MULTIPLE CHOICE OBJECTIVE TYPE QUESTIONS

1. Which one of the following does not fit in with the rest?
   (a) Rain
   (b) Snow
   (c) Frost
   (d) Sleet

2. The convective precipitation results from
   (a) Frontal disturbances during the cyclonic movement of barometric low
   (b) The rising of colder air into warmer surroundings
   (c) The rising of warmer air in colder denser surrounding
   (d) The interface of water and air on surface due to sudden change of temperature

3. Isohyets are
   (a) Areas of equal precipitation
   (b) Lines of equal precipitation on maps
   (c) Lines of equal temperature on maps
   (d) Lines of equal barometric preasure on maps

4. The intensity-duration-frequency curves for precipitation indicate that
   (a) The greater the intensity of rainfall the shorter length of time it continues
   (b) The days on which rainfall occurs at a location
   (c) Cumulative rainfall over a period with frequency of periodic peaks, is ultimately constant
   (d) The intensity of rainfall increases as the duration increases

5. The phenomenon of evaporation from water surfaces, from the soil and from plants is generally known as
   (a) Vaporisation
   (b) Boiling
   (c) Transpiration
   (d) Hydration

6. Evapo-transpiration is
   (a) Water equivalent of moisture contained in air which is lost through evaporation
   (b) Unaccounted loss of water by evaporation at a location
   (c) Evaporation from plants in a catchment area
   (d) The total evaporation and transpiration from the catchment area

7. For the growth of plants, the useful soil moisture is
   (a) Rain water
   (b) Gravity water
   (c) Capillary water
   (d) Chemically treated water

8. Intensity of rain fall is
   (a) Total rainfall in a period
   (b) Rainfall per unit area
   (c) Volume of water collected per unit time
   (d) Depth of rainfull per unit time during which it fell

9. Cyclonic precipitation results from
   (a) Thermal convection currents
   (b) Orographic convection currents
   (c) Frontal disturbances during the movement of barometric low
   (d) None of the above

10. Convective storm rainfall is caused by
    (a) Thermal or orographic convection
    (b) Sudden barometric drops
    (c) Gradual barometric drop
    (d) Isolated barometric fall in area

11. Convective storm rainfall generally
    (a) Of long duration and high intensity
    (b) Of short duration but of high intensity
    (c) Of short duration and of low intensity
    (d) Of long duration and of low intensity

12. A double mass curve of rain is a plot between
    (a) The total annual rainfall at a station and the total annual rainfall of the previous year
    (b) The total annual rainfall at a station and the total annual rainfall at a neighbouring station
    (c) The cumulative total annual rainfall at a station and the cumulative annual rainfall at a number of nearby stations
    (d) The actual rainfall and the cumulative rainfall

13. The movement of water in a channel is influenced by
    (a) Force of gravity
    (b) Slope
    (c) Friction of water with channel bed
    (d) All of the above

14. The flow in an open channel is called steady if
    (a) The channel always run full
    (b) The velocity of fluid remains constant with respect to time
    (c) The discharge remains maximum
    (d) The head does not change with respect to time

15. A current meter measures, the velocity of flow, if it is held
    (a) At the bottom surface of the channel
    (b) At the surface of the channel
    (c) At the centroid of the channel section
    (d) At any point within the cross-section

16. Which one of the following is not a hydrometeorological factor influencing the surface run off and characteristics of stream flow?
    (a) Precipitation
    (b) Vegetation cover
    (c) Evapo-transpiration
    (d) Air temperature and humidity

17. A hydrograph is a plot of
    (a) Precipitation against time
    (b) Stream flow against time
    (c) Surface run off against time
    (d) Recorded run off against time

18. A 100 year peak discharge means
    (a) A maximum discharge which occurs in 101st year
    (b) A maximum discharge of 100 year recurrence interval
    (c) The peak discharge during preceding years will occur 100 years after that
    (d) A maximum discharge with 100% probability of reoccuring during next 99 years

19. The infiltration capacity is
(a) Maximum rate of accumulation of water in an area
(b) (Precipitation – evaporation loss) per unit time
(c) Maximum rate at which water enters the soil
(d) Rainfall water entering subsoil

20. The instrument used for the measurement of wind speed is
(a) Anemometer   (b) Rotameter
(c) Odometer   (d) Atmometer

21. The number of rain gauges required per unit area to give fairly reliable data on rainfall over an area is
(a) Small where rainfall gradient is steep
(b) Large where rainfall gradient is steep
(c) Small for hilly areas
(d) Large for level terrain

22. The snow fall is expressed in terms of
(a) Weight of snow fallen per unit area
(b) Depth of snow fallen
(c) Depth of snow fallen and its equivalent in water depth
(d) Water level after the snow melts

23. The site of measurement of snow fall should be
(a) Horizontal
(b) Open to snow fall and in isolation
(c) Sheetered against strong winds and drifting snow
(d) All of the above

24. In the analysis of data if the value of one variate is independent of any other the variable in question is termed as
(a) Independent variable (b) Random variable
(c) Population   (d) Limit variable

25. In statistical analysis of data the difference between the maximum and the minimum values of the variable in a series is termed as
(a) Standard deviation   (b) Confidence limit
(c) Amplitude   (d) Mean deviation

26. Thiesson polygons
(a) Define the zone of influence of each station
(b) Define the zones of equal precipitation
(c) Are graphical representation of arithmetic mean data
(d) An accurate method of estimating rainfall data

27. A unit hydrograph gives correlation between
(a) The total rainfall and the total run off
(b) The cumulative rainfall and total run off
(c) The effective rainfall and the total run off
(d) The effective rainfall and the direct run off

28. If the duration of the unit hydrograph decreases infinitely, approaching zero, the unit hydrograph becomes
(a) Instantaneous unit hydrograph
(b) Constant unit hydrograph
(c) Straight line hydrograph
(d) Poly unit hydrograph

29. The S-curve can be used to obtain a unit hydrograph from that of
(a) A longer duration   (b) Normal duration
(c) Shorter duration   (d) Both (a) and (c) above

30. DAD (depth-area-duration) studies for a particular storm indicate that the average depth of rainfall
(a) Remains constant
(b) Decreases as the area decreases
(c) Decreases as the area increases
(d) Increases as the duration of rainfall increases

31. Identify the incorrect statement
(a) For a given basin, the durations of run off from rain falls of the same duration and uniform intensity in time and space are the same and do not depend on the total effective rainfall depth
(b) Volume of direct surface runoff within the same time increments are directly proportional the total volumes of run off
(c) A unit hydrograph is the hydrograph of a base time duration and of a unit run off volume
(d) The concept of the unit hydrograph is, theoretically, not correct. Indeed no two rainfalls have the same pattern in time and space

32. In a synthetic unit hydrograph as proposed by Snyder and Nash the relation between the base period (T) in days in terms of basin lag (t_p) in hours is
(a) $T = 3+ 3\left(\dfrac{t_p}{24}\right)$ (b) $T = 3+\left(\dfrac{t_p}{24}\right)$
(c) $T = 1+ 3\left(\dfrac{t_p}{24}\right)$ (d) $T = 1+\left(\dfrac{t_p}{24}\right)$

33. It is not ordinarily possible to get unit hydrograph
(a) From an ungauged catchment area
(b) By superposition from a unit hydrograph of a large duration
(c) From a hydrograph due to a complex storm
(d) From a hydrograph due to a single isolated storm

34. Run off can be estimated by
(a) Infiltration method
(b) Unit hydrograph
(c) Rational method
(d) Any of the above

35. Which of the following formula is used for Ghat area of Bombay?
(a) Inglis formula   (b) Lacey's formula
(c) Khosla'a formula   (d) Parker's formula

36. Which of the following formula for computation of run off takes into account the temperature of catchment area?
(a) Inglis formula   (b) Lacey's formula
(c) Khosla'a formula   (d) Parker's formula

37. Most of the formula for flood discharge are of the form
(a) $Q = CA^n$ (b) $Q = Ce^n$
(c) $Q = C\log_e(n)$ (d) $Q = C + A + n$

38. A 10% flood frequency means
(a) flood will increase by 10% every year
(b) every tenth year there will be flood
(c) flood has 10 out of 100 chances of being equalled or exceeded
(d) any of the above

