass curve of rain fall
- b. records the cumulative rain
- c. is sometimes called integrating rain gauge or continuous rain gauge
- d. All the above.

Answer: - Option D

30. In India the recording type rain gauge generally used, is

- a. Weighing type
- b. Tipping type
- c. Float recording type
- d. None of these.

Answer: - Option C

31. For determination of average annual precipitation in a catchment basin, the best method is

- a. Arithmetical method
- b. Thiess n's mean method
- c. Isohyetal method
- d. None of these.

Answer: - Option C

32. The run off is affected by

- a. Type of precipitation
- b. Rain intensity and duration of rainfall
- c. Rain distribution and soil moisture deficiency
- d. All the above.

Answer: - Option D

33. The initial basin recharge is equal to

- a. Interception
- b. depression storage
- c. rain absorbed by the moisture deficiency
- d. All the above.

Answer: - Option D

34. The run off a drainage basin is

- a. Initial recharge + ground water accretion + precipitation
- b. Precipitation + ground water accretion + initial recharge
- c. Precipitation - ground water accretion + initial recharge
- d. Precipitation - ground water accretion - initial recharge.

Answer: - Option D

35. Symons's rain gauge is

- a. Tipping-bucket gauge
- b. Weighing type gauge
- c. Float recording gauge
- d. Non-recording gauge.

Answer: - Option D

36. The rainfall cycle period in India is taken as

- a. 35 years.
- b. 20 years
- c. 30 years
- d. 25 years

Answer: - Option A

37. Isohyets are the imaginary lines joining the points of equal

- a. Pressure
- b. Height
- c. Humidity
- d. Rainfall.

Answer: - Option D

38. Estimate maximum flood discharge from 300 Sqkm in maharashtra state using Inglis formula.

- a. 2094.96 cum/sec
- b. 1094.96 cum/sec
- c. 3094.96 cum/sec
- d. 4094.96 cum/sec

Answer: - Option A

39. Estimate maximum flood discharge from 300 Sqkm in Maharashtra state using Dickens formula $c=30$.

- a. 2162.53 cum/sec
- b. 2094.96 cum/sec
- c. 3094.96 cum/sec
- d. 4094.96 cum/sec

Answer: - Option A

40. Yield Means.....

- a. Quantity of water available
- b. Precipitation available
- c. Flood Discharge
- d. All above

Answer: - Option a

Explanation:- Water available for use after all losses take place.

41. Rainfall for five stations are 20mm, 35mm,0mm,10mm,35mm with arithmetic mean method average rainfall is

- a. 10mm
- b. 20mm
- c. 25mm
- d. 30mm

Answer: - Option b

Prepared By Mr. Khade M. V.	Verified By Mr. Khade M. V. Module Coordinator	Re-Verified By Mr. Ranvir B. G. Academic Coordinator	Approved By Mr. Jadhav P.L. HoD CE



Unit-2. Crop Water Requirement and Reservoir Planning

Marks:-16

Content of Chapter:-

- 2.1 Crop water requirement: Crop period, base period, Duty, Delta, CCA, GCA, intensity of irrigation, factors affecting duty, relation between duty, delta and base period. Problems on water requirement and capacity of canal.
- 2.2 Method of application irrigation water and its Assessment of irrigation water.
- 2.3 Survey for irrigation project, data collection for irrigation project.
- 2.4 Area capacity curve,
- 2.5 Silting of reservoir, rate of silting, factors affecting silting, control measures.
- 2.6 Fixing Control levels and respective storage in reservoir.
- 2.7 Simple numerical problems on Fixing Control levels.

1. The project costing above 5 Cr. and having Cultivable Command Area (CCA) more than 10000 ha then the project is classified as

- a. Medium project
- b. Minor project
- c. Major project
- d. None of these

Answer: - Option c

2. The Crop period is period.....

- a. Sowing to harvest
- b. First watering to harvest
- c. Last watering to harvest
- d. None of these

Answer: - Option a

3. The Crop water requirement is period.....

- a. Water required for harvesting
- b. Water Required for growth of crop
- c. Both A and B
- d. None of these

Answer: - Option b

4. The capacity of canal is.....

- a. Min water carrying capacity
- b. Max water carrying capacity.
- c. Both A and B
- d. None of these

Answer: - Option b

5. The Base period is period.....

- a. Sowing to harvest
- b. First watering to Last watering
- c. Last watering to harvest
- d. None of these

Answer: - Option b

6. The project costing above 25 lakh and having Culturable Command Area (CCA) less than 2000 ha then the project is classified as

- a. Medium project
- b. Minor project
- c. Major project
- d. None of these

Answer: - Option c

7. The relation between duty D in hectares/ cumec, depth of water Δ in metres and base period B in days is given by

- a. $\Delta = \frac{1.98 B}{D}$
- b. $\Delta = \frac{8.64 B}{D}$
- c. $\Delta = \frac{5.68 B}{D}$
- d. $\Delta = \frac{8.64 D}{B}$

Answer: - Option b

8. The water stored in reservoir below the minimum pool level is called

- a. Useful storage
- b. Dead storage
- c. Valley storage
- d. Surcharge storage

Answer: - Option b

9. For a flood control reservoir, the effective storage is equal to

- a. Useful storage-valley storage
- b. Useful storage-surcharge storage
- c. Useful storage + surcharge storage +valley storage
- d. Useful storage + surcharge storage-valley storage

Answer: - Option d

10. The total depth of water required by a crop during the entire period the crop is in the field is known as

- a. Delta
- b. Duty
- c. Base period
- d. Crop period

Answer: - Option a

11. Crop ratio is the ratio of are irrigated

- a. In Rabi season to Kharif season
- b. In Kharif season to Rabi season
- c. Under perennial crop to total crop
- d. Under perennial crop to non-perennial crop

Answer: - Option a

12. The depth of rice root zone, is

- a. 50 cm
- b. 70 cm
- c. **90 cm**
- d. 60 cm

Answer: - Option c

13. Water supply through pipelines and tube wells to farms is known as

- a. Fertilization
- b. Hydration
- c. Pollination
- d. Irrigation

Answer: - Option d

14. Which of the following statement is correct for sprinkler irrigation method?

- a. It is used for rice and jute
- b. It is used for the soil and has very low infiltration rate
- c. it is best suitable for very light soil
- d. It requires borders and field channels

Answer: - Option c

15. Method of applying water directly to the root zone of the plant is called

- a. Check flooding
- b. Drip method
- c. Furrow method
- d. Sprinkler irrigation

Answer: - Option d

16. A sprinkler irrigation system is suitable when

- a. The load gradient is steep and the soil is easily erodible
- b. The soil is having low permeability
- c. The water table is low
- d. The crops to be grown have deep roots

Answer: - Option a

17. The intensity of irrigation means

- a. Percentage of cultivable commanded area to be irrigated annually
- b. Percentage of gross commanded area to be irrigated annually
- c. Percentage of the mean of cultivable commanded area and the gross commanded area to be irrigated annually
- d. Total depth of water supplied by the number of watering

Answer: - Option a

18. Which of the following is not a Rabi crop?

- a. Ground nut
- b. Wheat
- c. Barley
- d. Potato

Answer: - Option a

19. Discharge is measured in

- a. cumecs
- b. m
- c. cm
- d. ml

Answer: - Option a

20. How can we improve the duty of water?

- a. Lining of canals
- b. Construction of weir
- c. Construction of dam
- d. Check dam

Answer: - Option a

21. What is the time interval between two consecutive watering called?

- a. Crop period
- b. Period
- c. Base period
- d. Rotation period

Answer: - Option d

22. What is total depth of water, for complete growth of crop called?

- a. Delta
- b. Duty
- c. Base period
- d. None of these

Answer: - Option a

23. Period of kharif season is days

- a. 123
- b. 124
- c. 122
- d. 121

Answer: - Option a

24. Period of Rabi season is days

- a. 123
- b. 124
- c. 122
- d. 121

Answer: - Option c

25. Which of following crop yearly?

- a. Cotton
- b. Sugarcane
- c. Rice
- d. Jawar

Answer: - Option b

Explanation:- Sugarcane required 360 days to come maturity i.e. period from its sowing to harvest.

