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T.B.C. : ASCO-II(i)-24/25

Test Booklet Series

Sl. No. 18533

TEST BOOKLET

ASSISTANT SOIL CONSERVATION OFFICER
(AGRICULTURAL ENGINEERING)
(PAPER-I)

A

K-42

Time Allowed : 1 & ½ hrs. | **Maximum Marks : 100**

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1. Which of the following strainer is commonly used for shallow tube wells known as filter points?
   (A) Continuous slot type of strainer
   (B) Louver type of strainer
   (C) Pipe strainer with fine mesh jackets
   (D) Coir rope strainers

2. Which of the following is an effective method for the development of well?
   (A) Priming
   (B) Pumping with low discharge
   (C) Using chemicals
   (D) Jetting

3. Which of the following pump can effectively lift water under the maximum suction head of 6 to 8 meters?
   (A) A single-stage centrifugal pump
   (B) Submersible pumps
   (C) Turbine pumps
   (D) Jet pumps

4. Which of the following gives an indication of the chemical quality of the groundwater?
   (A) Geological logs
   (B) Resistivity logs
   (C) Sonic logs
   (D) Thermal logs

5. This form of water, held in the micropores of the soil, is the most available water to plants for utilization.
   (A) Gravitational water
   (B) Capillary water
   (C) Hygroscopic water
   (D) Free water

6. In hydraulic design of permanent gully control structure, the following parameter is determined
   (A) Dimension of the structure
   (B) Runoff rate
   (C) Structural strength
   (D) None of the above

7. In EI_{30} method, the I_{30} refers to
   (A) Rainfall depth 30mm
   (B) Kinetic energy of 30 minutes rainfall
   (C) Rainfall intensity of maximum 30 minutes rainfall
   (D) Kinetic energy of 30 mm rainfall

8. Base flow separation is performed
   (A) On a storm hydrograph to get the direct runoff hydrograph
   (B) On a flood hydrograph to obtain the effective rainfall
   (C) On hydrograph of effluent streams
   (D) On flood hydrograph to obtain the rainfall hyetograph

9. The equation for computing time of concentration

$(Tc) = 0.0195\ L^{0.77}\ S^{-0.385}$ is

(A) Boussinesque equation

(B) St. Venant equation

(C) Kirpich equation

(D) Darcy's equation

10. The pump efficiency, motor efficiency and drive efficiency of a centrifugal pump set are 80%, 90% and 75%, respectively. The overall efficiency of the pump set is

(A) 50%

(B) 54%

(C) 75%

(D) 90%

11. The infiltration rate curve after a long time becomes

(A) Vertical

(B) Horizontal

(C) Asymptotic to rate axis

(D) Asymptotic to time axis

12. The difference between observed total rainfall hyetograph and the excess rainfall hyetograph is termed as

(A) Soil moisture storage

(B) Abstractions

(C) Ground water recharge

(D) Detention storage

13. _____ system of tile drainage consists of parallel laterals that enter the main at an angle, usually from both sides

(A) Vertical

(B) Random

(C) Herringbone

(D) Interceptor

14. Along the direction of flow, the base of a Parshall flume at the throat is

(A) Sloping downwards

(B) Sloping upwards

(C) Narrowed

(D) Broadened

15. For open channel flow measurement under partially submerged condition, the best device is

(A) V notch

(B) Cipoletti weir

(C) Rectangular weir

(D) Parshall flume

16. A catchment area produces runoff as 40% of rainfall. If the rainfall is 5 cm and catchment area is 100 ha, the capacity of the pond to store the entire runoff is

(A) 200 m^3

(B) 500 m^3

(C) 2000 m^3

(D) 20000 m^3

17. Bulk density and porosity of a material are 1.25 gm/cc and 36%. The particle density will be

(A) 1.85gm/cc

(B) 1.95gm/cc

(C) 2.05gm/cc

(D) 2.25gm/cc

18. In Rational method, the time of concentration is used for computing

(A) Effective rainfall

(B) Direct Runoff

(C) Rainfall Intensity

(D) Runoff coefficient

19. Mathematical equation used to describe saturated-unsaturated flow of water in drip irrigation

(A) Richard equation

(B) Continuity equation

(C) Bernoulli's equation

(D) Laplace equation

20. The area under hydrograph represents

(A) Watershed area

(B) Peak rate of runoff

(C) Average runoff rate

(D) Volume of runoff

21. Curve number represents

(A) Rainfall property

(B) Watershed characteristics

(C) Wind characteristics

(D) Stream flow features

22. Bernoulli's principles is based on the law of conservation of

(A) Mass

(B) Momentum

(C) Energy

(D) None of these

23. If the saturated hydraulic conductivity of a soil is 1 m/day, the rate of water transmission across a rectangular area 100 m long and 1m height under a unit hydraulic gradient will be