39. Which of the following is the assumption of unit hydrograph theory?
(a) The effective rainfall is uniformly distributed within its duration
(b) The effective rainfall is uniformly distributed throughout the whole area of the drainage basin
(c) The ordinates or direct run off of common base time are directly proportional to the total amount of direct run off represented by each hydrograph
(d) All of the above

40. Maximum surface run off is favoured due to
(a) a flash storm
(b) leaf shaped catchment
(c) improved land management
(d) presence of forest area

41. Interception loss is
(a) more towards the end of a storm
(b) more at the beginning of a storm
(c) uniform throughout the storm
(d) low in the beginning of storm and gradually increases

42. Evaporation from water surface
(a) increases with humidity
(b) decreases with wind speed
(c) is proportional to the deficit of vapour pressure
(d) increases if there is salinity or pollution

43. Infiltration occurs at capacity rate
(a) due to watershed leakage
(b) if there had been antecedent rain fall
(c) if the intensity of rain fall is lower than the capacity rate
(d) during a first flash storm following summer

44. A self recording raingauge
(a) records the cloud cover
(b) records the snowmelt
(c) records the rainfall intensity
(d) records the cumulative depth of rainfall

45. A double mass analysis is made
(a) to find the missing rainfall at a station in a particular area
(b) to direct any change in exposure of a station
(c) to study change in rainfall pattern
(d) to predict rainfall in the following years

46. Precipitation includes all of the following except
(a) snow melt
(b) frost
(c) stream flow
(d) mist and fog

47. Isohyetal method gives accurate mean areal depth of rainfall
(a) in a basin consisting of plains and hills
(b) in a gently sloping basin
(c) when there are optimum number of rain gauge stations
(d) when the precipitation includes snow melt

48. A double mass analysis is made for all of the following EXCEPT
(a) to compute the average annual rainfall consistent with the changed environment
(b) to adjust the record at a station to the changed environment

(c) to find the missing rainfall at a station in a particular area
(d) to detect any change in exposure of a station

49. Evapo-transporation depends on
(a) hours of bright sun shine
(b) type of crop
(c) method of irrigation
(d) all of the above

50. When I is the inflow, O is the outflow and ΔS the change in storage then the hydrologic equation can be written as
(a) $I = O. \Delta S$
(b) $O = I.\Delta S$
(c) $O + I + \Delta S = 0$
(d) $I = O + \Delta S$

51. If a cold air mass drives out a warm air mass it is called a cold front. A cold front causes
(a) no precipitation
(b) intense precipitation on small area
(c) intense precipitation on large area
(d) light precipitation on large area

52. What is the probability that only one flood equal to or exceeding the 50 year flood will occur in 50 year period
(a) 2%
(b) 5%
(c) 25%
(d) 50%

53. What is the probability that one or more floods equal to or exceeding the "50-year flood" will occur in a 50-year period?
(a) 5%
(b) 50%
(c) 64%
(d) 88%

54. Unit hydrograph method for flood estimation is usually applied to
(a) large basins
(b) hilly areas
(c) small and medium sized basin
(d) all of the above

55. The channel velocity given by Mannings formula is affected by
(a) hydraulic mean radius
(b) slope of the river bed
(c) roughness of the bed and sides
(d) all of the above

56. The methods of mitigating floods are
(a) by temporary excavation of low lying areas and flood warnings
(b) by construction of levees, flood banks and dykes
(c) by channel improvement
(d) all of the above

57. All of the following are the methods of estimating high flood discharges except
(a) from the percent flood risk that can be allowed in the project
(b) by stochastic methods
(c) by flood frequency studies
(d) by empirical formula developed for the region

58. The methods of estimating high flood discharge are
(a) by empirical formula developed for the regions
(b) by applying rational formula
(c) by flood frequency studies
(d) all of the above

59. The shape of the hydrograph is effected by
   (a) shape of the basin
   (b) direction of storm movement
   (c) non-uniform areal distribution of rainfall
   (d) all of the above

60. A synthetic unit hydrograph is developed
   (a) by measuring the main stream lengths and area of the basin
   (b) by taking certain constants from another basin which is hydro meteorologically homogeneous
   (c) for a basin having a rain gauge network but with no steam gauging station
   (d) all of the above

61. The shape of the hydrograph of run off is affected by
   (a) the duration of the storm
   (b) a real distribution of the storm
   (c) the intensity of the storm
   (d) all of the above

62. The basic assumptions of the unit-hydrograph theory are
   (a) non-linear response and time invariance
   (b) non-linear time variance and linear response
   (c) linear response and linear time variance
   (d) time invariance and linear response

63. In case a 4 hour unit hydrograph area catchment has a peak ordinate of 60 m^3/s, the peak ordinate of an 8 hour unit hydrograph for the same catchment will be
   (a) 60 m^3/s
   (b) less than 60 m^3/s
   (c) more than 60 m^3/s
   (d) non of the above

64. The diameter of the area of a standard Symon's type rain gauge
   (a) 5.0 cm
   (b) 7.5 cm
   (c) 10 cm
   (d) 12.7 cm

65. The slope-area method is extensively used on
   (a) development of rating curve
   (b) areas where shifting control is predominant
   (c) estimation of flood discharge based on high water marks
   (d) all of the above

66. Virgin flow is
   (a) the flow unaffected by works of man
   (b) the flow in a river downstream of a gauging station
   (c) the flow in a river upstream of a guaging station
   (d) none of the above

67. Base flow is
   (a) The annual minimum flow in a stream
   (b) The flow not obstructed by man made structures
   (c) Delayed ground water flow reaching a stream
   (d) None of the above

68. An aquifer that is confined at the bottom but not at the top is knwon as
   (a) paritally confined aquifer
   (b) aquiclude
   (c) semiconfined aquifer
   (d) unconfined aquifer

69. A sand sample was found to have a porosity of 30%. For an aquifer of this material, the specific yield is
   (a) 30 percent
   (b) less than 30 percent
   (c) more than 30 percent
   (d) unpredictable

70. Unit hydrograph method is usually adopted for estimating floods when the catchment area is
   (a) 100 sq-km only
   (b) less than 5000 sq-km
   (c) more than 7500 sq-km
   (d) more than 10000 sq-km

71. In India the water year starts from
   (a) Ist January
   (b) Ist April
   (c) Ist June
   (d) Ist October

72. The water equivalent of snowfall is taken as
   (a) 10%
   (b) 30%
   (c) 60%
   (d) 75%

73. A plot of accumulated precipitation V, time in chronological order is called
   (a) Hyetograph
   (b) Unit hydrograph
   (c) Mass curve
   (d) Hydrograph

74. A plot of rainfall intensity versus time in known as
   (a) Hyetograph
   (b) Mass flow curve
   (c) Duration curve
   (d) Unit Hydrograph

75. A line joining places of equal rainfall depth in a given duration is known as
   (a) isogonic line
   (b) isohyet
   (c) wet contour
   (d) none of the above

76. Irrigation is needed where rainfall is
   (a) abundant
   (b) just enough and timely
   (c) Scarce
   (d) None of these

77. Bhakra dam is built on
   (a) Beas river
   (b) Sutlej river
   (c) Ganga river
   (d) none of these

78. Flow irrigation is done from
   (a) canals
   (b) wells
   (c) tube wells
   (d) none of these

79. Over irrigation results in
   (a) water-logging
   (b) wilting
   (c) fertility
   (d) none of these

80. Art of irrigation is practised in India since
   (a) Ancient times
   (b) Moghul period
   (c) British period
   (d) Independence

81. Jawaharlal Nehru lift irrigation scheme is located in
   (a) Rajasthan
   (b) U.P.
   (c) Haryana
   (d) Punjab

82. Presently percentage of area irrigated to that of total cultivated area is
   (a) 80%
   (b) 33%
   (c) 27%
   (d) 40%
   (e) 50%

83. Irrigation schemes in drought area are generally constructed as
    (a) productive schemes   (b) protective schemes
    (c) multi-purpose schemes

84. Furrow irrigation is
    (a) very common   (b) unpopular
    (c) costly method of irrigation in India

85. To reduce salinity by leaching the best method of irrigation is
    (a) sprinkler irrigation   (b) furrow irrigation
    (c) check flooding

86. In arid areas with uneven land surface most suitable method of irrigation is
    (a) basin method   (b) check flooding
    (c) furrow irrigation   (d) sprinkler irrigation