26. Which of following accurate method of assessment of water?

- a. Area
- b. Volumetric
- c. Seasonal
- d. Permanent

Answer: - Option b

27. Silting of reservoir means

- a. Full of water
- b. Silt
- c. Silt deposition
- d. All above

Answer: - Option c

28. Silting of reservoir controlled by

- a. Selection of proper dam site
- b. Constructing check dam
- c. Providing vegetation
- d. All above

Answer: - Option d

29. Highest level of Dam is

- a. TBL
- b. HFL
- c. FTL
- d. All above

Answer: - Option a

30. Highest level of reservoir is

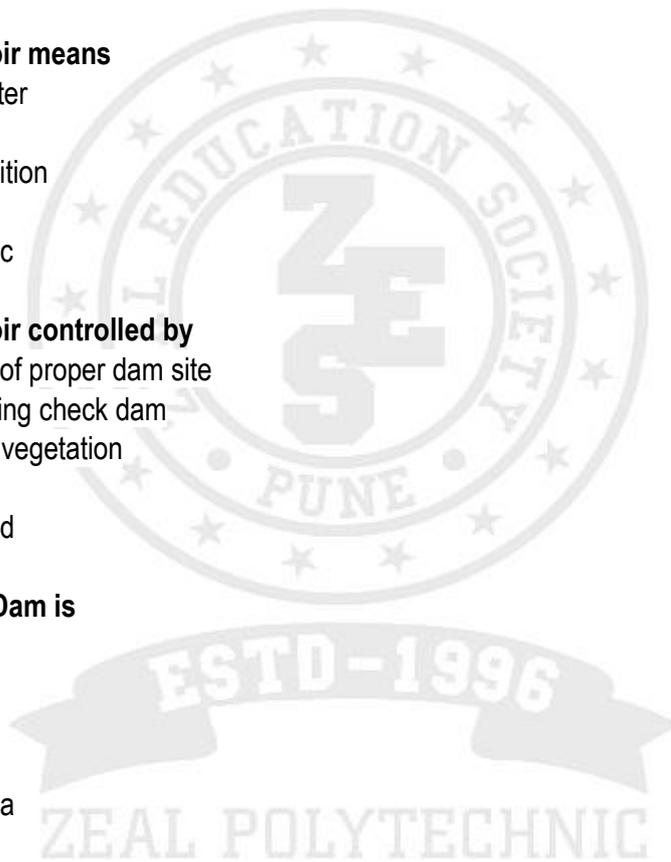
- a. TBL
- b. HFL
- c. FTL
- d. All above

Answer: - Option a

31. Lowest level of Dam is

- a. TBL
- b. HFL
- c. DSL
- d. GL

Answer: - Option d



32. Consumptive use of a crop during growth, is the amount of

- a. Interception
- b. Transpiration
- c. Evaporation
- d. All the above.

Answer: - Option d

Explanation:- Crop require water to its growth along with evaporation, transpiration, infiltration.

33. For the estimate of high floods in fan-shaped catchment, the formula used is

- a. Dicken's formula
- b. Ryve's formula
- c. Inglis formula
- d. None of these.

Answer: - Option c

34. Hydrograph is a graphical representation of

- a. Surface run off
- b. Ground water flow
- c. Discharge flowing in the river
- d. None of these.

Answer: - Option c

35. What is the time interval between the sowing and harvesting of crops?

- a. Base period
- b. Kor period
- c. Crop period
- d. Season period

Answer: - Option c

36. Crop period is approximately assumed to be the same as that of the base period

- a. Base period
- b. Season
- c. Rabi
- d. None of above

Answer: - Option a

37. Area Capacity curve useful to

- a. Reservoir planning
- b. Dam designing
- c. Both A and B
- d. None of above

Answer: - Option b

38. What is called as the percentage of C.C.A irrigated at a time in one crop season?

- a. Gross Command Area
- b. Culturable cultivated area
- c. Culturable uncultivated area
- d. Intensity of irrigation

Answer: - Option d

39. Area under sugarcane is 100 ha and delta is 180cm calculate duty.

- a. 1036.80 ha/comec
- b. 130.80 ha/comec
- c. 136.80 ha/comec
- d. 10036.80 ha/comec

Answer: - Option a

Explanation:- Use relationship between duty delta and base period to find out duty

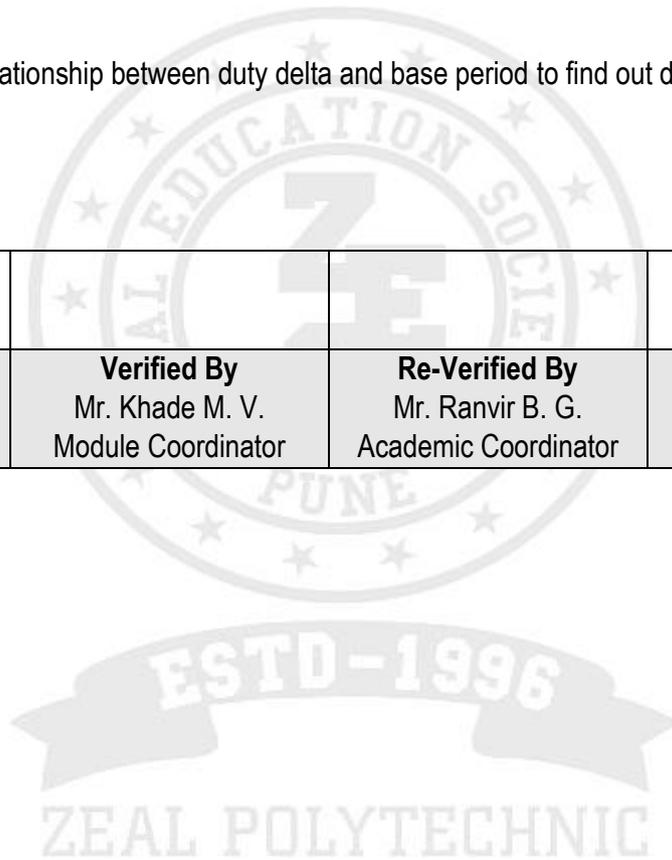
40. Calculate the delta for kharif jawar having duty as 2500ha/cumec.

- a. 41.2 cm
- b. 42.5 cm
- c. 43.2 cm
- d. 40.2cm

Answer: - Option b

Explanation:- Use relationship between duty delta and base period to find out duty.

Prepared By Mr. Khade M. V.	Verified By Mr. Khade M. V. Module Coordinator	Re-Verified By Mr. Ranvir B. G. Academic Coordinator	Approved By Mr. Jadhav P.L. HoD CE





Unit-3. Dams And Spillways

Marks:-12

Content of Chapter:-

- 3.1 Dams and its Classification Earthen and Gravity Dam. (Masonry and concrete)
- 3.2 Earthen Dams -Components and their function, typical cross section seepage through embankment and foundation seepage control through embankment and foundation.
- 3.3 Methods of constructions, types of failure of earthen dams and preventive measures.
- 3.4 Gravity Dams forces acting on gravity dam, Theoretical and practical profile, typical cross section, drainage gallery, joint in gravity dam, high dam and concept of low dam.
- 3.5 Spillways-Definition, function, location and components.
- 3.6 Emergency and services, ogee spillway and bar type spillway, discharge over spillway. Energy dissipation Spillway with and without gates.
- 3.7 Gates-Radial and Vertical

1. Portion of dam in contact with ground at downstream side is known as

- a. Heel
- b. Toe
- c. Crest
- d. Top

Answer: - Option a

2. Structure constructed across river to store water is known as

- a. Dam
- b. Barrage
- c. Weir
- d. All above

Answer: - Option d

3. Is not type of Gravity Dam.

- a. Earth
- b. Concrete
- c. Masonry
- d. All above

Answer: - Option a

4. Is Dam is stronger.

- a. Earthen
- b. Concrete
- c. Rock fill
- d. All above

Answer: - Option b

5. Grass planted on d/s side

- a. For aesthetic view
- b. Erosion Control
- c. Both A and B
- d. None of above

Answer: - Option b

6. What is the arrangement made near top of dam for passage of excess water from the reservoir?

- a. Gallery
- b. Spillway
- c. Sluice
- d. Abutments

Answer: - Option b

7. Earth dams are _____ in shape.

- a. Triangular
- b. Circular
- c. Rectangular
- d. Trapezoidal

Answer: - Option d

8. The obstruction or a barrier built across the stream or river is called _____

- a. Barrage
- b. Weir
- c. Dam
- d. Reservoir

Answer: - Option c

9. _____ dam which resists are the external forces by virtue of its self-weight

- a. Earthen dam
- b. Storage dam
- c. Detention dam
- d. Gravity dam

Answer: - Option d

10. Which of the following forces do not act on the dam?

- a. Silt pressure
- b. Wave pressure
- c. Creep pressure
- d. Uplift

Answer: - Option c

11. The elementary profile of a dam is generally a _____

- a. Rectangle
- b. Equilateral triangle
- c. Square
- d. Circular

Answer: - Option b

Explanation:- Triangle is most stable figure.

12. _____ is the common type of spillway used in gravity dams.

- a. Ogee spillway
- b. Trough spillway
- c. Side channel spillway
- d. Emergency spillway

Answer: - Option a

13. The free board is provided in dams to avoid _____

- a. Piping
- b. Overtopping
- c. Wave erosion
- d. Foundation of upstream

Answer: - Option b

14. The hydraulic fill is _____

- a. Method of construction of Concrete dam
- b. Method of construction of rock fill dam
- c. Method of construction of earthen dam
- d. All above

Answer: - Option c

15. Which of the following spillways is least suitable for an earthen dam?

- a. Ogee spillway
- b. Chute spillway
- c. Side channel spillway
- d. Shaft spillway

Answer: - Option a

Explanation:- Not easy to construct with earth material.

16. Stone pitching or riprap is generally provided to avoid _____

- a. Overtopping
- b. Erosion on u/s and d/s face
- c. Cracking due to frost action
- d. Gully formation

Answer: - Option b

17. The blanket in earth dam is provided _____

- a. At the ground level on u/s side
- b. At the ground level on the d/s side
- c. At the ground level of the D/s side of the dam
- d. On the D/s slope

Answer: - Option a

18. The force acting on a gravity dam which causes stability is

- a. Reservoir water pressure
- b. Wind pressure
- c. Earth and silt pressure
- d. Weight of the dam

Answer: - Option d

Explanation:- Body weight of dam provides stability to dam.