(A) 1 m^3/day

(B) 10 m^3/day

(C) 100 m^3/day

(D) 1000 m^3/day

24. Multi-slot divisors are used for studying

(A) Wind effect on rainfall

(B) Space distribution of rainfall

(C) Drop size distribution of rainfall

(D) Soil loss from experimental plots

25. In which factor of USLE, the effect of vegetation on soil loss is incorporated?

(A) Factor - R

(B) Factor - L

(C) Factor - K

(D) Factor - C

26. Which kind of pumps need priming?

(A) Hand pump

(B) Positive displacement pump

(C) Centrifugal pump

(D) Submersible pump

27. Combined use of surface water and groundwater for crop production is called

(A) Consumptive use

(B) Conjunctive use

(C) Joint use

(D) Optimal use

28. The moisture content in a field has to be raised from 12% to 20% through irrigation. If the apparent specific gravity of the soil is 1.5 and the root zone depth is 50 cm, the depth of water to be added would be

(A) 5 cm

(B) 6 cm

(C) 7 cm

(D) 8 cm

29. A pump with a discharge of 230 lit/min irrigates 100m × 100m rice crop in 2 days and 2 hours, then what is the average depth of irrigation?

(A) 3 cm

(B) 4 cm

(C) 4.9 cm

(D) 6.9 cm

30. What size of electric motor is required for pumping 300 lit/min against a head of 50m, assuming a pump efficiency of 65% and drive efficiency of 100%

(A) 7.2 hp

(B) 5.1 hp

(C) 3.3 hp

(D) 2.5 hp

31. A cipoletti weir is a trapezoidal weir having side slope of

(A) 4:1

(B) 2:1

(C) 1:4

(D) 1:2

32. Time Domain Reflectometry (TDR) is the method of measuring

(A) Soil moisture

(B) Vapour pressure

(C) Solar radiation

(D) Salt concentration

33. Water level in an irrigation pond is 1.5 m below the nearby rice field. The most suitable pump to lift the water to irrigate the rice filed is

(A) Axial flow pump

(B) Submersible pump

(C) Reciprocating pump

(D) Horizontal centrifugal pump

34. The understanding of soil-water-plant relationship is most important for

(A) Tillage operation

(B) Sowing of crops

(C) Harvesting of crops

(D) Design and management of irrigation system

35. The most common method of tube well drilling for fast drilling of large diameter holes in soft and unconsolidated formation is

(A) Cable tool drilling

(B) Rotary drilling

(C) Reverse circulation rotary drilling

(D) Over burden method of drilling

36. A submersible pump is required when one of the following is too high

(A) Suction lift

(B) Delivery head

(C) Diesel cost

(D) Water demand

37. A soil has available water holding capacity of 200 mm per meter of soil depth. For a crop root zone depth of 1.5 m, the depth of applied irrigation water should not exceed