87. Best method of assessment of irrigation water is
    (a) crop rate   (b) betterment levy
    (c) seasonal rate   (d) volumetric rate

88. The yield of a well depends upon
    (a) permeability of soil
    (b) area of aquifer opening into the wells
    (c) actual flow velocity   (d) all the above
                                        (IES 2008)

89. Heavy soil is
    (a) porous   (b) impermeable
    (c) water tight

90. River plains are made of
    (a) alluvium   (b) red soils
    (c) black soils

91. Soil is called saline when pH value is
    (a) less than 4   (b) 7
    (c) more than 7

92. For plant growth it is always available
    (a) gravitational water   (b) hygroscopic water
    (c) capillary water

93. Crop rotation means
    (a) giving rest to cultivable land
    (b) adding manure to land
    (c) growing different crops in successive seasons

94. Plants develop their roots and derive moisture mostly from
    (a) upper portion
    (b) middle portion
    (c) lower portion of the root-zone

95. Most fertile soil is
    (a) alluvium   (b) black soil
    (c) laterite soil   (d) red soil

96. Intensity of irrigation means
    (a) total depth of water applied to a crop
    (b) percent area irrigated of C.C.A.
    (c) area left uncultivated during the year

97. First watering to a crop is called
    (a) paleo   (b) kor
    (c) flooding

98. Probability of a 10 year flood to occur at least once in the next 4 years is

(a) 25%   (b) 35%
(c) 50%   (d) 65%   (IES 2000)

99. The standard project flood is
    (a) derived from the probable maximum precipitation in the region.
    (b) derived from the severemost meteorological conditions anywhere in the country
    (c) the flood with return period of 1000 yrs.
    (d) the same as the probable maximum flood.
                                        (IES 2002)

100. Delta of a crop means
     (a) area under the crop   (b) crop period
     (c) depth of water required by the crop

101. What is hydrological cycle?
     (a) processes involved in the transfer of moisture from sea to land.
     (b) Processes involved in the transfer of mosisture from sea back to sea again
     (c) Processes involved in the transfer of water from snowmelt in mountains to sea
     (d) Processes involved in the transfer of moisture from sea to land and back to sea again   (IES 2009)

102. Rabi crops pertain to
     (a) winter season   (b) summer season
     (c) monsoon season

103. Duty of the canal water is expressed in
     (a) cumec   (b) centimeters
     (c) ha per cumec   (IES 2007)

104. When you grow two crops in one year on the same field it is called
     (a) cash crop   (b) mixed crop
     (c) double crop

105. Perennial crop is one which lasts
     (a) during rabi season   (b) for eight months
     (c) all the year   (IES 2008)

106. C.C.A. means
     (a) gross commanded area
     (b) culturable commanded area
     (c) irrigated area
     (d) uncultivated area

107. Duty of canal water is calculated
     (a) only at the outlet   (b) only at the headworks
     (c) at any important point on the canal system

108. Mixed crop of the following is
     (a) rice   (b) wheat
     (c) sugacane   (d) wheat and gram

109. Acidic soils are reclained by
     (a) leaching of the soil
     (b) using limestone as a soil amendument
     (c) using gypsum as a soil amendment
     (d) provision of drainage

110. Duty of well water is more than canal water because
     (a) conveyance losses in well irrigation are less
     (b) well water is clear than canal water
     (c) lifting of water increases cost of well water
     (d) well water is used economically

111. Hydrology deals with
 (a) all aspects of water available on the earth
 (b) irrigation water requirement of crops
 (c) mechanics of motion of water
112. Hydrological cycle represents
 (a) circulation of water through a canal system
 (b) circulation process of entire moving waters of the earth
 (c) water utilisation by a plant structure
113. Water year ranges from
 (a) January 1 to December 31
 (b) April 1 to March 31
 (c) June 1 to May 31
 in the Indian sub-continent
114. Precipitation is the term used to denote
 (a) all forms of falling moisture
 (b) sedimentation in the reservoirs
 (c) some chemical reaction that takes place in curing saline and alkali soils
115. Isohyets are
 (a) contours of equal precipitation
 (b) elevations of areas above mean sea level
 (c) depth of ground water level below ground surface
116. Runoff denotes
 (a) amount of evaporation
 (b) surplus rainfall flowing through the streams
 (c) canals discharge wasted after irrigation
117. Evaporation taking place from plant surfaces is called
 (a) interception   (b) interflow
 (c) infiltration   (d) transpiration
118. Ombrometer (Phviometer) is used to measure
 (a) soil moisture stress of a plant
 (b) rainfall depth
 (c) leaf area
 (d) root zone depth   **(IES 2010)**
119. Rain gauges are used to
 (a) measure volume of precipitation
 (b) depth of rainfall
 (c) predict occurrence of rainfall
120 Rainfall records are maintained on
 (a) daily   (b) monthly
 (c) yearly basis   (d) none
121. In India maximum rainfall occurs at
 (a) Barmer in West Rajasthan
 (b) Amritsar in Punjab
 (c) Cherapunji in Assam
 (d) Bombay in Maharashtra
122. Runoff is measured as
 (a) total volume of water gone through a stream
 (b) average depth of water over a catchment
 (c) average rate of flow through a stream
 (d) all
123. Hydrograph of a stream is
 (a) a graphical representation of discharge variations arranged corresponding to time
 (b) a graphical representationof hydrological cycle
 (c) a graphical representation of rainfall record
 (d) all

124. The shape of the recession limb of a hydrograph depends on
 (a) basin as well as strom characteristics
 (b) strom characteristics only
 (c) basin characteristics only
 (d) base flow only   **(IES 2012)**
125. A current meter is used to measure
 (a) depth of flow   (b) velocity of flow
 (c) peak flow   **(IES 2010)**
126. Echo sounder is used to measure
 (a) width of river   (b) velocity of flow
 (c) depth of flow
127. Velocity is measured by
 (a) floats   (b) current meter
 (c) pivot point method
128. Popular method of river discharge measurements is
 (a) area-velocity method (b) weir
 (c) venturi flume
129. Common methods of depth measurement are
 (a) sounding rod   (b) rod float
 (c) lead line   (d) echo-sounder
 (e) pivot point method
130. A reservoir is used for
 (a) controlling floods   (b) generating hydro power
 (c) irrigation   (d) sewage disposal
                                   (IES 2011)
131. Characteristics of a good reservoir site are
 (a) it is watertight
 (b) catchment does not produce floods
 (c) it does not submerge valuable property
 (d) it is away from irrigated area
 (e) outlet is narrow
132. M.W.L. means
 (a) mean water level   (b) minimum water level
 (c) maximum water level
133. Free board in a dam is
 (a) a type of shutter
 (b) name of storage
 (c) margin between water level and top of dam
134. Gross storage capacity is given by
 (a) live storage + flood absorption capacity
 (b) live storage + dead storage
 (c) live storage – dead storage
135. Gallery is
 (a) a passage left in a completed dam
 (b) an observation tower
 (c) a part of a dam
136. Silting of reservoir
 (a) reduces efficiency of dam
 (b) reduces storage capacity
 (c) raises reservoir water level
137. Mass curve of inflow is
 (a) always a straight line
 (b) never a straight line
 (c) a line parallel to time axis

138. Mass curve of demand could be
   (a) a straight line   (b) a curve
   (c) a line parallel to time axis
   (d) all

139. Economical height of dam is the one of which
   (a) cost of dam is minimum
   (b) cost of dam per unit storage is minimum
   (c) storage is maximum

140. Shape of gravity dam is roughly
   (a) triangular   (b) square
   (c) trapezoidal

141. Storage dams are generally
   (a) gravity dams   (b) earth dams
   (c) both

142. Arch dams are constructed in
   (a) narrow valleys with good abutment
   (b) narrow valleys with sound foundation
   (c) wide valleys with weak foundation

143. Gravity dam is most suitable when foundation is
   (a) weak   (b) strong
   (c) with heavy over burden
   (d) rocky but cracked

144. Gravity dams can be constructed with
   (a) concrete   (b) masonry
   (c) sand   (d) rocks

145. Uplift is
   (a) vertical movement during earthquake
   (b) upward thrust of seepage water
   (c) vertical component of standing water

146. Earthquake
   (a) reduces effective weight of a dam
   (b) increases horizontal water pressure
   (c) causes dam failure by crushing