19. A solid barrier constructed at a suitable location across a river valley to impound water is called _____

- a. Reservoir
- b. Dam
- c. Bridge
- d. Retaining wall

Answer: - Option b

Explanation:- Dam constructed to store water.

20. The safety valve of a dam is its _____

- a. Drainage gallery
- b. Inspection gallery
- c. Spillway
- d. Outlet sluices

Answer: - Option b

Explanation:- Water from dam totally controlled by Spillway.

21. The safety valve of a dam is its _____

- a) drainage gallery
- b) inspection gallery
- c) spillway
- d) outlet sluices

Answer: Option c

Explanation: A spillway is essentially a safety valve for the dam and must be properly designed. It should have adequate capacity to dispose off the entire surplus water from upstream to downstream at the time of the arrival of the worst design flood.

22. An ungated spillway starts functioning as soon as the water level in the reservoir crosses the _____

- a) maximum reservoir level
- b) minimum reservoir level
- c) maximum conservation level
- d) full Supply level

Answer: Option c

Explanation: Maximum conservation level is nothing but normal pool level which is the maximum elevation to which the reservoir water surface will rise during normal operating conditions. This is equivalent to the elevation of the spillway crest or the top of the spillway gates, such uncontrolled spillways are only guided by the available water head.

23. Which of the following is the simplest type of spillway and may be constructed on small bunds or thin arch dams?

- a) Straight drop spillway
- b) Ogee spillway
- c) Shaft spillway
- d) Siphon spillway

Answer: Option a

Explanation: Straight drop weir or Overfall spillway is a low weir and simple vertical fall type structure. It is the simplest type of spillway and can be constructed on small bunds, thin arches, etc. The downstream face of the spillway may be kept vertical or slightly inclined.

24. The spillway can be best built independently of the dam when there is

- a) deep narrow gorge with steep slopes
- b) deep narrow gorge with gradual slopes
- c) wide gorge with a gradual slope
- d) wide valley with moderate slopes

Answer: Option a

Explanation: The spillway can be best built independently of the dam where there is a deep narrow gorge with steep banks separated from a flank by a hillock with its level above the top of the dam. A concrete or an earthen dam can be constructed across the main valley and a spillway can be constructed independently into the saddle under such circumstances.

25. Which of the following is a secondary safety arrangement?

- a) Safety valves
- b) Spillway gates
- c) Subsidiary spillway
- d) Energy dissipaters

Answer: Option c

Explanation: If at the worst condition the water rises above the maximum reservoir level it will overtop such an embankment. A secondary safety arrangement known as subsidiary dam or emergency spillway or breaching section is generally provided on large dams for the disposal of excess water, especially on earthen and rock-fill dams.

26. Which of the following spillway is least suitable to earthen dams?

- a) Ogee spillway
- b) Chute spillway
- c) Side-channel spillways
- d) Shaft spillway

Answer: Option a

Explanation: It is an improvement over the free over-fall spillway. It is mostly suitable for concrete gravity dams especially when the spillway is located within the body of the dam in the same valley.

27. If the operating head on an ogee spillway is more than the design head then

- a) the pressure on the crest will be zero
- b) the pressure on the crest will be negative causing cavitation
- c) the pressure on the crest will be positive
- d) the discharge coefficient of the spillway will be reduced

Answer: Option b

Explanation: The lower nappe of the falling jet may leave the ogee profile when the operating head of the spillway is more than the design head. This generates negative pressure at the point of separation which leads to the formation of cavities in the water resulting in cavitation.

28. In the functioning of an ogee spillway, the operating head _____

- a) frequently exceeds the design head
- b) rarely exceeds the design head
- c) never exceeds the design head
- d) has no connection with the design head

Answer: Option b

Explanation: An ogee spillway is designed for maximum head up to RL of maximum reservoir level; there are almost no chances of operating head exceeding the design head. Under rare emergency as in excessive floods, it may become necessary to allow the reservoir level to go even above the MRL in such case the operating head may exceed the design head.

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29. Which of the following spillway is an improvement over free overflow spillway?

- a) Straight drop spillway
- b) Open channel spillway
- c) Overflow spillway
- d) Siphon spillway

View Answer

Answer: Option c

Explanation: Ogee spillway is an improvement over free overflow spillway and is widely used with concrete, arch and buttress dam. The profile is made such that the shape of the lower nappe of a freely falling jet over a duly ventilated sharp-crested weir.

30. If the head of the water over the spillway is less than the design head, then _____

- a) the pressure on the crest will be zero
- b) the pressure on the crest will be negative causing cavitation
- c) the discharge coefficient of the spillway is increased
- d) the discharge coefficient of the spillway will be reduced

View Answer

Answer: Option d

Explanation: If the head of water over the spillway is less than the design head, the falling jet would adhere to the crest of the ogee spillway. This causes positive hydrostatic pressure and thereby reduces the discharge coefficient of the weir.

31. The spillway which can be called as an overflow spillway is essentially _____

- a) an ogee spillway
- b) a shaft spillway
- c) a chute spillway
- d) a syphon spillway

Answer: Option a

Explanation: Ogee spillway is also called as overflow spillway and is an improvement over straight drop spillway. In this spillway, the water jet falls clearly away from the face of the spillway and the gap between the jet and the face is kept ventilated.

32. Which of the following plot is useful in determining the clearance for the spillway deck bridge and the top levels of walls on the side of the spillway?

- a) The coordinates of the lower nappe
- b) The coordinates of the upper nappe
- c) Both the coordinates of upper and lower nappe
- d) The origin or apex of crest

Answer: Option b

Explanation: The crest profile is determined by the coordinates of the lower nappe. The plotting of the upper nappe is useful in determining the clearance for the spillway deck bridge and the top levels of the training walls on the side of the spillway.

33. What is the satisfactory radius for the reverse bottom curve which is provided at the downstream end of the spillway?

- a) One-fourth of the spillway height
- b) Equal to the spillway height
- c) Half the value of the spillway height
- d) One-third of the spillway height

Answer: Option a

Explanation: A smooth gradual reverse curvature is provided at the bottom of the downstream face after the plotting of the profile of the spillway. The curve turns the flow into the discharge channel. The satisfactory radius of the curve is taken as one-fourth of the spillway height.

34. If the upstream face of the spillway is kept vertical, the crest shape should also confirm to the lower nappe of an inclined sharp-crested weir.

- a) True
- b) False

Answer: Option b

Explanation: If the upstream face of the spillway is kept vertical, the crest shape confirms to the lower nappe of a vertical sharp-crested weir under the maximum head. But if u/s face is kept sloping the crest shape should also confirm to the lower nappe obtained for an inclined sharp-crested weir.

35. In a fixed roller of a spillway gate, the rollers are attached to the _____

- a) gate
- b) groove gate
- c) either gate or groove gate
- d) guide grooves

Answer: Option a

Explanation: Rollers are generally attached to the gate and ride in tracks on the downstream side of the groove guide. The openings between the upstream leaf plate and the sides of the pier grooves are sealed using rubber seals.

36. In the vertical Stoney spillway gate, the rollers are placed between the _____

- a) gate and u/s groove guide
- b) gate and the d/s groove guide
- c) u/s and d/s groove guide
- d) attached to the gate and groove guides

Answer: Option b

Explanation: A train of the roller is generally placed in between the gate and the d/s guide. These rollers may be placed independent of the gate and the guide thus eliminating the axle friction but rolls vertically between the two when the gate is moved.

37. The spillway gate which when lowered cannot be seen from a distance is of the type _____

- a) Sliding gate
- b) Roller gate
- c) Tainter gate
- d) USBR drum gate

Answer: Option d

Explanation: The system of drum gates consists of a segment of a cylinder which may be raised or lowered into the recess made into the top of the spillway. Whenever the drum is lowered, the surface becomes coincident with the designed ogee shape of the crest.

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38. The most common vertical lift gates in modern days is _____

- a) sliding gates
- b) free-roller gates
- c) stoney gates
- d) fixed wheel gates

Answer: Option d

Explanation: The design and construction of free-roller gate are difficult as the rollers are not attached to the gate and the guide. Therefore, the rollers are attached to the gate. Large vertical lift gates are broken into two horizontal sections to reduce the load on the hoisting mechanism.

39. The working of Reinold's gate is automatic.

- a) True
- b) False

Answer: Option a

Explanation: It is a rectangular gate fixed with rollers and it moves up and down along the upstream vertical face of the spillway. The gate is suspended by means of chains which pass over the pulleys and to the other end of the chains a counterweight is attached.

40. Which of the following gate is also called flush boards?

- a) Dropping shutters
- b) Tainter gates
- c) Drum gates
- d) Vertical lift gates

Answer: Option a

Explanation: Dropping shutters are also called permanent flush boards. They are generally used to raise the water level by 1 to 1.25 m. This type consists of shutters or plates made of steel which are hinged at the bottom.

41. Which one of the following gate is not suitable for curved crests?

- a) Flush boards
- b) Tainter gates
- c) Drum gates
- d) Vertical lift gates

Answer: Option a

Explanation: In flush boards, the shutters are hinged at the bottom and are supported by struts. Whenever the water level rises above the top of the shutters they dropdown. Hence they are not suitable for curved crests.