(A) 20 cm

(B) 30 cm

(C) 40 cm

(D) 60 cm

38. A flow in which the velocities of liquid particles at all sections of the pipe are equal is called

(A) Steady flow

(B) Compressible flow

(C) Uniform flow

(D) Streamline flow

39. Seepage loss in irrigation network is

(A) Desirable as it contributes to groundwater recharge

(B) Desirable as it protects the overtopping of canal bank

(C) Contributes to the irrigation by subsurface flow

(D) Undesirable as it causes water table rise and salinity problem

40. Agency responsible for efficient canal water management at field level is

(A) Central commission

(B) National water policy authority

(C) Command area development authority

(D) Central board of irrigation and power

41. In a monoblock pumpset _____ is 100%.

(A) Pump efficiency

(B) Motor efficiency

(C) Drive efficiency

(D) Input efficiency

42. Groyne is associated with

(A) Ravine control

(B) Splash erosion control

(C) Coastal protection

(D) Stream bank erosion control

43. Drainage density of watershed is the ratio of

(A) Total number of streams to the watershed area

(B) Total length of streams to watershed area

(C) Total number of streams to total length of streams

(D) Total length of streams to total number of streams

44. A drop spillway is used for

(A) Erosion control in gully

(B) Flow measurement in stream

(C) Flow regulation in stream

(D) Flow diversion in gully

45. The runoff from a watershed of 18 ha area having rainfall intensity of 10 cm/hour and runoff coefficient 0.3 is

(A) 0.5 m^3/sec

(B) 1.0 m^3/sec

(C) 1.5 m^3/sec

(D) 3.0 m^3/sec

46. The ratio of inertia force to gravitational force is called

(A) Reynold's number

(B) Froude number

(C) Euler number

(D) Weber number

47. Which of the following is a secondary filter in drip irrigation system

(A) Disc filter

(B) Vortex filter

(C) Centrifugal filter

(D) Media filter

48. In the case of drip irrigation laid on hilly region, the lateral should be laid along

(A) Along the slope

(B) Along the contour

(C) Across the contour

(D) Along the grade

49. Irrigation frequency is a function of

(A) Crop only

(B) Soil only

(C) Crop and Soil only

(D) Crop, Soil and Climate

50. A soil sample has a porosity of 40 percent, its void ratio is

(A) 0.06

(B) 0.28

(C) 0.40

(D) 0.66

51. Drip irrigation is recommended when the water is saline because

(A) The total water used in drip system is very small

(B) At least area between plants will be saved from becoming saline

(C) Due to continuous low discharge, high salt concentration cannot buildup near the roots

(D) As and when needed, fresh water can be pumped through the system to flush out the salts

52. In a steady hydraulic jump, the Froude No. of the incoming stream ranges from

(A) 1.9 to 2.5

(B) 2.5 to 4.5

(C) 4.5 to 9.0

(D) 9.0 to 11.5

53. The area benefitted by an irrigation project is known as

(A) Command area

(B) Watershed

(C) Drainage area

(D) Catchment area

54. Warabandi refers to

(A) Giving irrigation by turns

(B) Rectangulation of fields

(C) Land consolidation

(D) Furrow method of irrigation

55. Gabions are used for

(A) Flood control

(B) Flow measurement

(C) Storage of runoff

(D) Gully stabilization

56. At saturation, a clay soil will hold more water than a sandy soil due to

(A) Clay has high permeability

(B) Clay particles are charged

(C) Clay has high porosity

(D) Clay has large pores

57. Which of the following method is associated with derivation of synthetic UHG?

(A) Stehlic method

(B) Snyder's method

(C) Rational method

(D) SCS method

58. Salinity of irrigation water is measured by

(A) SAR value

(B) Electrical conductivity

(C) pH value

(D) ESP value

59. A tile drainage network is effective in

(A) Controlling water table

(B) Controlling weed growth

(C) Removing the hygroscopic water

(D) Controlling evapotranspiration losses

60. The Hooghoudt's equation for spacing of drains is applicable to

(A) Any type of soil

(B) Only for sandy soil

(C) Non-homogenous soil with an impermeable layer below it

(D) A homogenous soil with an impermeable layer below it

61. Groundwater recharge by surface flooding of water is governed primarily by

(A) Infiltration rate

(B) Transmissivity

(C) Hydraulic conductivity

(D) Storage coefficient

62. The specific yield of unconfined aquifer is

(A) Greater than porosity

(B) Less than porosity

(C) Equal to porosity

(D) Unrelated to porosity

63. Wells that are used for obtaining only freshwater from freshwater aquifer underlain with deep brackish water aquifer, are called

(A) Cavity wells

(B) Bore wells

(C) Skimming wells

(D) Semi artesian wells

64. When groundwater flows into a river to augment its discharge, the river is called

(A) An influent river

(B) An effluent river

(C) An intermittent river

(D) An ephemeral river

65. The line joining the static water level in several wells excavated through a confined aquifer is known as

(A) Cone of depression

(B) Piezometric surface

(C) Perched water table

(D) Hypsometric curve

66. An unconfined aquifer is also known as

(A) Artesian aquifer

(B) Leaky aquifer

(C) Water table aquifer

(D) Perched aquifer

67. The process of removing sand, silt and fine gravel from the aquifer surrounding the perforated section of the well casing is generally known as

(A) Casing the well

(B) Alignment of well

(C) Cleaning the well

(D) Developing the well

68. If A is the specific yield, B is the specific retention and C is the porosity of an aquifer, which of the following is the correct relationship between them?

