

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

Test Booklet Series

A

TEST BOOKLET

ASSISTANT AGRICULTURE ENGINEER

PAPER – II

T. B. C. : AAE – 2/22

Sl. No.

2277

Time Allowed : 2 Hours

Maximum Marks : 100

: INSTRUCTIONS TO CANDIDATES :

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET OF THE SAME SERIES ISSUED TO YOU.
2. ENCODE CLEARLY THE TEST BOOKLET SERIES A, B, C OR D, AS THE CASE MAY BE, IN THE APPROPRIATE PLACE IN THE ANSWER SHEET USING BALL POINT PEN (BLUE OR BLACK).
3. You have to enter your **Roll No.** on the Test Booklet in the Box provided alongside. **DO NOT** write *anything else* on the Test Booklet.
4. YOU ARE REQUIRED TO FILL UP & DARKEN ROLL NO., TEST BOOKLET / QUESTION BOOKLET SERIES IN THE ANSWER SHEET AS WELL AS FILL UP TEST BOOKLET / QUESTION BOOKLET SERIES AND SERIAL NO. AND ANSWER SHEET SERIAL NO. IN THE ATTENDANCE SHEET CAREFULLY. WRONGLY FILLED UP ANSWER SHEETS ARE LIABLE FOR REJECTION AT THE RISK OF THE CANDIDATE.
5. This Test Booklet contains 100 items (questions). Each item (question) comprises four responses (answers). You have to select the correct response (answer) which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct response (answer), you should mark (darken) the response (answer) which you consider the best. In any case, choose **ONLY ONE** response (answer) for each item (question).
6. You have to mark (darken) all your responses (answers) **ONLY** on the **separate Answer Sheet** provided, by using **BALL POINT PEN (BLUE OR BLACK)**. See instructions in the Answer Sheet.
7. All items (questions) carry equal marks. All items (questions) are compulsory. Your total marks will depend only on the number of correct responses (answers) marked by you in the Answer Sheet. For each wrong response (answer), 0.25 marks shall be deducted from the marks awarded for correct answers.
8. Before you proceed to mark (darken) in the Answer Sheet the responses (answers) to various items (questions) in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per the instructions sent to you with your **Admission Certificate**.
9. After you have completed filling in all your responses (answers) on the Answer Sheet and after conclusion of the examination, you should hand over to the Invigilator the *Answer Sheet* issued to you. You are allowed to take with you the candidate's copy / second page of the Answer Sheet along with the **Test Booklet**, after completion of the examination, for your reference.
10. Sheets for rough work are appended in the Test Booklet at the end.

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1. Bernoulli's equation is applicable for :
 - (A) Viscous and compressible fluid flow
 - (B) Inviscid and compressible fluid flow
 - (C) Viscous and incompressible fluid flow
 - (D) Inviscid and incompressible fluid flow

2. Which one of the following statements is correct for a superheated vapour ?
 - (A) Its pressure is less than the saturation pressure at a given temperature.
 - (B) Its temperature is less than the saturation temperature at a given pressure.
 - (C) Its volume is less than the volume of the saturated vapour at a given temperature.
 - (D) Its enthalpy is less than the enthalpy of the saturated vapour at a given pressure.

3. Viscosity of tomato juice increases rapidly with increase in concentration of solid, therefore, the juice must be concentrated in a :
 - (A) Recirculating batch type rising film evaporator
 - (B) Recirculating batch type falling film evaporator
 - (C) Backward feed multiple effect evaporator
 - (D) Forward feed multiple effect evaporator

4. The peak wavelength of radiation emitted by a black body at a temperature of 2000 K is $1.45 \mu\text{m}$. If the peak wavelength of emitted radiation changes to $2.90 \mu\text{m}$, then the temperature (in K) of the black body is :
 - (A) 500
 - (B) 1000
 - (C) 4000
 - (D) 8000

5. During a non-flow thermodynamic process (1-2) executed by a perfect gas, the heat interaction is equal to the work interaction ($Q_{1-2} = W_{1-2}$) when the process is :
 - (A) Isentropic
 - (B) Polytropic
 - (C) Isothermal
 - (D) Adiabatic

6. A slender rod of length L , diameter d ($L \gg d$) and thermal conductivity k_1 is joined with another rod of identical dimensions, but of thermal conductivity k_2 , to form a composite cylindrical rod of length $2L$. The heat transfer in radial direction and contact resistance are negligible. The effective thermal conductivity of the composite rod is :
 - (A) $k_1 + k_2$
 - (B) $\sqrt{k_1 k_2}$
 - (C) $\frac{k_1 k_2}{k_1 + k_2}$
 - (D) $\frac{2k_1 k_2}{k_1 + k_2}$