42. Which of the following gate works on the principle of counterweights against the water pressure?

- a) Dropping shutters
- b) Stop logs and needles
- c) Stoney roller gate
- d) Drum gates

Answer: Option a

Explanation: In dropping shutters, the shutters are hinged at the bottom and are supported by struts and these shutters can be raised or lowered from an overhead cableway or a bridge. They work on the principle of counterweights against the water pressure.

43. _____ are used only for very minor works.

- a) Dropping gates
- b) Stop logs and needles
- c) Rectangular gates
- d) Drum gates

View Answer

Answer: Option b

Explanation: A Stop log consists of wooden beams and planks placed on to one another and leakage between them is a big problem. Needles are wooden logs kept side by side and it is very difficult to handle these logs at the time of flow. Hence they are not used on any major works.

44. Which of the following gate is not suitable for smaller spillways?

- a) Drum gates
- b) Radial gates
- c) Needles and stop logs
- d) Fixed roller gates

Answer: Option a

Explanation: Drum gates are suitable for longer spans of the order of 40 m or so and medium heights of 10 m or so. The drum is enclosed on all the three sides as well as on the ends thus forming a water-tight vessel. It requires a large recess and is not suitable for small spillways.

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Unit-4. Minor and Micro Irrigation

Marks:-10

Content of Chapter:-

- 4.1 Bandhara irrigation:Layout, Componants construction and working Advantages and disadvantages, solid and open bandhara.
- 4.2 Percolation Tanks – Need, selection of site.
- 4.3 Lift irrigation scheme-Components and their functions ,lay out.
- 4.4 Drip and Sprinkler Irrigation- Need, components, Layout, operation and Maintenance.
- 4.5 Farm ponds, Jalyukta shivar scheme.
- 4.6 Well irrigation: Types of well,yeild of well, advantages and disadvantages of well irrigation.

1. Jalyukt Shivar Yojna is introduced by

- a. Maharashtra Government
- b. Bihar Government
- c. Gujarat Government
- d. Assam Government

Answer: Option a

2. Jalyukt Shivar Yojna has a target to reach _____ Villages Per Year

- a. 5000
- b. 6000
- c. 1000
- d. 500

Answer: Option a

3. Natural sub-irrigation comes under Sub-surface irrigation.

- a)True
- b) False

Answer: Option a

4. Irrigation from well comes under.....

- a. Lift
- b. Tank
- c. Flow
- d. Drip

Answer: Option a

5. What type of irrigation system needs mechanical means to supply water for irrigation?

- a. Combined System
- b. Storage Irrigation
- c. Lift Irrigation
- d. Flood irrigation

Answer: Option c

6. _____ is a form of overhead irrigation.

- a. Drop
- b. Lift
- c. Sprinkler
- d. Well

Answer: Option c

7. Inundation irrigation system is functional all through the year.

- a) True
- b) False

Answer: Option b

8. The percolation tanks are constructed on

- a. Pervious soils
- b. Impervious soils
- c. Coarse soils
- d. None

Answer: Option a

9. The field water efficiency of trickle irrigation is:

- a) 50-55%
- b) 55-85%
- c) 80-90%
- d) 60-70%

Answer: Option c

10. Sub-irrigation is used in areas with:

- a. Low Water table
- b. High Water table
- c. Slope terrain
- d. Flat terrain

Answer: Option b

11. Evaporation losses are More in

- a. Surface Irrigation
- b. Subsurface Irrigation
- c. Both
- d. None

Answer: Option a

12. Bandhara are included in

- a. Major Irrigation scheme
- b. Minor Irrigation Scheme
- c. Medium Irrigation Scheme
- d. all of the above

Answer: Option c

13. Flood Can be controlled in

- a. Solid Bandhara
- b. Open Bandhara
- c. Both
- d. None

Answer: Option b

14. The Height of Solid Bandhara Varies Between

- a. 1-3 m
- b. 4-6 m
- c. 2-4 m
- d. 3-5 m

Answer: Option a

15. Percolation tanks are important to

- a. Raise water table
- b. Control floods
- c. Both
- d. None

Answer: Option a

16. Crops grown in Sprinkler irrigation system:

- a. Wheat
- b. Jowar
- c. Tea
- d. All of the above

Answer: Option d

17. Drip Irrigation is suitable for

- a. Cash crops
- b. Orchards
- c. Paddy crops
- d. Cereals

Answer: Option b

18. Which Scheme is Costly?

- a. Lift irrigation
- b. Canal irrigation
- c. Solid bandhara
- d. Open bandhara

Answer: Option a

19. Which Scheme is Costly?

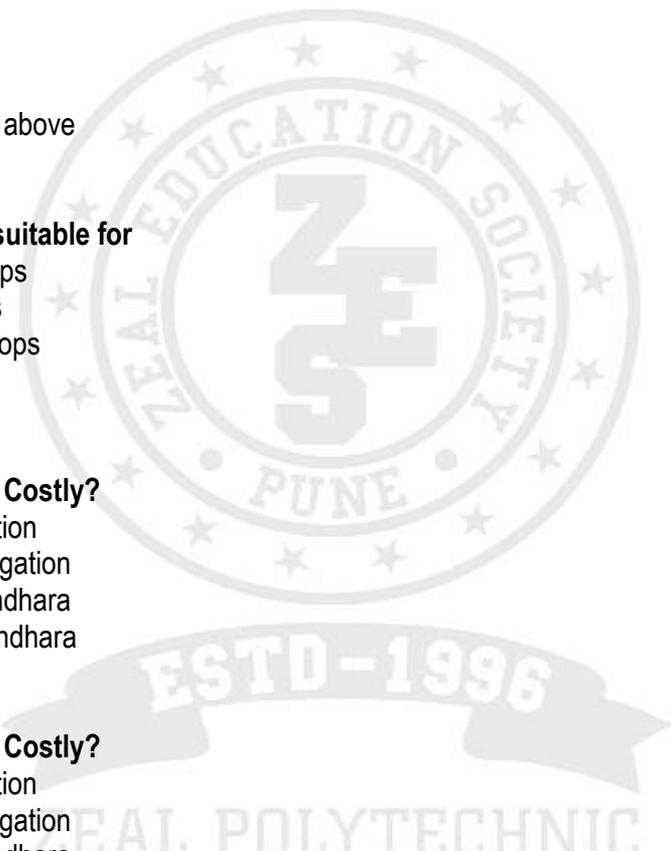
- a. Lift irrigation
- b. Canal irrigation
- c. Solid bandhara
- d. Open bandhara

Answer: Option a

20. Intake.....Pump, delivery pipe

- a. Suction pipe
- b. Chamber
- c. Valve
- d. Pipe

Answer: Option a



21. Jalayukta shiwar Yojan related to

- a. Water Conservation
- b. Soil Conservation
- c. Food production
- d. All above

Answer: Option d

22. Percolation tank constructed on ...

- a. Pervious soil
- b. Rock
- c. Impervious soil
- d. None of Above

Answer: Option a

23. Sprinkler Irrigation system required more water compared to drip irrigation.

- a. True
- b. False

Answer: Option a

24. Drip irrigation system required less water than

- a. Flood Irrigation
- b. Sprinkler Irrigation
- c. Subsurface irrigation
- d. All of the above

Answer: Option d

25. Which scheme is less effective.....

- a. Sprinkler irrigation
- b. Flood irrigation
- c. Drip irrigation
- d. All of the above

Answer: Option b

26. The performance of a well is measured by its _____

- a) specific capacity
- b) specific yield
- c) storage coefficient
- d) permeability coefficient

Answer: Option a

Explanation: Specific capacity is the measure of the well performance indicating the rate of water percolation into a well. It is also defined as the yield of a well under the head of one meter. The specific capacity of the well is not constant but decreases as the discharge increases.

27. The safe depression head for open wells is generally taken to be x times the critical depression head when x is _____

- a) 1/6
- b) 1/3
- c) 1/2
- d) 3/4

Answer: Option b

Explanation: The depression head is kept equal to one-third of the critical depression head. The

maximum or critical yield corresponds to the critical depression head and the maximum safe yield corresponds to the working head.

28. The yield of a well depends on _____

- a) permeability of soil
- b) area of aquifer opening into the wells
- c) actual flow velocity
- d) permeability and actual flow velocity

Answer: Option a

Explanation: Yield of a well is the rate at which water percolates into the well under the safe maximum depression head or the critical depression head. It depends on the position of the water table, permeability, and porosity of the soil, rate of water withdrawal from the well, and amount of water storage in the well.

29. Which type of open well is suitable when the sub-soil is formed of gravel or coarse sand deposits?

- a) Unlined wells
- b) Wells with pervious lining
- c) Wells with impervious lining
- d) Temporary wells

Answer: Option b

Explanation: Permanent lining or wells with impervious lining is sunk in regions with alluvial soil formation. Unlined wells or temporary wells are of very shallow depths and can be constructed only when the water table is very near to the ground. Wells with pervious lining is generally suitable in the strata of gravel or coarse sand.

30. Depending upon the type of sub-soil formation, the construction of well is done in two ways i.e. Dug wells and Sunk wells. Dug wells are constructed in soft formations.

- a) True
- b) False

Answer: Option b

Explanation: Sunk wells are constructed in soft formations and the subsoil formation may be sandy or clayey. The lining is first constructed above the ground level and then it sunk in the sub-soil formation by putting a load on the lining, therefore, it is called sunk well.