147. Elementary profile of a gravity dam is
   (a) a trapezoidal figure (b) a pyramid
   (c) a right angled triangle

148. Rock fill dam is
   (a) non-rigid type   (b) rigid type
   (c) high dam

149. Breaching section in earth dam is provided
   (a) in the body of the dam
   (b) by the side of the dam
   (c) on the periphery of the reservoir basin away from the dam

150. Blanket in earth dams is provided
   (a) at the ground level on the u/s side
   (b) at the ground level in the body of the dam
   (c) at the ground level on the D/s side of dam
   (d) on the D/s slope

151. Earth dam when over-topped by flood water
   (a) may not fail
   (b) must fail
   (c) never fails

152. Earth dam could be constructed with only
   (a) clay   (b) sand
   (c) rock   (d) gravel

153. The spillway in which water spills and flows over the body of the spillway are
   (a) solid gravity spillway (b) siphon spillway
   (c) saddle spillway   (d) shaft spillway

154. Spillway performs the function of a
   (a) safety valve   (b) measuring device
   (c) observation opening in case of a dam

155. Common methods of protection of steam bed below spillways are
   (a) creation of hydraulic jump on the d/s face
   (b) provision of upturned bucket
   (c) provision of sluices
   (d) grouting of steam bed

156. Sluices are provided in a dam to
   (a) supply water to d/s area
   (b) reduce flood level
   (c) remove sediment from reservoir
   (d) all

157. In earth dams spillways are provided
   (a) in the body of the dam
   (b) on the periphery of the reservoir basin
   (c) by the side of the dam structure

158. Crest of an emergency spillway is fixed at
   (a) dead storage level   (b) F.R.L.
   (c) M.W.L.   (d) top of the dam

159. Cut-off in earth dams is provided to
   (a) check free flow of seepage water
   (b) increase path of percolation
   (c) make foundation water-tight

160. Canals constructed to give employment to the people during famines are called
   (a) permanent canals   (b) inundation canals
   (c) productive canals   (d) protective canals

161. Permanent canals run
   (a) perennially   (b) intermittently
   (c) don't run at all

162. The canal aligned along the water shed is known as
   (a) ridge canal   (b) contour canal
   (c) side slope canal

163. Balancing depth of excavation of a canal is one for which
   (a) section is economical
   (b) volume of excavation is equal to volume of filling in banks
   (c) water flows under gravity
   (d) depth of flow is equal to height of banks

164. Main canal takes-off from
   (a) a regulator   (b) a river
   (c) a reservoir   (d) a well

165. Inundation canals are
   (a) perennial   (b) non-perennial
   (c) productive

166. Bandhara irrigation is
   (a) run-off-the river scheme
   (b) minor scheme
   (c) unproductive scheme
   (d) the only efficient scheme

167. Berms are provide to
   (a) remove the silt from the canal
   (b) strengthen the canal bank
   (c) check the seepage
   (d) allow traffic along the canal
168. Dowel on the canal bank serves the purpose of
   (a) a drainage   (b) a foot path
   (c) a road curb
169. Spoil bank is a term used to designate
   (a) a canal bank constructed wrongly
   (b) damaged canal bank
   (c) additional embankment constructed to dispose off excess excavated material
170. Pushta is additional cover provided on the canal bank to
   (a) make the bank water-tight
   (b) provide additional cover over saturation line
   (c) permit inspection of the canal bank
   (d) cover the breaches in the canal
171. The most serious type of water loss from a canal is
   (a) evaporation   (b) absorption
   (c) percolation
172. The purpose of canal lining is to
   (a) control seepage
   (b) strengthen canal section
   (c) increase capacity of the canal
   (d) all
173. Concrete lining can be done
   (a) with machinery only
   (b) manually only
   (c) equally by machinery and manually
174. In brick lining the layer which makes the canal water-tight is
   (a) lower layer of the bricks
   (b) sandwiched layer of the cement mortar
   (c) upper layer of the bricks
   (d) all layers together
175. When excavated soil is in excess it is deposited in spoil banks. When extra amount of earth is required it is obtained from
   (a) silt traps   (b) berms
   (c) borrow pits   (d) dowel
176. To strengthen the canal banks artificial silting is induced in the canal. Even then silting of canal poses a problem because
   (a) silting has manurial property
   (b) silting deforms the canal section
   (c) silting reduces the velocity by increasing resistance to flow
   (d) silting reduces the canal capacity
177. Sand core is provided in the canal banks to
   (a) make the bank porous to allow quick drainage of seepage water
   (b) plug the rate holes
   (c) reduce clay content in the banks
178. Canal breach occurs when
   (a) piping takes place through a canal bank
   (b) canal banks are over-topped by excess flows
   (c) cultivators cut the embankment to derive additional suply or to make way for flood water
   (d) all
179. Remodelling of irrigation canals is done when
   (a) a canal section is extremely deformed
   (b) a canal system has become very old
   (c) the scope of irrigation in the scheme is proposed to be increased
180. Headworks is an assemblege of the following hydraulic structures
   (a) (i) A weir (ii) guide banks (iii) head regulator
   (b) (i) A dam (ii) embankments (iii) spillway
   (c) (i) A siphon (ii) spurs (iii) bank revetment
181. Headworks can be constructed usefully in the following river reach
   (a) hilly   (b) sub-mountainous
   (c) plain   (d) tidal
182. Site of headworks is good when
   (a) it is situated on a river bend
   (b) it is close to irrigate area
   (c) good foundation is available for the structures
   (d) river section is wide
183. Waste weirs are generally used as
   (a) low storage dams   (b) diversion structures
   (c) spillways
184. Weir and barrage are both low barriers built across the river to raise the water level but
   (a) barrage has gates to control flow
   (b) weir has shutters to control flow
   (c) weir has gates to control flow
185. On previous foundations following type of structure is suitable
   (a) Masonry weir   (b) rock-fill weir
   (c) waste weir
   (d) concrete barrage with cut off
   (e) solid gravity weir
186. Divide wall is a structure constructed to
   (a) divide the river channel into bigger and smaller compartment
   (b) distribute canal discharge into two canals
   (c) facilitate construction of weirs
187. Under sluices are the openings in the weir constructed to
   (a) flush the silt from a still pond
   (b) reduce peak flood level in the river
   (c) supply irrigation water
188. What type of cross drainage work is provided when the canal runs below the drain, with FSL of canal well below the bed of the drains?
   (a) Aqueduct   (b) Super passage
   (c) Level crossing   (d) Siphon aqueduct
   (IES 2006)
189. Head regulator
   (a) regulates river flow
   (b) supplies measured quantity of water to irrigation canal
   (c) regulates silt entry

200. Weirs constructed on permeable foundation are likely to fail due to
(a) piping or undermining
(b) crushing
(c) sliding
(d) uplift

201. River training works serve the following purposes
(a) increase or decrease the river discharge
(b) protect the river bed and banks from erosion
(c) direct the river flow in desired direction
(d) protect the important hydraulic structures
(e) protect the surrounding land from flooding

192. Some rivers are called Himalayan river because
(a) they are hilly rivers
(b) they orginate from Himalaya and therefore they are perennial
(c) they are snow fed

193. The river which builds up its bed progressively is called
(a) aggrading river
(b) degrading river
(c) boulder river

194. Generally a river becomes degrading type below a dam because
(a) the river carries very less discharge
(b) the river width is much less
(c) the river water is clear and can pick up silt particle

195. When a river departs from its straight course and follows a sinuous path the river is said to form meanders. The main causes for this occurrence are
(a) the river wants to travel longer length
(b) the river carries heavy silt load
(c) the equilibrium condition of river flow is disturbed to induce unequal erosion
(d) the river valley is full of rocky structures

196. Extreme condition of the meanders is called
(a) cut-off
(b) spur
(c) island

197. The embankments are constructed parallel to the river channel. The embankments built considerably away from the river bank are known as
(a) marginal embankments
(b) guide banks
(c) retired embankments

198. Guide banks induce the flow through a confined waterway. They can be provided only
(a) in pairs
(b) singly
(c) parallel to each other (d) none

199. Guide banks converging in the down stream direction are called
(a) divergent guide banks
(b) parallel guide banks
(c) convergent guide banks

200. A spur pointing upstream forms a still pocket against its upstream face. It has an effect of
(a) repelling the flow from the bank
(b) attracting the flow towards the bank
(c) deflecting the flow at the site.