7. Convective heat transfer coefficient of a body is dependent partly upon its :
- Temperature
 - Composition (type of material)
 - Shape and size
 - None of these
8. Natural convection is associated with :
- Prandtl number only
 - Reynolds number only
 - Grashof number only
 - Nusselt number only
9. Thermal Death Time (TDT) curve is between :
- Time Vs Temperature
 - Temperature Vs log (time)
 - Time Vs log (number of survivors)
 - None of these
10. Larger decimal reduction time implies :
- Microorganisms (m. o.) more heat resistant
 - Microorganisms less heat resistant
 - Microbial growth redness with time
 - No effect on Microorganisms
11. Psychrometric relations developed are valid at only :
- Any pressure
 - One atmosphere
 - Below one atmosphere
 - Above one atmosphere
12. Consider an ideal vapour compression refrigeration cycle. If the throttling process is replaced by an isentropic expansion process, keeping all the other processes unchanged, which one of the following statements is true for the modified cycle ?
- Coefficient of performance is higher than that of the original cycle
 - Coefficient of performance is lower than that of the original cycle
 - Coefficient of performance is same as that of the original cycle
 - Refrigerating effect is lower than that of the original cycle
13. The "degrees of freedom" for a pure substance at its triple point is :
- 3
 - 2
 - 1
 - 0
14. Colloidal stability of milk casein is because of the highly hydrated carbohydrate residues in :
- α_{s1} casein
 - α_{s2} casein
 - β casein
 - κ casein

15. Rice bran is stabilized prior to oil extraction to protect it from the activity of:
- (A) Polyphenol oxidase
 - (B) Peroxidase
 - (C) Lipase
 - (D) Lipoxygenase
16. Sticking of powder to wall of the chamber during spray drying of fruit juice is due to:
- (A) Low glass transition temperature of the compounds in juice
 - (B) High glass transition temperature of the compounds in juice
 - (C) Improper processing parameters of spray dryer
 - (D) Presence of gums in feed material
17. Ratio of Schmidt number to Lewis number is:
- (A) Prandtl number
 - (B) Reynolds number
 - (C) Nusselt number
 - (D) Sherwood number
18. 'Red dog' is one of the byproducts during milling of:
- (A) Corn
 - (B) Rice
 - (C) Ragi
 - (D) Wheat
19. Potato slices have been dehydrated from an initial solid content of 12% to a final solid content of 94%. If the peeling and other losses are to the tune of 10%, final yield (percent) of the dried chips per ton of fresh potato taken is approximately:
- (A) 11.5
 - (B) 10.0
 - (C) 8.5
 - (D) 5.0
20. Which of the following radiation methods is used in preserving food from spoilage by microorganisms?
- (A) Radio waves
 - (B) Microwaves
 - (C) Non-ionizing
 - (D) Ionizing
21. Which of the following is oil soluble pigment present in fruits and vegetables?
- (A) Flavonoids
 - (B) Carotenoids
 - (C) Anthocyanins
 - (D) Tannins
22. Which of the following represent the group of saturated fatty acids?
- (A) Lauric, Myristic, Arachidic
 - (B) Palmitic, Linoleic, Linolenic
 - (C) Capric, Stearic and Oleic
 - (D) Behenic, Caprylic, Arachidonic

23. Irradiation carried out to reduce viable non-spore forming pathogenic bacteria using a dose between 3 to 10 kGy is called :
- (A) Radurization
(B) Thermoradiation
(C) Radappertization
(D) Radicidation
24. Identify an example of a classical diffusional mass transfer process without involving heat, among the following :
- (A) Drying of food grains
(B) Carbonation of beverages
(C) Distillation of alcohol
(D) Concentration of fruit juice
25. Log Mean Temperature Difference (LMTD) correction factor (F) is applicable to :
- (A) Spiral tube heat exchanger
(B) Steam jacketed kettle
(C) Plate heat exchanger
(D) Evaporator tubes
26. In refining of the rice bran oil for edible purpose, neutralization process is carried out mainly to remove :
- (A) Wax and organic impurities
(B) Gums and mucilage
(C) Saturated glycerides
(D) Free fatty acids
27. One hundred kilogram spice is extracted for essential oil using twice the amount of a pure organic solvent. The extracted solid mass contains 5% residual oil (oil-free solid mass basis). The liquid extracted mass contains 20% oil. Assume no solvent is retained by the extracted solid mass. Initial mass of the oil in the spice in kg is :
- (A) 52.5
(B) 55.0
(C) 57.5
(D) 60.0
28. A fat globule of $1.5 \mu\text{m}$ diameter is rising up in a stagnant skim milk medium of 1005 kg m^{-3} density and 1.5 cP viscosity. If the density of the fat globule is 915 kg m^{-3} , the steady rising velocity of the globule in μms^{-1} is :
- (A) 0.074
(B) 0.082
(C) 0.095
(D) 0.125
29. Milk and fruit juice are deaerated before they are allowed to flow through pasteurizer. This is done in order to :
- (A) Reduce fouling of pasteurizer
(B) Increase rate of heat transfer
(C) Reduce oxidative deterioration
(D) Avoid discoloration