31. A well 3 meters in diameter has its normal water level 3 meters below the ground level. By pumping water level in the well is depressed to 10 meters below the ground level. In 4 hours the water rises by 5 meters. Calculate the specific yield of the well.

- a) 2.213 m³/hr
- b) 5 m³/hr
- c) 1.242 m³/hr
- d) 3.224 m³/hr

Answer: Option a

Explanation: Specific yield (K) is calculated from the formula, $K = 2.303 (A/T) \log (H_1/H_2)$ where A is the area of the well, T is the total time of recuperation to bring the water level from depth H_1 to H_2 .

Given values, $A = 3.14/4 \times 9 = 7.065$ sq. m, $T = 4$ hours, $H_1 = 7$ m, $H_2 = 2$ m

$K = 2.303 \times 7.065 \times 1/4 \times \log (7/2) = 2.213$ m³/hr under a head of one meter.

32. An open well is called shallow well when _____

- a) the depth of well is small
- b) the water table is high
- c) it does not encounter mota formation
- d) it finds the foundation in the mota formation

Answer: Option a

Explanation: A shallow well is that well which does not encounter mota formation. A deep well is that well which goes below the water table and finally finds its foundation in the mota formation.

33. Open well has big diameter than tube well because _____

- i. Open well has to irrigate more area.
- ii. Water contribution to the well is natural and therefore, the percolation area has to be more.
- iii. Storage of water has to be made before irrigation is done.

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

Answer: Option c

Explanation: Open wells have comparatively bigger diameter varying from 2-9 m and are suitable for low discharges in the order of 1-5 liters per second. The yield of the well is limited as the groundwater storage is limited. An open well irrigates small area and its cost per hectare is generally more than that of a tube well.

34. If the sub-soil formation is of fine sand, the rough value of the specific yield of well per unit area of the well (K/A) given by Marriot is _____

- a) 0.25
- b) 0.50
- c) 0.75
- d) 1.0

Answer: Option b

Explanation: When the limit of critical velocity is not exceeded it may be rightly assumed that K/A is constant for a well. K/A is the specific yield of well per unit area of the well. The value for K/A given by Marriot for clay sub-soil is 0.25, for fine sand = 0.50 and for coarse sand, it is 1.0.

35. Mota layer sometimes is also known as Marbarwa or Magasan is an impervious layer.

- a) True
- b) False

Answer: Option a

Explanation: Mota is an impervious patch of small thickness situated in the pervious soil mass. It gives structural support to the open well and is useful for unlined and partly lined wells. It can either be continuous or may be localized.

36. 13. A well is to be constructed in a fine sandy sub-soil formation. The discharge of the well under the depression head of 4 m is 0.004 m³/sec. Calculate the diameter of the well.

- a) 2 m
- b) 2.5 m
- c) 3 m
- d) 3.5 m

Answer: Option c

Explanation: Given, Yield of well = 0.004 x 3600 = 14.4 m³/hour

Q or yield = K x H

14.4 = K x 4 or K = 3.6 m³/hour under head of 1 meter.

From Marriot's table, the value of K/A for sandy sub-soil formation = 0.5

$$3.6/A = 0.5 \text{ or } A = 7.2 \text{ m}^2$$

$$\text{Diameter of well} = (A \times 4/3.14)^{1/2} = 3.07 \text{ m.}$$

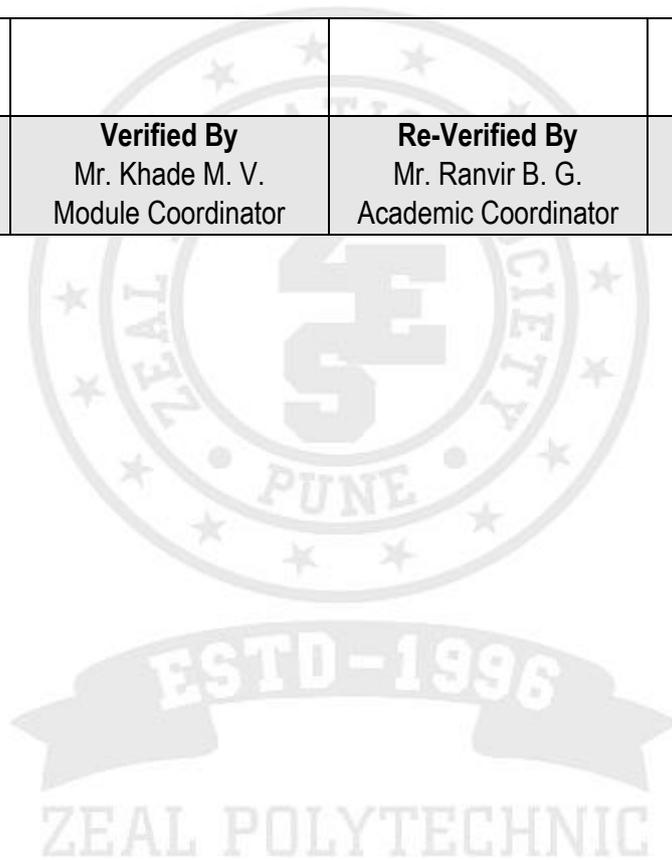
37. The rate of water contribution to the well increases with the increase in the depression head.

- a) True
- b) False

Answer: Option a

Explanation: The velocity of the percolating water depends on the depression head. If the amount of water withdrawn from the well is more, increasing the depression head, higher flow velocities will prevail in the vicinity of the well. At a certain stage, depression head may become so great that the soil particles also start coming with the percolating water.

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Unit-5. Diversion Head Works

Marks:-08

Content of Chapter:-

- 5.1 Weirs – components parts, types, layout of diversion head works with its components and their function.
5.2 Diversion head work -layout, components and their function.
5.3 Barrages – components and their function. Difference between weir and barrage.

1. Weirs are normally used to calculate

- a. Discharge
- b. Volume
- c. Head loss
- d. Velocity

Answer: Option a

2. Divide wall helps in concentrating scouring action.

- a) True
- b) False

Answer: Option a

3. Generally, the weir is aligned at right angles to the direction of the main river current because

- a. It ensures less length of the weir
- b. It gives better discharging capacity
- c. It is economical
- d. All of the above

Answer: Option d

4. Head regulator helps in controlling the flow in the canal.

- a. True
- b. False

Answer: Option b

5. Which device is used for silt removal after it enters the canal?

- a. Weir
- b. Silt Extractor
- c. Silt Excluder
- d. Silt Ejector

Answer: Option d

6. Which is/are the component/s of diversion headwork.

- a. Fish ladder
- b. Scouring sluices
- c. Divide wall
- d. All of the above

Answer: Option d

7. What device is placed in front of head regulator for silt removal?

- a. Weir
- b. Silt Extractor
- c. Silt Excluder
- d. Barrage

Answer: Option d

8. The function of a diversion head works of a canal from a river, is

- a. To remove silt
- b. To control flood
- c. To store water
- d. All of above

Answer: Option d

9. The overflowing sheet of water is called

- a. Head
- b. Nappe
- c. Upstream
- d. Crest

Answer: Option b

10. The Shape of ogee Weir is

- a. L shaped
- b. S shaped
- c. Oval shaped
- d. D shaped

Answer: Option b

11. By constructing which structure we can help the fish in their migration?

- a. Scouring sluices
- b. Silt excluder
- c. Fish ladder
- d. Divide wall

Answer: Option c

12. Function of Stilling Pond is to

- a. Reduce velocity of water
- b. To store water
- c. To control floods
- d. To raise water level

Answer: Option a

13. Low cost flood banks are
- Dams and weirs
 - Barrages and weirs
 - Dams and barrages
 - None

Answer: Option b

14. When the weight of the weir balances the uplift pressure caused by the head of water seeping below the weir, it is called as _____
- gravity weir
 - non-gravity weir
 - vertical drop masonry weir
 - concrete glacis weir

Answer: Option a

Explanation: In Gravity weir, the weight of the weir balances the uplift pressure caused by the seepage water. In non-gravity weirs, the weight of the concrete slab and the divide piers together keep the structure safe against the uplift.

15. Which weir is also called Dry Stone Slope Weir?
- Masonry weir
 - Gravity weir
 - Rock-fill weir
 - Concrete weir

Answer: Option c

Explanation: Rock-fill weir is also called Dry Stone Slope Weir. It is the simplest type of construction and is economical only when the stone is easily available. This type of weir is also becoming obsolete with the development of concrete glacis weir.

16. Which type of weir is suitable for hard clay and consolidated gravel foundations?
- Gravity weir
 - Non-gravity weir
 - Masonry weir with a vertical drop
 - Rock-fill weirs with sloping aprons

Answer: Option c

Explanation: This type of weir was used in all the old head-works and is particularly suitable for hard clay and consolidated gravel foundations. Masonry weir is becoming obsolete and all the modern constructions are done by the modern concrete weirs.

17. Which weir is of recent origin and their design is based on modern concepts of sub-surface flow?
- Gravity weir
 - Non-gravity weir
 - Masonry dam with a vertical drop
 - Concrete weir with sloping glacis

Answer: Option d

Explanation: The design of concrete weir with sloping glacis is based on the modern concepts of sub-surface flow i.e. Khosla's theory. Sheet piles are driven at sufficient depths at the upstream and downstream floor end. The hydraulic jump is formed on the downstream sloping glacis to dissipate the energy of the flowing water.