201. River generally form meanders in
(a) delta stage of river
(b) trough stage of river
(c) boulder stage of river

202. The stone cover laid to protect the face of the guide bank at river bed level is called
(a) launching apron   (b) blanket
(c) cut-off   (d) curtain

203. Selection of type of cross drainage work depends on
(a) bed levels of a canal and a drainage
(b) water levels of a canal and a drainage
(c) discharge of a canal and a drainage
(d) all

204. In both the structures the canal is carried below a drainage. But when the canal barrel runs full it is called
(a) siphon   (b) super-passage
(c) canal-siphon

205. A structure constructed to carry drainage water under pressure through an inverted siphon below a canal is known as
(a) aqueduct   (b) siphon aqueduct
(c) drainage siphon

206. In a canal siphon the flow is under
(a) atmospheric pressure (b) negative pressure
(c) positive pressure

207. When a small irrigation canal has to cross over a medium drain we construct
(a) pipe aqueduct   (b) box culvert
(c) irrigation culvert   (d) aqueduct

208. Which of the following categories best describes the Hirakud reservoir?
(a) Reservior for irrigation and power
(b) Reservior for flood control, power and irrigation
(c) Reservoir for irrigation and water supply
(d) Reservoir for recreation and fishery
(IES 2009)

209. When a drain flows below a canal such that its H.F.L. touches the underside of the supporting structure, the structure is known as:
(a) siphon aqueduct   (b) siphon super passage
(c) aquduct   (d) super passage

210. Super passage is a structure in which
(a) canal flows over a drainage channel
(b) drainage channel flows over a canal
(c) both flow at the same level

211. When a canal and a drain cross each other at the same level we provide level crossing. This structure consists of following components:
(a) (i) Escape weir (ii) regulator (iii) cross regulator (iv) guide banks
(b) (i) barrage (ii) regulator (iii) guide banks
(c) (i) dam (ii) spillway (iii) sluices

212. Inlet and outlet are provided as across drainage measure when the discharge of the drain is:
(a) medium   (b) high
(c) low

13. To reduce the cost of the cross drainage work we resort to
    (a) fluming
    (b) blocking of drain
    (c) cut-off
    (d) lifting of canal water

14. Cross drainage works are the structures constructed to
    (a) carry a canal across the drain
    (b) carry a roadway over the drain
    (c) control flow of silt in the drainages

215. Hydraulic structures contructed across a canal are called
    (a) cross drainage works
    (b) cross communication works
    (c) regulatory work

216. A regulator regulates the flow of water into a canal. It also performs following functions
    (a) prevents silt entry into a canal
    (b) affords measurement of inflow discharge
    (c) affords facility for road transport
    (d) all

217. A regulator constructed on a canal at an intermediate point is called
    (a) cross regulator
    (b) head regulator
    (c) distributory head regulator

218. The discharge per unit drawdown at the well is known as   **(IES 2008)**
    (a) specific yield
    (b) specific storage
    (c) specific retention
    (d) specific capacity

219. A cross regulator is often combined with
    (a) a fall
    (b) a road bridge
    (c) a distributory off take
    (d) all

220. Falls are provided in a canal to
    (a) lower the canal bed level
    (b) generate electrical energy
    (c) increase driving head of flow of water
    (d) all

221. Sarda type fall is one with a crest
    (a) at bed level of a canal
    (b) above the bed level
    (c) above the F.S.L. of a canal

222. When length of the body wall of a fall is less than normal width of a canal it is called
    (a) Notch fall
    (b) Sarda fall
    (c) flumed fall
    (d) Ogee fall

223. Hydraulic jump is created on the glacis of a fall to
    (a) increase depth of flow
    (b) dissipate excess energy of flow
    (c) reduce difference of water level between upstream and downstream of a fall

224. Canal escapes are essential safety valves for a canal. They
    (a) relieve canal of excess discharge
    (b) provide strurctural strength to the canal banks
    (c) take out silt from the canal

225. A structure which takes out silt from a canal is called
    (a) silt excluder
    (b) silt ejector
    (c) scouring sluice
    (d) King's vanes
    (e) Gibb' groyne wall

226. A good outlet satisfies following conditions
    (a) it is low in cost
    (b) it is independent of discharge fluctuations
    (c) it is stable with less moving parts
    (d) all

227. In a proportional module outlet discharge
    (a) is not dependent on the water levels in the parent and field channel
    (b) is dependent on both
    (c) is dependent on the water level in the parent channel only

228. Crump's A.P.M. outlet is
    (a) a modular outlet
    (b) a semi-modular outlet
    (c) a non-modular outlet

229. Tail cluster is an assemblege of
    (a) (i) weir (ii) head regulator (iii) guide banks constructed at the head of a canal
    (b) more than similar outlets constructed at a tail of a canal
    (c) (i) escape weir (ii) cross regulator constructed at intermediate point of a canal

230. A tract is said to be water-logged when
    (a) it is flooded with water for quite sometime
    (b) it comes under water permanently
    (c) crop root-zone gets deprived of aeration due to the pressure of excessive moisture

231. Main cause of water logging is
    (a) excessive seepage and percolation of water
    (b) heavy rainfall
    (c) occurrence of impermeable strata at shallow depth
    (d) porosity of soil

232. Owing to water logging the land is finally rendered infertile and unproductive. The conditions which lead the situation to this state are
    (a) creation of anerobic conditions in the crop root-zone
    (b) accumulation of harmful salts
    (c) lowering of soil temperature
    (d) all

233. A problem of water logging manifests fully in a slow manner. The first symptom of water logging is
    (a) appearance of harmful salts on the fields
    (b) water table rises and almost raches ground level
    (c) comparative reduction in crop yield inspite of irrigation and fertilization
    (d) all

234. Best way of keeping watch over the problem of occurrence of water-logging in practice is to
    (a) observe well water level at regular interval
    (b) chemically analyse soil to determine accumulation of salts
    (c) compare crop yields from year to year

235. Seepage loss from irrigation canals can be reduced by
    (a) closing down the canal
    (b) lining the canal
    (c) introducing intercepting drains

236. Remedial measures adopted to control water-logging are
   (a) interoduction of lift irrigation scheme
   (b) quick disposal of rainfall
   (c) preventing loss of water in percolation from fields
   (d) implementation of a drainage scheme

237. The quantitive statement of the balance between water gains and losses in a certain basin during a specified period of time is known as

   Which one of the following?
   1. Water budget
   2. Hydrologic budget
   3. Groundwater budget

   Select the correct answer using the codes given below
   (a) 1 only   (b) 2 only
   (c) 3 only   (d) none of these
                                    (IES 2007)

238. Main benefits obtained from drainage schemes, after the water-logged conditions are removed, are
   (a) improvement of soil structure
   (b) improvement of soil productivity
   (c) improvement of micro climate
   (d) improvement of soil texture
   (e) improvement of soil fertility

239. Surface drains are of three types. They are
   (a) storm water drains   (b) relief drains
   (c) seepage drains   (d) intercepting drains
   (e) storm-cum-seepage drains

240. A tube well is suitable when the subsoil formation is made up of
   (a) cracked and faulted rock
   (b) alluvium
   (c) various layers of sandy, clayey soil, gravel and over burden
   (d) clayey soil

241. A stilling well is required when the stage measurement is made by employing

   (a) Bubble gauge   (b) Float gauge recorder
   (c) Vertical staff gauge (d) inclined staff gauge
                                    (IES 2011)

242. Kirpich equation is used to determine which one of the following?
   (a) Runoff from a given rainfall
   (b) Base time for a unit hydrograph
   (c) Time of concentration in run-off hydrograph
   (d) None of these   (IES 2008)

243. Well irrigation is introduced in canal irrigated tract to
   (a) augment canal irrigation area
   (b) remove dificiency of canal irrigation
   (c) replace canal or flow irrigation slowly
   (d) relieve water-logging of certain past

244 Open well has big diameter than tube well because
   (a) open well has to irrigate more area
   (b) water contribution to the well is natural and, therefore, percolation area has to be more
   (c) a storage of water has to be made before irrigation is done

245. Discharge of an open well is less than a tube well because
   (a) water is lifted from the open well generally without using electrical or diesel energy
   (b) only stored water is lifted from the open well
   (c) strainers are not provided in the open well