30. When heat flows in steady state through two metal plates separated by a negligibly small air gap between them, the rate of heat flow will be governed by :
- Thermal diffusivity of air
 - Thermal diffusivity of metal plate
 - Thermal conductivity of air
 - Thermal conductivity of metal plates
31. The temperature at which the water in a fruit will freeze is dependent on the amount of the following present in the fruit :
- Sugar
 - Fibre
 - Oil
 - Water
32. Thermal vapour compression is used in a / an :
- Evaporator
 - Homogenizer
 - Pasteurizer
 - None of these
33. The dimension of mass transfer coefficient is :
- $ML^{-2} \theta^{-1}$
 - $ML^{-1} \theta^{-1}$
 - $ML^2 \theta^{-1}$
 - $ML \theta^{-1}$
34. The vertical issues of FSS Act includes :
- Functional foods
 - Food Additives
 - Water, flavoured water and beverages
 - Genetically modified organisms and foods
35. Temperature yielding maximum storage life of food materials decreases in the order :
- Potato < Fish < Milk < Orange
 - Fish < Milk < Orange < Potato
 - Fish < Potato < Orange < Milk
 - Milk < Fish < Orange < Potato
36. The falling drop of water become sphere due to :
- Surface tension of water
 - Compressibility of water
 - Viscosity of water
 - Capillarity of water
37. In a U-tube manometer, one end is open to the atmosphere, the other end attached to a pressurized gas of gauge pressure 40 kPa. The height of the fluid column on the atmospheric side is 60 cm, and that on the gas side is 30 cm. The Manometric fluid used is : (Take $g = 9.8 \text{ m/s}^2$)
- Liquid ammonia
 - Water
 - Mercury
 - Oil

38. If the tank is moving vertically, which of its component is subjected to maximum total pressure ?
- The higher part of vertical walls
 - The lower part of vertical walls
 - Base
 - Centre of the tank
39. In a stationary fluid, how does the local pressure of the liquid vary ?
- In the horizontal direction, only
 - With depth only
 - Neither with depth nor along the horizontal direction
 - Both with depth and along the horizontal direction
40. A uniform body of size 4 m long \times 2.5 m wide \times 1.5 m deep floats in water. What is the weight of the body if the depth of immersion is 1 m ?
- 73.5 kN
 - 147.1 kN
 - 294.3 kN
 - 588.6 kN
41. For compressible fluid flow in a pipe, having a decrease in specific gravity, what will be the effect of a reduction in diameter ?
- It will cause a decrease in velocity
 - It will cause an increase in velocity
 - It remains constant
 - None of these
42. Which equation must be perfunctorily satisfied while dealing with fluid flow problems ?
- Newton's Third law
 - Newton's Second law
 - Continuity equation
 - Law of Conservation of momentum
43. If there is a change in angle contained by two sides, the average of the curve is :
- Linear Deformation
 - Linear Translation
 - Rotation
 - Angular Deformation
44. The flow of fluid along a curvilinear or curved path is known as :
- Vortex Flow
 - Sink Flow
 - Circular Flow
 - Curvilinear Flow
45. The loss of head due to friction in a pipe of uniform diameter in which a viscous flow is taking place, is (where R_N = Reynold number) :
- $1/R_N$
 - $4/R_N$
 - $16/R_N$
 - $64/R_N$