18. Which weir is now extensively used especially on pervious foundations?

- a) Vertical drop masonry weir
- b) Rock-fill weirs with sloping aprons
- c) Concrete weirs with sloping glacis
- d) Non-gravity weirs

Answer: Option c

Explanation: Modern concrete weirs with sloping downstream glacis are generally provided with low crest counter-balanced gates. This is now exclusively used on permeable foundations. Masonry weirs are suitable for hard clay and gravel foundations. Rock-fill weir is suitable for fine sandy foundations.

19. Which of the following statement is incorrect about Non-gravity weir?

- a) The weir floor is designed continuous with the divide piers as a reinforced structure
- b) The weight of the concrete slab balances the uplift pressure
- c) The weight of the divide piers also keep the structure against uplift
- d) Brick piers have to be used in place of RCC

Answer: Option d

Explanation: The weir floor and divide-pier are designed as a reinforced structure continuously. The RCC has to be used in place of brick piers and as the weight of the floor can be much less than that of gravity weir, considerable savings are obtained.

20. Into how many groups the gravity weir is sub-divided?

- a) 5
- b) 4
- c) 3
- d) 2

Answer: Option c

Explanation: According to the material used and certain design features, the gravity weir is sub-divided into three groups. They are vertical drop weir, sloping weir, and parabolic weir. Sloping weir is again classified into two groups, namely masonry slop weir and dry stone slope weir.

21. In gravity weir, the uplift pressure is due to the seepage of water.

- a) True
- b) False

Answer: Option a

Explanation: In gravity weir, the uplift pressure is due to the seepage of water below the floor and is resisted entirely by the weight of the floor.

22. The uplift pressure in non-gravity weir is resisted by the bending action.

- a) False
- b) True

Answer: Option b

Explanation: In non-gravity type weir the thickness of the floor is relatively kept less, and the uplift pressure is largely resisted by the bending action of the reinforced concrete floor.

23. Which type of weir is suitable for any type of foundation?

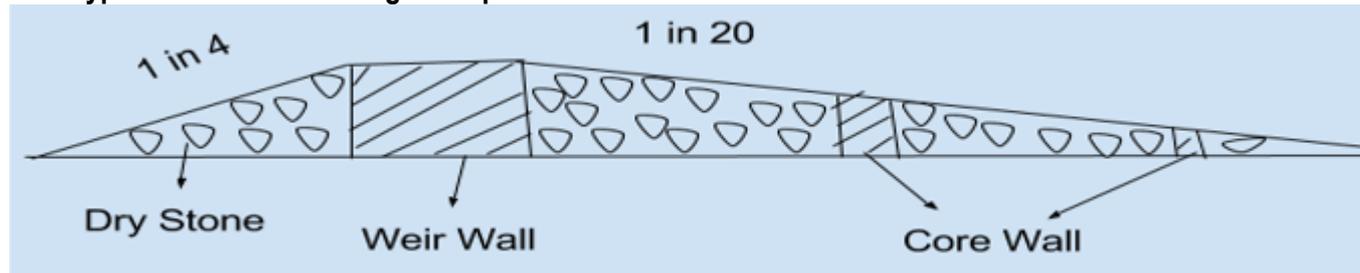
- a) Sloping Weir
- b) Vertical Drop Weir
- c) Parabolic Weir
- d) Masonry Sloping Weir

Answer: Option b

Explanation: This type of weir is suitable for kind of foundation because it is provided with or without crest gates, cutoff piles are provided at both upstream and downstream, to protect against

scouring aprons are provided at both up and down streams, and at downstream to relieve uplift pressure graded inverted filter is provided.

24. What type of weir does the diagram represent?



- a) Parabolic Weir
- b) Gravity Weir
- c) Dry Stone Slope Weir
- d) Vertical Drop Weir

Answer: Option c

Explanation: The figure represents a sloping weir made up of dry stone or rock fill. It also represents body walls at both upstream and downstream sides and rock falls laid in the form of glacis with few intervening core walls.

25. What is the main difference between a dam and weir?

- a) Height and Duration of Storage
- b) Capacity of Water
- c) Material used for Construction
- d) Location of the Structure

Answer: Option a

Explanation: Weir is an obstruction across the river to raise its water level and divert into new channel. It can also store water for short duration of time of short supplies, known as storage weir. The only main difference between dam and weir is that dam can store water comparatively for longer duration than weir and the dam is at more height than the weir.

26. What is the difference between a weir and a barrage?

- a) Discharge Capacity
- b) No Solid Obstruction
- c) Storage Capacity
- d) Velocity of Flow

Answer: Option b

Explanation: Barrage is almost a similar structure like a weir, but the difference is that barrage is not a solid obstruction across a river and moreover the heading of the river is controlled by gates alone. The crest level in barrage is kept at low level. During floods the gates are kept for discharge of excess waters and when the flood recedes the gates are lowered, thus solving the silting problem.

27. In which type of weir energy dissipation takes place?

- a) Barrage
- b) Vertical Drop Weir
- c) Sloping Weir
- d) Parabolic Weir

Answer: Option d

Explanation: This weir is similar to the spillway section of a dam. The body of this weir is kept as a low dam. A cistern is provided at the downstream side for energy dissipation of the falling waters from upstream to the downstream side.

28. Which type of weir is of recent origin?

- a) Vertical Drop Weir
- b) Masonry or Concrete Sloping Weir
- c) Parabolic Weir
- d) Barrage

Answer: Option b

Explanation: This type weir is of recent origin. They are much suitable for soft and sandy foundations and are generally used when the difference between the weir crest and downstream river bed is limited to 3 metres.

29. What number of causes is responsible for the failure of weirs?

- a) 2
- b) 4
- c) 3
- d) 1

Answer: Option b

Explanation: Mainly four causes are responsible for the failure of weirs. They are piping, rupture of floor due to uplift, rupture of floor due to suction caused by standing wave, and scouring at the upstream and downstream side of the weir floor.

30. Into how many components the diversion headwork is divided?

- a) 8
- b) 5
- c) 4
- d) 7

Answer: Option a

Explanation: The diversion head work is generally divided into eight component parts, namely weir, divide wall, fish ladder, pocket or approach ladder, scouring sluices, silt prevention devices, canal head regulator, and river training works.

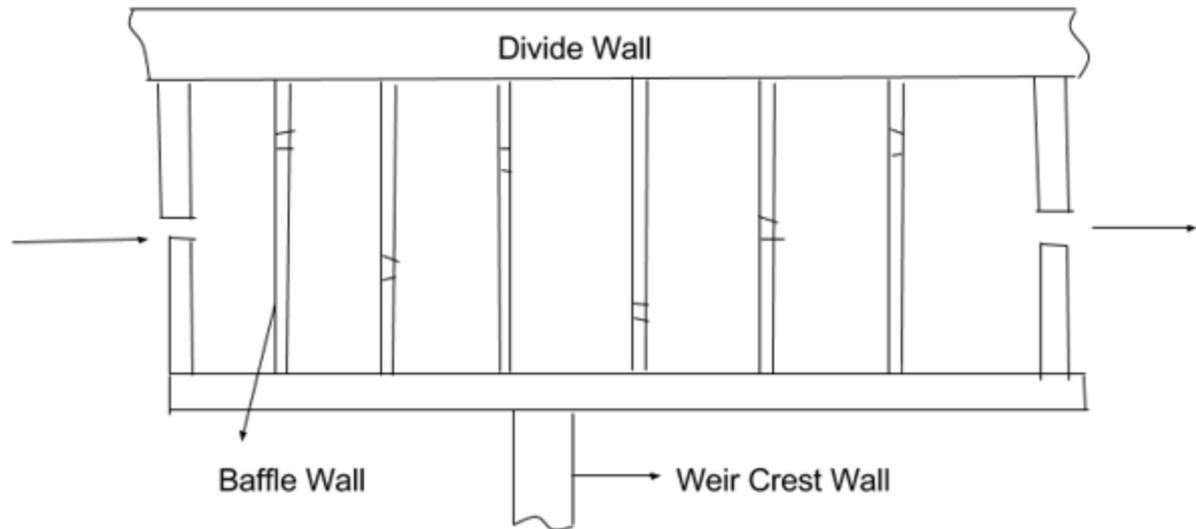
31. In order to find the proper location for the head works on the river, the river is divided into how many stages?

- a) 5
- b) 2
- c) 3
- d) 4

Answer: Option d

Explanation: In order to find an appropriate location for the head work on the river, the river is divided into four stages. They are mountainous stage, boulder stage, alluvial plain, and delta stage.

32. What does the diagram represent?



- a) Divide Wall
- b) Plan of Fish Ladder
- c) Scouring Sluices
- d) Canal Head Regulator

Answer: Option b

Explanation: The figure represents the plan of a fish ladder installed in the channel, where the water comes to the channel from end and leaves it at the other end. Baffle walls are also provided in the path to control the silt and sediment load and also the velocity of the flow, thus helping the fish.

33. Divide wall helps in concentrating scouring action.

- a) True
- b) False

Answer: Option a

Explanation: If perhaps divide wall is not provided then the currents approach the scouring sluices from all directions and their effectiveness is reduced. Thus the dividing wall helps in concentrating the scouring action of the under sluices from washing out the silt deposited in the pocket.