246. 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

247. Rate of water contribution to a well increases when depression head of draw-down is
   (a) high   (b) negligible
   (c) medium

248. Specific yield is also called specific capacity of a well. It is expressed in
   (a) m³/sec   (b) m³
   (c) m³/hour under a head of one metre

249. Draw-down or depression head is
   (a) difference of water level before and after pumping
   (b) difference between the water level in the well after pumping and the level of unaffected water table
   (c) depth of water level below ground level after pumping

250. A household tube well is called Abysinian tube well. It falls under
   (a) strainer type   (b) cavity type
   (c) slotted type

251. In a tube well strainers are used to
   (a) reduce the area of percolation
   (b) prevent average soil particles from entering the bored hole
   (c) improve the quality of water

252. Two tube wells are said to interfere when
   (a) pumping from one well lowers the discharge of the other well
   (b) command of one well overlaps the command of the other well
   (c) circles of influence of the two wells under maximum draw down conditions cross each other

253. Duty of wells expressed in hectares the well can irrigate to bring a crop to maturity because
   (a) well irrigation is a minor scheme
   (b) well water is lifted intermittently and cannot be expressed in ha/m³/sec
   (c) well is situated in the middle of the commanded area
   (d) wells are owned by cultivators and so the source of supply is private one

254. It is seen that delta for a crop from well water is 66 percent that of canal water. The reason for this is that
   (a) a well is situated in the field itself and therefore conveyance losses are minimum

(b) well water is used economically as energy is required to lift the water

(c) well water is used at a right time in right quantity

(d) all

255. Tube wells do not derive water from the over burden though it is pervious because

(a) top layers do not have more water

(b) top layers contain contaminated water

(c) top layers are above ground water table

(d) all

256. Penman's equation is based on

(a) energy budgeting only

(b) energy budgeting and water budgeting

(c) energy budgeting and mass transfer

(d) water budgeting and mass transfer

257. A canal section is called most economical

(a) depth of cutting is least

(b) depth of filling in banks is least

(c) depth of cutting is such that excavated soil is sufficient to construct banks

258. A line canal is in

(a) initial regime   (b) permanent regime

(c) final regime

259. C.V.R. is a short form of

(a) current velocity ratio (b) Chezy's velocity ratio

(c) constant volume ratio (d) critical velocity ratio

260. Chezy's equation gives velocity of flow. Chezy's constant is given by

(a) Manning formula

(b) Kutter's formula

(c) Bazin's formula

(d) Lacey's regime perimeter formula

261. Design procedure of canals on non-alluvial soils and alluvial soils is different because

(a) on alluvial soils canal carries silt along-with water

(b) on alluvial soils there is more percolation loss

(c) in alluvial tracts construction of canal bank poses a difficulty

262. The snow fed rivers are the following:

(a) The Ganga   (b) The Narmada

(c) The Sutlej   (d) The Chambal

(e) The Brahmaputra

263. Irrigation water performs following functions.

(a) acts as a solvent for nutrients

(b) floods the land

(c) keeps the soil temperature under limits

(d) acts as a nutriment carrier

264. Water becomes unsuitable for irrigation due to presence of

(a) toxic chemicals   (b) sediment

(c) bacteria

265. The design flood commonly adopted in india for barrages and minor dams is

(a) Probable maximum flood

(b) A flood of 50–100 years return period

(c) Peak flood

(d) Standard project flood or a 100 years flood, whichever is higher   (IES 2012)

266. Maintenance of drainage system is similar to canal system in many ways for

(a) storm water drains   (b) seepage drains

(c) tile drains

267. What would be the volume of water stored in a saturated column with a porosity of 0.35 with a cross-sectional area of 1 m² and depth of 3 m?

(a) 2.0 m³   (b) 0.105 m³

(c) 1.05 m³   (d) 3.0 m³   (IES 2012)

268. The muskingum method of flood routing is a

(a) form of hydraulic routing of a flood

(b) from of resevoir routing

(c) complete numerical solution of st. venant equation

(d) Hydrological channel routing method (IES 2012)

269. Rotary boring method is also called hydraulic rotary boring method because

(a) it uses drilling fluid to remove the cuttings

(b) its working is based on principle of hydraulics

(c) it is used to drill water supply wells

270. Unlike open wells water can be lifted from tube wells by pumps only because

(a) water is available at great depths

(b) diameter of tube well is small

(c) tube well does not have storage and therefore high rates of withdrawal are to be maintained

(d) all

271. Development of tube well is done to

(a) clear the water bearing formation of mud and fire particles

(b) stabilise the sub-soil formation around the filter

(c) derive clear water

(d) all

272. The surface joining the static levels in several non-pumping wells penetrating a continuous confined aquifer represents

(a) Water table surface   (b) Capillary fringe

(c) Piezometric surface of the aquifer

(d) Physical top surface of the aquifer   (IES 2012)

273. Forebay provides temporary storage before water goes to turbines. Following perform the function of forebay

(a) river   (b) tailrace channel

(c) reservoir   (d) approach channel

274. When without storing water power plant is constructed it is called

(a) low-head installation (b) storage installation

(c) run-of-the river installation

(d) none

275. The surge tank serves following purposes

(a) it allows the sediment to settle down

(b) it prevents debris from entering power house

(c) it controls pressure variations in pipelines

(d) it regulates flow in the pipelines

276. Pondage means
(a) pond level
(b) permanent storage made in pond
(c) temporary storage to meet peak demands

277. A turbine in which all the potential is charged to kinetic energy is called
(a) impulse turbine (b) reaction turbine
(c) propeller turbine

278. An urban area is located in plains having "average climatic conditions". The impervious area thereof for which drainage must be provided is 3.6 ha and the design rainfall intensity is 2.0 cm/hr. The drain will be designed for a runoff of
(a) 0.05 m³/s (b) 0.10 m³/s
(c) 0.20 m³/s (d) 0.40 m³/s (IES 2012)

279. Protective project is generally taken up in
(a) desert areas where water is not available
(b) hilly areas where communications are difficult
(c) periods of famine to provide employment to people

280. Multi-purpose project is one which combines
(a) irrigation and hydro power benefits
(b) hydro power and flood control benefits
(c) flood control and water supply benefits
(d) all

281. B.C. ratio is the test of
(a) economic feasibility of project
(b) factor of safety of the dam
(c) success of irrigation application
(d) all

282. Bhakra Nangal project is
(a) located in Punjab (b) multi-purpose project
(c) the highest gravity dam in India
(d) all

283. Minor irrigation serves
(a) 20 hectares only (b) upto 500 hectares
(c) upto 2000 hectares

284. Dam stone is
(a) the material with which dam is constructed
(b) a type of stone
(c) is a stone pillar embedded on top of a bund
(d) all

285. Sprinkler irrigation is adopted in
(a) uneven terrain
(b) extreme drought and cold conditions
(c) erodable soils
(d) all

286. A discharge of a cumec is flowing in a rectangular channel one metre wide at a depth of 20 cm. The bed slope of the channel is
(a) mild (b) critical
(c) steep (d) adverge

287. Water table drops by 3 m in an irrigable land of 50 hectare. If porosity and specific retention are 0.30 and 0.10 respectively, the change in storage in hectare-meter is
(a) 15 (b) 30 (c) 45 (d) 60

288. The repeating variables in dimensional analysis should
(a) include the dependent variable
(b) have amongst themselves all the basic dimensions
(c) be derivable from one another
(d) exclude one of the basic dimensions

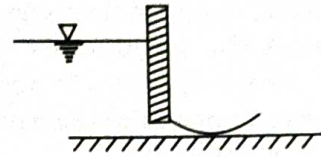289. The water surface profile resulting from flow underneath the gate in Fig. 9.19 below is

Fig. 9.19.

(a) H_3 (b) M_1 (c) H_2 (d) S_2

290. At a rated capacity of 44 cumecs, a centrifugal pump develops 36 m of head when operating at 1450 rpm. Its specific speed is
(a) 654 (b) 509 (c) 700 (d) 90

291. A-2-hour unit hydrograph can be approximated as trapezoidal as shown in Fig. 9.20. The unit hydrograph refers to catchment of area.
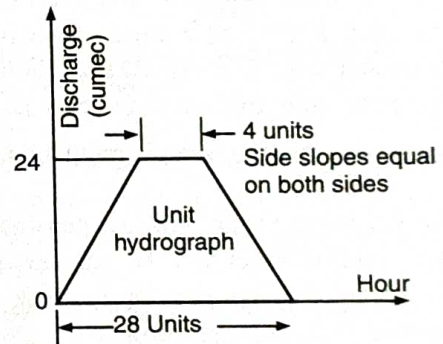
Fig. 9.20.