46. Pick up the incorrect statement from the following :
- (A) In free flooding irrigation, water is admitted at one corner of a field and is allowed to spread over the entire area.
 - (B) In check method of irrigation, the field is divided into smaller compartments and water is admitted to each in turn.
 - (C) In furrow irrigation, water is admitted between the rows of plants in the field.
 - (D) None of these
47. The infertility of the soil in waterlogged area is due to :
- (A) Death of bacteria causing nitrification
 - (B) Increase in salinity
 - (C) Growth of weeds
 - (D) All of these
48. The total number of independent equations that form the Lacey regime theory is :
- (A) 6
 - (B) 10
 - (C) 3
 - (D) 4
49. During land levelling of agricultural land for irrigation and drainage purposes, the acceptable deviation in elevation from the design value in metre is :
- (A) 0.015
 - (B) 0.025
 - (C) 0.055
 - (D) 0.150
50. A crop has effective root zone depth of 1200 mm and monthly (30 days) crop evapotranspiration of 260 mm. The effective rainfall during 30 days period is 20 mm. The field capacity and permissible soil moisture depletion (volume basis) are 16% and 8% respectively. The irrigation interval in days for the crop will be :
- (A) 30
 - (B) 18
 - (C) 12
 - (D) 8
51. The consumptive use of water for a crop :
- (A) Is measured as the volume of water per unit area
 - (B) Is measured as depth of water on irrigated area
 - (C) May be supplied partly by precipitation and partly by irrigation
 - (D) All of these
52. Irrigation for cereal crop is generally done by :
- (A) Check flooding
 - (B) Basic flooding
 - (C) Furrow
 - (D) Subway surface irrigation

53. Effective precipitation for a crop may be defined as :
- Total precipitation during the crop period
 - Available water stored in soil within root zone of the crop
 - Total precipitation minus the loss due to infiltration
 - Total precipitation minus the loss due to evaporation
54. Top of the weir is called :
- Ridge
 - Peak
 - Head
 - Crest
55. The ratio of total volume of water delivered to a crop to the area on which it has been spread, is called :
- Critical depth
 - Duty
 - Delta
 - Base
56. Tile drains increase crop yield by :
- Removing the free gravity water that is not directly available to the plants
 - Increasing air circulation
 - Reducing and removing toxic substances such as sodium and other soluble salts
 - All of these
57. The grid iron pipe drainage system is more economical than the Herring-bone pipe drainage system because :
- It is adopted in the fields which do not require complete drainage
 - The number of main or sub-main lines is reduced
 - The number of junctions and the double-drained area are reduced
 - It has only main or sub-main lines
58. If the drainable porosity of a command area is 5% and the design rate of drop of the water table is 0.25 m day^{-1} , the drainage coefficient of the command area in mm day^{-1} will be :
- 250
 - 12.5
 - 1.25
 - 0.0125
59. What is the size of the tile at an outlet of a 12 hectare drainage system, if the D.C is 2 cm and the tile grade is 0.5%. Assume the rugosity coefficient as 0.015 for the tile drain material ?
- 10 cm
 - 15 cm
 - 20 cm
 - 25 cm
60. Which type of alternate layouts system for tile drainage has two mains ?
- Double Main System
 - Natural System
 - Grid-iron System
 - Herring Bone System

61. How many cubic metres of water will be removed for this particular period of a system designed to use a D. C. of 1.5 cm draining 20 hectares for a capacity of 5 days ?
- (A) 10000 m³
 (B) 15000 m³
 (C) 20000 m³
 (D) 25000 m³
62. What is the cross sectional shape of shallow surface drains ?
- (A) Triangular Shape
 (B) Circular Shape
 (C) Rectangular Shape
 (D) Trapezoidal Shape
63. In surface inlet, what is provided to deal with trash ?
- (A) Cunnette
 (B) Beehive Grate
 (C) Blind Inlet
 (D) Surface Inlet
64. Which type of drains is used for small quantity of waters removal ?
- (A) Blind Inlet
 (B) Shallow Surface Drains
 (C) Deep Surface Drains
 (D) Open Drains
65. An aquifer can hold water _____ and the state of water is _____
- (A) Permanently – State of flow
 (B) Temporarily – State of flow
 (C) Permanently – State of stagnancy
 (D) Temporarily – State of stagnancy
66. If P and A are the perimeter and area of a drainage basin, its compactness coefficient, is :
- (A) $P^2/2\pi A$
 (B) $P/2\pi A$
 (C) $P/2\sqrt{\mu A}$
 (D) $P^3/\pi^3 A$
67. The yield of an open well depends upon :
- (A) Permeability of a soil
 (B) Area of aquifer opening into the wells
 (C) Actual flow velocity
 (D) All of these
68. If the axial length of a drainage basin is 35 km and its form factor is 0.2, the total area of the basin is :
- (A) 205 sq. km.
 (B) 215 sq. km.
 (C) 225 sq. km.
 (D) 245 sq. km.
69. A well of diameter 25 cm fully penetrates a confined aquifer. After a long period of pumping at a rate of 55 l/sec, the observations of drawdown taken at 12 m and 120 m distances from the centre of the well are found to be 3.5 m and 0.75 m respectively. The transmissivity of the aquifer _____ is _____ m²/day.
- (A) 633.5
 (B) 623.5
 (C) 600
 (D) None of these