34. Head regulator helps in controlling the flow in the canal.

- a) False
- b) True

Answer: Option b

Explanation: As the name itself suggests (regulator) head regulator helps in regulating the supply of flow easy in a canal, controls silt entry into the canal, and shut river floods.

35. By constructing which structure we can help the fish in their migration?

- a) Scouring Sluices
- b) Silt Excluder
- c) Fish Ladder
- d) Divide Wall

Answer: Option c

Explanation: Before the start of monsoons the fish migrate to the upstream in search of warm water. So, therefore some provision is made to make some space available for them to travel. And this achieved by the construction of fish ladder as they provide the room for movement and also slows down the flow for easy traveling of fish.

36. What device is placed in front of head regulator for silt removal?

- a) Weir
- b) Silt Extractor
- c) Silt Excluder
- d) Barrage

Answer: Option c

Explanation: Silt excluder is placed in front of the head regulator by which the silt is removed from the water even before the water enters the canal. The fundamental principle on which this device acts is the fact that stream carrying silt in suspension, the concentration of silt charge is more in upper layers than in lower layers. Therefore this device is so designed for separating these two layers without disturbance.

37. Which device is used for silt removal after it enters the canal?

- a) Silt Excluder
- b) Silt Ejector
- c) Weir
- d) Barrage

Answer: Option b

Explanation: This device can be called as a failsafe device in case the silt excluder does not work properly or the silt charge is beyond the capacity of the silt excluder. This device removes or ejects or extracts the silt which has entered the canal and is thrown out. This device placement is a curative measure and is constructed at some distance from the head regulator.

38. Depending on how many considerations the capacity of under sluices is fixed?

- a) 5
- b) 4
- c) 2
- d) 3

Answer: Option d

Explanation: The discharging capacity of an under sluice is fixed by the considerations like to ensure proper scouring and its capacity should be double the canal discharge, sluices should of sufficient capacity to discharge winter freshlet, and during floods 10 to 15 percent of maximum flood discharge should be done.

39. How many river training works are needed on the canal head works?

- a) 5
- b) 3
- c) 4
- d) 2

Answer: Option b

Explanation: Three river training works are needed on the canal head works, to prevent the river from outflanking the works due to a change in its course and ensure smooth and an axial flow of water. The works include guide banks, marginal bunds, and spurs. Guide banks force the river into the restricted channel, thus ensuring smooth and axial flow near the weir site. In order to protect the area from submergence due to raise in HFL these marginal bunds are provided. The spurs are the works that protect the marginal bunds.

Prepared By Mr. Khade M. V.	Verified By Mr. Khade M. V. Module Coordinator	Re-Verified By Mr. Ranvir B. G. Academic Coordinator	Approved By Mr. Jadhav P.L. HoD CE



Unit-6 Canals

Marks:-10

Content of Chapter:-

6.1 CANALS – Classification of canals according to alignment and position in the canal network. Cross section of canal in embankment and cutting, partial embankment and cutting, balancing depth. Design and cutting, partial embankment and cutting, balancing depth. Design of most economical canal section.
6.2 Canal lining - Purpose, material used and its properties. Advantages of canal lining.
6.3 CD works- Aqueduct , siphon aqueduct, super passage, level crossing.
6.4 Canal regulators- Head regulator, Cross regulator, Escape, Falls and Outlets.

1. The difference in level between the top of a bank and supply level in a canal, is called

- a. Berm
- b. Free board
- c. Height of bank
- d. None of these

Answer: Option c

2. Lining of canal is necessary

- a. To minimize the seepage losses in canal
- b. To prevent erosion of bed and sides due to high velocities
- c. To increase the discharge in canal section by increasing the velocity
- d. All of the above

Answer: Option d

3. Irrigation canals are generally aligned along

- a. Ridge line
- b. Contour line
- c. Valley line
- d. Straight line

Answer: Option a

4. When a canal and a drainage approach each other at the same level, the structure so provided, is

- a. An aqueduct
- b. A syphon
- c. A level crossing
- d. Inlet and outlet

Answer: Option c

5. When a canal is carried over a natural drainage, the structure provided, is known as

- a. Aqueduct
- b. Syphon
- c. Super passage
- d. Level crossing

Answer: Option a

6. Advantage/s of canal lining is/are.

- a. Reduce seepage
- b. Provide smooth surface
- c. Increase velocity of water
- d. All of the above

Answer: Option d

7. Dis-advantage/s of canal lining is/are,

- a. Evaporation loss is increase
- b. Scouring is increase in canal bed
- c. Initial cost is more
- d. All of the above

Answer: Option c

8. Which material is used in canal lining

- a. PCC
- b. RCC
- c. Brick
- d. All of the above

Answer: Option d

9. A Canal designed to irrigate throughout the year is

- a. Permanent canal
- b. Perennial Canal
- c. continuous canal
- d. Green canal

Answer: Option b

10. Canals constructed for draining off water from water logged areas, are known

- a. Drains
- b. Inundation canals
- c. Valley canals
- d. Contour canals

Answer: Option a

11. Which type of canal does not need cross drainage structures?

- a) Side Slope Canal
- b) Contour Canal
- c) Watershed Canal
- d) Field Channel

Answer: Option a

Explanation: Side slope canal is that type of canal which runs perpendicular to the ground contours, i.e they run parallel to natural drainage flow and do not intercept the drainage channels and therefore avoiding the construction of cross drainage structures

12. What is the name given to the junction of two streams?

- a) Ridge
- b) Area of Mixture
- c) Merging
- d) Area of Mingling

Answer: Option a

Explanation: The dividing line between the catchment areas of two streams is called ridge or

watershed. The main watershed between two streams divides the drainage area of the two streams.

13. On flatlands what type of canal alignment is used?

- a) Side Slope Canal
- b) Contour Canal
- c) Watershed Canal
- d) Field Channel

Answer: Option c

Explanation: For flat lands, the slopes are relatively flat and uniform and it is very easy, and advantageous to align canals along watershed. Therefore the name of the alignment is watershed canal.

14. A canal aligned on the watershed saves the cost of constructed cross drainage works.

- a) True
- b) False

Answer: Option a

Explanation: By aligning a canal on the ridge, helps to irrigate the land on both sides of the canal. Moreover, the drainage flows away from the ridge, this gives an advantage in a way that the drainage does not cross a canal aligned on the ridge. Therefore the cost of construction of cross drainage works is reduced.

15. Which type of canal is most useful in hilly areas?

- a) Side Slope Canal
- b) Contour Canal
- c) Watershed Canal
- d) Field Channel

Answer: Option b

Explanation: The idea of watershed canal in hilly areas is does not work because it is highly uneconomical, since the river flows in valley below the ridge. And the watershed may be hundreds of meters above the river.

16. Contour canal can irrigate only on one side of the canal.

- a) True
- b) False

Answer: Option a

Explanation: In this canal the river slope is much steeper than the canal bed slope so therefore the canal encloses more and more area between itself and the river. It should be noted that more fertile lands are located at the lower levels. In other words we can say contour canal irrigates only on one side as the other side is higher

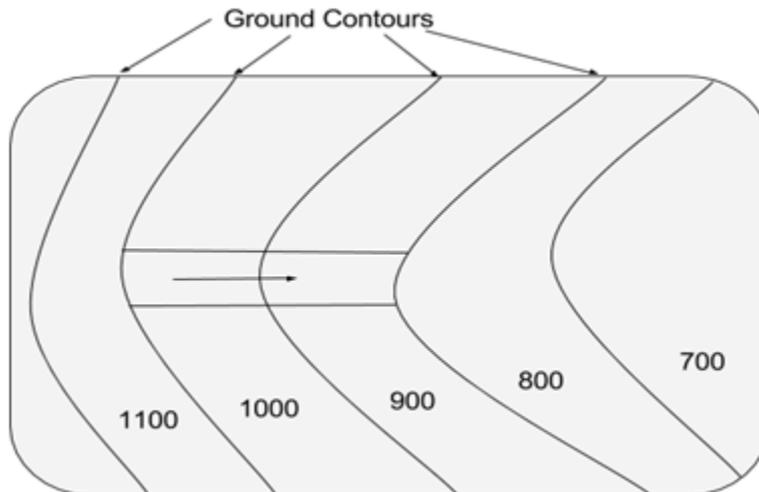
17. What type of canal necessitates construction of cross drainage works more than any other types?

- a) Side Slope Canal
- b) Contour Canal
- c) Watershed Canal
- d) Field Channel

Answer: Option b

Explanation: In this contour canal the drainage of the river flow is always perpendicular to the ground contours, and this would certainly require crossing of natural drains and streams, which necessitates the construction of cross drainage structures.

18. What type of canal alignment does the diagram represent?



- a) Alignment of Side Slope Canal
- b) Alignment of Contour Canal
- c) Alignment of Watershed Canal
- d) Alignment of Field Channel

Answer: Option c

Explanation: The image indicates an alignment of canal perpendicular to the ground contours. So, therefore the fitting example of this type of alignment is alignment of side slope canal.