(a) 138.24 km² (b) 0.0384 km²
(c) 384 m² (d) 3840 m²

292. Delta (Δ) in cm, Duty (D) in hectare/Cumec and Base period (B) in days are related as
(a) $\Delta = 864\ B/D$ (b) $B = 864\ D/\Delta$
(c) $B = 864\ \Delta/D$ (d) $D = 8.64\ B/\Delta$

293. Water flows in a rectangular channel at a depth of 1.20 m and a veleocity of 2.4 m/s. A local rise in the bed of 0.60 m will cause
(a) the surface to rise (b) the surface to fall
(c) a stationary jump to form
(d) a surge to travel upstream

294. The design flood for a culvert should be preferably
(a) the probable maximum flood
(b) obtained from statistical considerations, say a flood of 50 years return period
(c) the highest observed flood
(d) obtained from a flood formula

295. The live storage requirement for a reservoir is to be determined by
(a) topographical survey
(b) annual demand
(c) double mass curve analysis
(d) mass curve analysis

296. A tropical cyclone in a northern hemisphere is a wind stream with
(a) high pressure zone of anti-clockwise rotation
(b) high pressure zone of clockwise rotation
(c) low pressure zone of anti-clockwise rotation
(d) low pressure zone of clockwise rotation

297. The standard project flood is
(a) the same as the probable maximum flood
(b) the same as the design flood
(c) smaller than the probable maximum flood
(d) larger than the probable maximum flood by a factor implying safety factor

298. The volume of water that can be released by gravitational effects from a unit volume of an aquifer is its
(a) specific storage   (b) specific yield
(c) specific capacity   (d) specific porosity

299. In a syphon aqueduct, the most sever condition of uplift on the floor occurs when
(a) the canal and drainage run full
(b) the canal runs full; the drainage channel is dry; and the water table is at the stream level
(c) the canal is dry, the drainage floor is at HFL, and the water table is at the HFL of the drainage flow
(d) the canal runs full; and the drainage is dry

300. A forebay in a hydel system is provided at the junction of
(a) the tail race channel and the penstock
(b) the power channel and the tailrace channel
(c) the power channel and the penstock
(d) the penstock and the turbine

301. Dickens formula predicts maximum flood discharge, O, in terms of the area, A, and the coefficient, c, as $O=cA$. The value of c is
(a) 0.25   (b) 0.50   (c) 0.67   (d) 0.75

302. For the head regualtor the most severe condition of uplift pressure on the floor occurs when
(a) the flow in the river is at flood level and canal is running at full supply depth
(b) the canal runs at the river flow is at high flood level
(c) the canal runs at full supply depth and the river flow is at pond level
(d) the canal runs dry and the river flow is at pond level

303. The expression for the specific speed of a pump
(a) does not include the diameter
(b) yields larger values for radial pumps than for axial flow pumps
(c) is necessarily nondimensional
(d) includes power as one of the variables

304. If D = scour depth measured below high flood level and d = depth of scour below the original bed level, then the width of the launching apron at the toe of the guide bank will generally be equal to
(a) 1.5 D (b) 1.5 d (c) 2.0 D (d) 20.0 d

305. Which of the following pairs are correct matched?
1. Device to receive and eject drainage from canal ...... Inlet and outlet
2. Cross drainage structure when canal bed level and ..... canal siphon drain bed level are same
3. Gross masonary work to facilitate road transport .... Bridge
Select the correct answer using the codes given below.
Code:
(a) 1, 2 and 3   (b) 1 and 3
(c) 2 and 3   (d) 1 and 2

306. As per the recommendatins of IS, the shape of lined canal is
(a) trapezoidal   (b) semicircular
(c) parabolic   (d) elliptic

307. A lysimeter is used to measure
(a) infiltration   (b) evaporation
(c) evapotranspiration   (d) radiation

308. The dimensions of a pressure gradient in a fluid flow are
(a) $ML^{-1} T^2$ (b) $ML^{-3} T^{-2}$
(c) $ML^{-2} T^{-2}$ (d) $M^{-1} L^{-3} T^{-2}$

309. In deriving the equation for the hydraulic jump in a rectangular channel in terms of the conjugate depths and the initial Froude number
(a) continuity equation and energy equation are used
(b) continuity equation and momentum equation are used
(c) equations of continuity, momentum and energy, are used
(d) gradually varied flow equation is used

310. The peak discharge of the instaneneous unit hydrograph of a basin, when compared to the peak discharge of a 4-hour unit hydrograph of that basin would be
(a) greater   (b) equal
(c) equal or lesser   (d) lesser

311. The base period for a particular crop is 100 days and the duty of the canal is 1000 hactres per cumec, the depth of water will be
(a) 0.864 cm   (b) 8.64 cm
(c) 86.4 cm   (d) 864 cm

312. If one wants to 90% sure that the design flood in a dam project will not occur during the design life period of 100 years the recurrence interval for such a flood would be
(a) about 90 years   (b) equal to 100 years
(c) about 110 years   (d) roughly 1000 years

313. A channel designed by Lacey's theory has a mean velocity of 1 m/s. The silt factor is unity. The hydraulic mean radius will be
(a) 1.5 m   (b) 2.0 m   (c) 2.5 m   (d) 1.0 m

314. A 4-hour rainfall in a catchment of 250 km² produces rainfall depth of 6.2 as and 5.0 cm in successive 2-hour unit periods. Assuming the ϕ-inex of soil to be 1.2 cm/hour, the runoff volume in ha-m will be
(a) 1   (b) 22   (c) 1600   (d) 2200

315. A submerged pipe outlet from a minor feeds into a well chamber across the bank. Water from the well chamber overflows a weir-like face into the field channel. The flow into the field channel
    (a) will increase with any drop in the water level in the minor
    (b) will not be much affected by any change in the water level in the minor
    (c) will decrease with any drop in the water level in the minor
    (d) will be proportional to the flow in the minor when the minor flows between set ranges

316. Consider the following types of weirs:
    1. Proportional weir
    2. Cipolletti weir
    3. Parabolic weir
    4. Rectangular weir (without end treatment)
    All these weirs have varying values exponent in the formula $Q = KH^m$. The correct sequence of these weirs in increasing order of the value of 'n' is
    (a) 2, 1, 3, 4   (b) 2, 1, 4, 3
    (c) 1, 2, 3, 4   (d) 1, 2, 4, 3

317. Depth-area-duration curves would seem to resemble
    (a) arcs of a circle concave upwards with duration increasing outward
    (b) first quadrant limbs of hyperbolae with duration increasing outward
    (c) third quadrant limbs of hyperbolae with duration decreasing outward
    (d) first quadrant limbs of hyperbolae with duration decreasing outward

318. When a river starts meandering, the sediment carrying capacity
    (a) first decreases and ultimately increases
    (b) first increases and ultimately decreases
    (c) remains unaffected as the plan shape changes continue
    (d) changes erratically all the time leaving permanent braids

319. A homogeneous earth dam with no horizontal drainage filter at downstream is shown in the Fig. 9.21. The slope of the downstream side, β is less than 30^0. In order to determine the value of 'a', the discharge 'q' per unit length through the section of height a sin β is assumed to be (k = coefficient of permeability of soil)
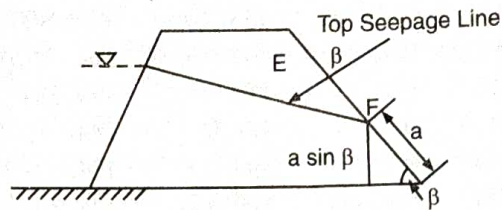

Fig. 9.21.