70. Pick up the correct statement from the following :

- (A) A confined bed of impervious material laid over an aquifer, is known as an aquiclude.
- (B) The topmost water bearing strata having no aquifer, is known as non-artesian aquifer.
- (C) The ordinary gravity wells which supply water from the topmost water bearing strata, are called water table wells.
- (D) All of these

71. A commonly use of hand pump is the :

- (A) Centrifugal Pump
- (B) Reciprocating Pump
- (C) Rotary Pump
- (D) Axial flow Pump

72. For the operating point of the pump, a system characteristic between the head required 'H' and the discharge to be maintained 'Q' is generally expressed as :

- (A) Linear equation
- (B) Parabolic equation
- (C) Exponential equation
- (D) Cubic equation

73. A centrifugal pump having an overall efficiency of 75% requires 6 kW power at 1450 rpm to deliver water against a suction head of 5 m and a delivery head of 12 m. If the pump runs at 1650

rpm and frictional head losses are negligible, the total head developed by the pump will be :

- (A) 22.01 m
- (B) 25.05 m
- (C) 29.35 m
- (D) 31.72 m

74. A piston pump is driven by a 5 m diameter horizontal axis wind turbine for supplying water from a borehole with a total pump head of 10 m. The mean velocity of air is 18 km h^{-1} and the density of air is 1.29 kg m^{-3} . The actual power coefficient of the wind turbine is 0.30 and the overall pump efficiency is 60%. Neglecting the transmission losses, the expected pump discharge in L s^{-1} will be :

- (A) 2.90
- (B) 5.80
- (C) 28.50
- (D) 32.27

75. Negative slip occurs in reciprocating pumps, when delivery pipe is :

- (A) Long and suction pipe is short and pump is running at low speed
- (B) Long and suction pipe is short and pump is running at high speed
- (C) Short and suction pipe is long and pump is running at low speed
- (D) Short and suction pipe is long and pump is running at high speed

76. A centrifugal pump acts as a reverse of :
- Outward radial flow reaction turbine
 - Pelton turbine
 - Inward radial flow reaction turbine
 - Reciprocating pump
77. Hydrograph is a graphical representation of :
- Surface run off
 - Ground water flow
 - Rainfall
 - Discharge flowing in the river
78. If a gauge is installed perpendicular to the slope, its measurement is reduced by multiplying :
- sine of the angle of inclination with vertical
 - cosine of the angle of inclination with vertical
 - Tangent of the angle of inclination with vertical
 - Calibration coefficient of the gauge
79. For the upstream face of an earthen dam, the most adverse condition for stability of slope is :
- Sudden drawdown
 - Steady seepage
 - During construction
 - Sloughing of slope
80. Precipitation caused due to striking of air masses with a topographical feature, is called :
- Orographic precipitation
 - Convective precipitation
 - Cyclonic precipitation
 - None of these
81. Pick up the correct statement from the following :
- The unit hydrograph of a specified unit duration obtained from the past data can be used to obtain the hydrograph of future storms of like duration.
 - To obtain the ordinates of storm hydrograph, the ordinates of unit hydrograph are multiplied by the multiplying factor.
 - The multiplying factor for storm hydrograph may be obtained by dividing the run off in mm by 25 mm.
 - All of these
82. For determination of average annual precipitation in a catchment basin, the best method is :
- Arithmetical method
 - Thiessen's mean method
 - Isohyetal method
 - None of these