19. Which type of canal need syphons?

- a) Side Slope Canal
- b) Contour Canal
- c) Watershed Canal
- d) Field Channel

Answer: Option b

Explanation: The alignment of watershed canal should run in areas where there homes, sacred places etc, and does not run in loops of the ridge line but run in straight. So, for these depressions in the ridge line necessitates construction of viaducts or syphons to maintain the canal fixed supply level.

20. If a looping is present in the ridge line they how can that area be irrigated with?

- a) Distributaries
- b) Tributary
- c) Weir
- d) Canal

Answer: Option b

Explanation: The alignment of watershed canal does not run along the loops of the ridge line, but instead they run in straight line leaving a small area between the alignment and the looped ridge line. This area can be irrigated with help of a distributary which starts from the starting of the loop of the ridge line and runs along the ridge line and finally joins the alignment at the end of the loop.

21. A lined canal costs about 2 to 2.5 times as much as the unlined canal.

- a) True
- b) False

Answer: Option a

Explanation: The construction of larger reservoirs and bigger dams will be necessary if there is heavy seepage loss in canals. Lining the canals reduces their impounding capacity and hence lower the construction costs of these works.

22. Which of the following is not an advantage of the lining of the canal?

- a) Seepage control
- b) Prevention of water-logging
- c) Increase in channel capacity
- d) Increased maintenance costs

Answer: Option d

Explanation: Huge expenditure is spent on annual repair and maintenance of the unlined canal. The provision of lining reduces expenditure required for removal of silt, minor repairs like plugging of cracks, cuts, and removal of weeds and water plants.

23. The capacity of the channel is a function of velocity.

- a) True
- b) False

Answer: Option a

Explanation: The vegetation on the sides and bottom of the canal retards the flow of water in unlined canals. The higher the velocity, the greater is the capacity of the channel and hence, capacity is a function of velocity.

24. What is the range of value of Manning's coefficient for straight alignment for cast in-situ concrete lining?

- a) 0.012 – 0.015
- b) 0.015 – 0.018
- c) 0.018 – 0.020
- d) 0.020 – 0.025

Answer: Option b

Explanation: In absolutely straight reaches and with relatively higher discharges lower values of Manning's constant may be attained. For cast in-situ concrete lining, the value of n varies from 0.015–0.018 and for cement plastered masonry the value varies from 0.012-0.015.

25. Lining decreases the channel capacity and consequently reduces the required channel section.

- a) True
- b) False

Answer: Option b

Explanation: The lining causes less resistance to the flow of water as it provides a smooth surface and consequently velocity is more. The capacity can be considerably increased by lining the canal section. A lined channel will require fewer dimensions and less earthwork.

26. Removal of silt considerably reduces the annual expenditure required on unlined channels for desilting.

- a) True
- b) False

Answer: Option a

Explanation: Lining protects the canal section against breaches and bank erosion. On account of the high velocities in lined-channels silts are readily carried away. This reduces the annual expenditure for desilting.

27. Which of the following statement is wrong?

- a) A lined canal is not susceptible to erosion
- b) The provision of adequate lining reduces the danger of breaches of channel
- c) The lining does not reduce the money spent in removing weeds
- d) Lining eliminates flood dangers

Answer: Option c

Explanation: The plants flow down the canal due to higher flow velocities in lined-canals due to which expenditure is reduced considerably. A strong concrete lining eliminates the dangers from flood and

minor repairs like plugging of cracks, cuts and uneven settlements of banks (which results in breaches of the channel).

28. Which of the following statement is wrong?

- a) The velocity varies inversely with the Manning's coefficient
- b) For unlined channels in good condition, the value of Manning's coefficient is 0.015 for concrete
- c) Flatter slopes can be provided without silting on a lined channel
- d) The lining does not help to bring high areas under the command

Answer: Option d

Explanation: The longitudinal slope of a lined canal is flatter than the corresponding unlined canal. Flat slope raises the F.S.L of the lined canal and it brings high patches of the land under command.

29. What types of channel sections are usually adopted?

- a) Triangular and Circular channel
- b) Triangular and Trapezoidal channel
- c) Rectangular and Trapezoidal channel
- d) Rectangular and Triangular channel

Answer: Option b

Explanation: Generally, Triangular and Trapezoidal channel sections are adopted. For smaller discharges, the Triangular channel section is adopted and trapezoidal channel for larger discharges.

30. Which of the following CD works carry drainage over the canal?

- a) Aqueduct and Syphon Aqueduct
- b) Super passage and Syphon
- c) Level-crossing and inlets outlets
- d) Canal Syphon and Aqueduct

Answer: Option b

Explanation: In Aqueduct and Syphon Aqueduct, the canal is carried over the natural drain. In level crossing and inlet and outlets, the canal water and drainage water are allowed to intermingle with each other.

31. The canal water flows freely under gravity in which of the following CD works?

- a) Aqueduct and Super passage
- b) Super passage and Syphon
- c) Canal Syphon and Aqueduct
- d) Level-crossing and inlets outlets

Answer: Option a

Explanation: In canal syphon and syphon aqueduct, canal water flows under symphonic action. The canal and the drainage system approach each other practically at the same level in CD works like Level crossing and inlets and outlets.

32. A Super passage is the reverse of _____

- a) syphon
- b) aqueduct
- c) inlets and outlets
- d) syphon Aqueduct

Answer: Option b

Explanation: In Aqueduct, the drainage water runs below the canal either freely or under symphonic action. In Super passage, the drain is taken over the canal such that the canal water runs below the drain. Similarly, a syphon is also a reverse of aqueduct syphon.

33. Which of the following statement is not correct about canal syphon?

- a) FSL of the canal is much above than the bed level of the drainage trough
- b) To minimize the trouble of silting, a ramp is provided at the exit
- c) The canal water flows under symphonic action
- d) For siphoning small discharges, barrels are adopted

Answer: Option d

Explanation: For siphoning higher discharges, horseshoe-shaped, rectangular or circular barrels are adopted. For siphoning small discharges, precast RCC pipes are adopted.

34. Which CD work is generally adopted when the drainage discharge is small and the drain crosses the canal with its bed level equal to or slightly higher than the canal FSL?

- a) Syphon Aqueduct
- b) Level crossing
- c) Inlets and outlets
- d) Aqueduct

Answer: Option c

Explanation: Level crossing is generally adopted when the canal and the drainage are practically at the same level and for high flood drainage discharge but short-lived. Aqueduct or super passage is adopted when high flood drainage discharge is large.

35. The drainage water is sometimes allowed to join the canal water to augment canal supplies through a hydraulic structure is called as _____

- a) canal outlet
- b) canal inlet
- c) module
- d) level crossing

Answer: Option b

Explanation: The structure allows the drainage water to enter the canal and get mixed with the canal water. It helps in augmenting canal supplies. It is adopted when high flood drainage discharge is small.

36. The crossing arrangement preferably made at the junction of a huge canal and a river stream carrying a short-lived high flood discharge at almost equal bed levels is a

- a) super passage
- b) aqueduct
- c) level crossing
- d) canal syphon

Answer: Option c

Explanation: This is a type of cross-drainage works in which the canal water and the drain get intermixed. The arrangement is generally adopted when a huge canal crosses a large torrent carrying a high short-lived flood.

37. In a syphon aqueduct provided with a pucca bottom floor, the uplift will occur on

- a) the roof slab
- b) the bottom floor
- c) both the roof slab as well as the bottom floor
- d) nowhere since the flow is free in the canal as well as in the drainage channel

Answer: Option b

Explanation: The uplift pressure on the floor of the aqueduct is caused due to seepage of water from the canal to the drainage and the sub-soil water table in the drainage bed. The drain bed of the aqueduct is generally depressed and provided with the pucca floor.

38. Which of the following is a disadvantage of CD works carrying the canal over the discharge?

- a) The damage caused by floods is not rare
- b) The canal is not open for inspection and maintenance
- c) The CD works are less liable to damage than the earthwork of the canal
- d) During heavy floods, the foundations are susceptible to scour or waterway of the drain may get choked

Answer: Option d

Explanation: In this arrangement, the canal is above the ground hence it is open to inspection. The damage done by light floods is rare. The CD works are less liable to damage than the earthwork of the canal when the canal passes below the drainage.

39. In which of the following arrangement, the perennial drainage discharge is advantageously used?

- a) Level crossing
- b) Inlets and Outlets
- c) Syphon
- d) Aqueduct

Answer: Option a

Explanation: In level-crossing, a regulator is provided across the drainage to control the discharge. When there are no floods the torrent regulator is kept closed and during floods, the regulator is opened so as to pass the flood discharge.

40. The number of inlets should be equal to the number of outlets.

- a) True
- b) False

Answer: Option b

Explanation: It is not necessary to have equal values of escaped discharge and admitted discharge. There can be fewer outlets for more number of inlets. The outlet can be combined with some other work where a separate arrangement is provided for escaping at a small extra cost.

41. Which of the following is a disadvantage of CD works carrying drainage over the canal?

- a) The arrangement is generally constructed when the drain is very big as compared to the section of the canal
- b) The damage caused by floods is not rare
- c) The CD works are more liable to damage than the earthwork of the canal
- d) The perennial canal is not open to inspection or maintenance

Answer: Option d

Explanation: The main advantage of this arrangement is that the CD works are less liable to damage than the earthwork of the canal. The major disadvantage is that the inspection road cannot be provided along the canal hence, it is not open to inspection or maintenance.

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