    (a) $ka \sin β \cos β$ (b) $ka \sin β \tan β$
    (c) $ka \sin^2 β$ (d) $ka \sin^2 β \cos^2 β$

320. Consider the flownet shown in the following Fig. 9.22.
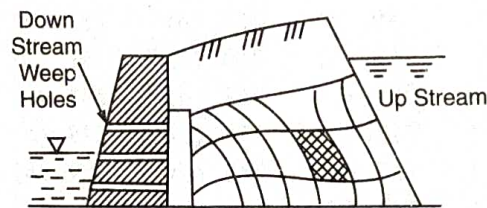

Fig. 9.22.

    The ratio of the number of flow channels to the number of potential drops is
    (a) 3/8   (b) 3/7   (c) 4/7   (d) 4/8

321. Storage of water by impounding is required where
    (a) plenty of water is avilable in the stream in all season
    (b) excess of suspended and dissolved matter are present in the water
    (c) There is a large variation in quantity of the river flow from time to time
    (d) the flow is uniform throughout the year but is insufficient

322. In a wide rectangular channel, the small surface waves caused due to disturbance by a suddenly thrown heavily weighted log of wood, thrown parallel to the cross-section were seen to move at 1.2 m/s downstream and 1.4 m/s upstream (with reference to the banks). The depth of flow and the mean flow velocity are, respectively, nearly
    (a) 0.2 m and 1.4 m/s   (b) 0.3 m and 1.4 m/s
    (c) 0.2 m and 1.5 m/s   (d) 0.3 m and 1.5 m/s

ANSWERS

1. (c)	2. (c)	3. (b)	4. (a)	5. (c)	6. (d)	7. (c)	8. (d)	9. (d)	10. (a)
11. (b)	12. (c)	13. (d)	14. (b)	15. (d)	16. (b)	17. (b)	18. (b)	19. (c)	20. (a)
21. (b)	22. (c)	23. (d)	24. (b)	25. (d)	26. (a)	27. (d)	28. (a)	29. (d)	30. (c)
31. (d)	32. (a)	33. (b)	34. (d)	35. (a)	36. (c)	37. (a)	38. (c)	39. (d)	40. (a)
41. (b)	42. (c)	43. (d)	44. (d)	45. (b)	46. (c)	47. (a)	48. (c)	49. (d)	50. (d)
51. (b)	52. (a)	53. (c)	54. (c)	55. (d)	56. (d)	57. (a)	58. (d)	59. (d)	60. (d)
61. (d)	62. (d)	63. (b)	64. (d)	65. (c)	66. (a)	67. (c)	68. (d)	69. (b)	70. (b)
71. (c)	72. (a)	73. (c)	74. (a)	75. (b)	76. (c)	77. (b)	78. (a)	79. (a)	80. (a)
81. (c)	82. (c)	83. (b)	84. (a)	85. (c)	86. (d)	87. (d)	88. (c)	89. (b)	90. (a)
91. (c)	92. (c)	93. (c)	94. (a)	95. (a)	96. (b)	97. (a)	98. (b)	99. (b)	100. (c)
101. (d)	102. (a)	103. (c)	104. (c)	105. (c)	106. (b)	107. (c)	108. (d)	109. (b)	110. (a,d)

111. (*a*)	**112.** (*b*)	**113.** (*c*)	**114.** (*a*)	**115.** (*a*)	**116.** (*b*)	**117.** (*d*)	**118.** (*d*)	**119.** (*b*)	**120.** (*d*)
121. (*c*)	**122.** (*d*)	**123.** (*a*)	**124.** (*c*)	**125.** (*b*)	**126.** (*c*)	**127.** (*a,b*)	**128.** (*a*)	**129.** (*a,c,d*)	**130.** (*a,b,c*)
131. (*a,c,e*)	**132.** (*c*)	**133.** (*c*)	**134.** (*b*)	**135.** (*a*)	**136.** (*b*)	**137.** (*b*)	**138.** (*d*)	**139.** (*b*)	**140.** (*a*)
141. (*c*)	**142.** (*a*)	**143.** (*b*)	**144.** (*a, b*)	**145.** (*b*)	**146.** (*b*)	**147.** (*c*)	**148.** (*a*)	**149.** (*c*)	**150.** (*a*)
151. (*b*)	**152.** (*a*)	**153.** (*a, c*)	**154.** (*a*)	**155.** (*a, b*)	**156.** (*d*)	**157.** (*b, c*)	**158.** (*c*)	**159.** (*a, b*)	**160.** (*d*)
161. (*a, b*)	**162.** (*a*)	**163.** (*a, b*)	**164.** (*b, c*)	**165.** (*b*)	**166.** (*a*)	**167.** (*b, c*)	**168.** (*c*)	**169.** (*c*)	**170.** (*b*)
171. (*c*)	**172.** (*d*)	**173.** (*c*)	**174.** (*b*)	**175.** (*c*)	**176.** (*b, d*)	**177.** (*b*)	**178.** (*d*)	**179.** (*a, c*)	**180.** (*a*)
181. (*b, c*)	**182.** (*b, c*)	**183.** (*c*)	**184.** (*a, b*)	**185.** (*d*)	**186.** (*a*)	**187.** (*a, b*)	**188.** (*b*)	**189.** (*b, c*)	**190.** (*a, d*)
191. (*a*)	**192.** (*c*)	**193.** (*a*)	**194.** (*c*)	**195.** (*b, c*)	**196.** (*a*)	**197.** (*c*)	**198.** (*d*)	**199.** (*a*)	**200.** (*a*)
201. (*b*)	**202.** (*a*)	**203.** (*d*)	**204.** (*a, c*)	**205.** (*b, c*)	**206.** (*c*)	**207.** (*a*)	**208.** (*b*)	**209.** (*a*)	**210.** (*b*)
211. (*a*)	**212.** (*c*)	**213.** (*a*)	**214.** (*a*)	**215.** (*c*)	**216.** (*d*)	**217.** (*a*)	**218.** (*b*)	**219.** (*d*)	**220.** (*a, b*)
221. (*b*)	**222.** (*c*)	**223.** (*b*)	**224.** (*a, c*)	**225.** (*b, c*)	**226.** (*d*)	**227.** (*c*)	**228.** (*d*)	**229.** (*b*)	**230.** (*c*)
231. (*a*)	**232.** (*d*)	**233.** (*c*)	**234.** (*a*)	**235.** (*b, c*)	**236.** (*a, d*)	**237.** (*a*)	**238.** (*a, b, c*)		
239. (*a, c, e*)		**240.** (*b, c*)	**241.** (*b*)	**242.** (*c*)	**243.** (*b, d*)	**244.** (*b, c*)	**245.** (*b*)	**246.** (*c*)	**247.** (*a*)
248. (*c*)	**249.** (*b*)	**250.** (*a*)	**251.** (*b*)	**252.** (*c*)	**253.** (*b*)	**254.** (*d*)	**255.** (*a, c*)	**256.** (*c*)	**257.** (*c*)
258. (*b*)	**259.** (*d*)	**260.** (*b, c*)	**261.** (*a*)	**262.** (*a, c, d*)		**263.** (*a, c, d*)		**264.** (*a, c*)	**265.** (*d*)
266. (*a*)	**267.** (*c*)	**268.** (*d*)	**269.** (*a*)	**270.** (*d*)	**271.** (*d*)	**272.** (*c*)	**273.** (*c, d*)	**274.** (*c*)	**275.** (*c, d*)
276. (*c*)	**277.** (*a*)	**278.** (*c*)	**279.** (*c*)	**280.** (*d*)	**281.** (*a*)	**282.** (*d*)	**283.** (*c*)	**284.** (*c*)	**285.** (*d*)
286. (*c*)	**287.** (*b*)	**288.** (*a*)	**289.** (*b*)	**290.** (*a*)	**291.** (*c*)	**292.** (*a*)	**293.** (*b*)	**294.** (*d*)	**295.** (*b*)
296. (*c*)	**297.** (*d*)	**298.** (*b*)	**299.** (*d*)	**300.** (*c*)	**301.** (*d*)	**302.** (*b*)	**303.** (*a*)	**304.** (*a*)	**305.** (*a*)
306. (*a*)	**307.** (*c*)	**308.** (*c*)	**309.** (*b*)	**310.** (*a*)	**311.** (*c*)	**312.** (*c*)	**313.** (*c*)	**314.** (*a*)	**315.** (*b*)
316. (*d*)	**317.** (*b*)	**318.** (*b*)	**319.** (*d*)	**320.** (*b*)	**321.** (*c*)	**322.** (*b*)			