83. For efficient working of a control meter, its throat length is approximately kept :
- (A) Equal to the critical depth
 (B) Twice the critical depth
 (C) Three times the critical depth
 (D) Four times the critical depth
84. For the estimate of high floods in fan-shaped catchment, the formula used is :
- (A) Dicken's formula
 (B) Inglis formula
 (C) Ryve's formula
 (D) None of these
85. For a catchment area of 120 km^2 , the equilibrium discharge in m^3/hour of a S-curve obtained by the summation of 6 hour unit hydrograph is :
- (A) 0.2×10^6
 (B) 0.6×10^6
 (C) 2.4×10^6
 (D) 7.2×10^6
86. The flow in a chute spillway is generally :
- (A) Supercritical
 (B) Critical
 (C) Subcritical
 (D) Uniform
87. What is the volume of groundwater which can be extracted by gravity drainage from a soil stratum when expressed as percentage fraction of the volume of the soil stratum ?
- (A) Pellicular water
 (B) Specific yield
 (C) Available water
 (D) Field capacity
88. The permeability of an aquifer (m/day) will :
- (A) Increase with an increase in temperature of water flowing through the aquifer
 (B) Decrease with an increase in temperature of water flowing through the aquifer
 (C) Not get affected by the change in temperature of water flowing through the aquifer
 (D) Increase upto 20°C and then decreases with the increase in the temperature of water flowing through the aquifer
89. Normal annual rainfall at metrological stations P, Q and R are 1606 mm, 1803 mm and 1653 mm respectively. In 1999 station Q was inoperative and stations P and R recorded annual rainfall of 1530 mm and 1451 mm respectively. Estimated value of rainfall at Q in 1999 is :
- (A) 1490.5 mm
 (B) 1650.2 mm
 (C) 1687.3 mm
 (D) 1803.0 mm

90. A flow duration curve indicates :
- The stream flow available for different percent of time
 - The duration of floods or droughts
 - The effect of storage
 - The power available for different percent of time
91. A S-curve hydrograph derived from a 4-hr UG (time base $T = 24$ hr) for a 640 km^2 basin :
- Is the result of six 4-hr unit storms occurring in succession over the basin
 - Produces a constant outflow 445 cumec after 24 hours
 - The shape of the curve in the first 24 hours is in the form of letter S
 - All of these
92. Muskingum method of flood routing is used for :
- Hydraulic channel routing
 - Hydraulic reservoir routing
 - Hydrologic channel routing
 - Solving Saint-Venant equations
93. In a rectangular channel, the flow is in critical state with a specific energy of 3.0 m. The discharge per unit channel width is :
- $2.00 \text{ m}^3 \text{ s}^{-1} \text{ m}^{-1}$
 - $3.13 \text{ m}^3 \text{ s}^{-1} \text{ m}^{-1}$
 - $5.75 \text{ m}^3 \text{ s}^{-1} \text{ m}^{-1}$
 - $8.86 \text{ m}^3 \text{ s}^{-1} \text{ m}^{-1}$
94. Bench terraces are constructed on a 10% hill slope. If the vertical interval is 1.5 m, the earthwork per hectare is :
- 1875 m^3
 - 3750 m^3
 - 7500 m^3
 - 18750 m^3
95. A flownet below a dam consists of 24 equipotential drops and 7 flow channels. The difference between the upstream and downstream water levels is 6 m. The length of the flow line adjacent to the toe of the dam at exit is 1 m. The specific gravity and void ratio of the soil below the dam are 2.70 and 0.70, respectively. The factor of safety against piping is :
- 1.67
 - 2.5
 - 3.4
 - 4
96. In a rectangular channel, the ratio of the velocity head to the flow depth for critical flow condition, is :
- 1/2
 - 2/3
 - 3/2
 - 2

97. A rectangular open channel has a width of 5 m and a bed slope of 0.001. For a uniform flow of depth 2 m, the velocity is 2 m/s. The Manning's roughness coefficient for the channel is :
- (A) 0.002
(B) 0.017
(C) 0.033
(D) 0.050
98. The most suitable hydraulic structure for conveying water from higher elevation to lower elevation across the earthen bund is :
- (A) Drop structure
(B) Pipe drop structure
(C) Chute spillway
(D) Gabion structure
99. If the width of bench terrace is W, drop D and existing land slope S ; then for 150% batter slope, the drop D will be :
- (A) $\frac{WS}{100}$
(B) $\frac{WS}{(100 - S)}$
(C) $\frac{2WS}{(200 - S)}$
(D) $\frac{3WS}{(300 - 2S)}$
100. In an arid region :
- (A) Rainfall is mostly during summer
(B) Each fall of rain is considered as a separate unit
(C) 'Drip irrigation' is preferred
(D) Major loss is by transpiration
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SPACE FOR ROUGH WORK

SEAL