(A) $A + B + C = 1$

(B) $AB = C$

(C) $A + B - C = 0$

(D) $A/B = 1/C$

69. A geological formation which is essentially impermeable to the flow of water, eventhough contains large amount of water.

(A) Aquifer

(B) Aquitard

(C) Aquiclude

(D) Aquifuge

70. Which of the following is a suitable unit for specific capacity?

(A) m/s

(B) hr^{-1}

(C) m^2/hr

(D) litre/s

71. The natural syphon type recording rain gauge records the observations in the form of

(A) Hyetograph

(B) Mass curve

(C) Histogram

(D) Hydrograph

72. Calculate the discharge rate (lit/sec) at the outlet to irrigate an area of 40 ha. The evapotranspiration requirement of crop is 2 mm/day and the irrigation water is applied for 6 hrs.

(A) 37

(B) 46

(C) 23

(D) 28

73. The settling of suspended materials in standing water follows the

(A) Stoke's law

(B) Gravitational law

(C) Continuity law

(D) Law of conservation

74. Which of the following is a method used to estimate potential evapotranspiration?

(A) Hazen-Williams equation

(B) Manning's equation

(C) Chezy's equation

(D) Thornthwaite equation

75. Which of the following is not an example of artificial groundwater recharge?

(A) Sprinklers

(B) Percolation tank

(C) Subsurface dam

(D) Injection wells

76. According to Dalton's law of evaporation, the process of evaporation ceases when which of the following conditions is met?

(A) Saturation vapour pressure = atmospheric pressure

(B) Saturation vapour pressure < actual vapour pressure

(C) Saturation vapour pressure > actual vapour pressure

(D) Saturation vapour pressure = actual vapour pressure

77. What does the term "unit" indicate in unit hydrograph?

(A) Unit width of catchment

(B) Unit area of catchment

(C) Unit volume of base flow

(D) Unit depth of rainfall excess

78. Which of the following term is a measure of the amount of water vapour in the air as a proportion of the maximum amount of water vapour the air could hold at the same temperature?

(A) Dew point

(B) Sublimation point

(C) Evaporation rate

(D) Relative humidity

79. The boundary between the saturated zone and the unsaturated zone is called the _____

(A) Water table

(B) Aquifer

(C) Aquiclude

(D) Porosity

80. The checkdams are used for controlling

(A) Splash erosion

(B) Rill erosion

(C) Sheet erosion

(D) Gully erosion

81. In chute spillway, the outlet section is normally

(A) Channel

(B) Grassed waterway

(C) SAF stilling basin

(D) Open sump

82. When a body floating in a liquid is given small angular displacement, it starts oscillating about a point. This point is known as

(A) Centre of gravity

(B) Metacentre

(C) Centre of buoyancy

(D) Centre of pressure

83. The shoulder bunds are associated with

(A) Brush wood check dam

(B) Gabions

(C) Grassed waterways

(D) Terraces

84. The horizontal interval between contour bunds depends on

(A) Amount of rainfall

(B) Land slope

(C) Soil type

(D) Land cover

85. Increasing the slope length twice, increases the soil loss by

(A) 0.5 times

(B) 3 times

(C) 1.4 times

(D) 4 times

86. The capacity of farm pond is computed using the formula

(A) Clark's formula

(B) Rational method

(C) Trapezoidal rule

(D) Ramser's formula

87. In USLE, the highest value for factor C could be

(A) 1.0

(B) 2.0

(C) 3.0

(D) 6.0

88. Which of the following soil characteristics is not considered for determining the land capability?

(A) Soil texture

(B) Soil depth

(C) Soil horizon

(D) Permeability

89. The sediment concentration in reservoir water varies with

(A) Depth

(B) Particle size

(C) Storage volume

(D) Storage area

90. In which of the following watershed, the channel flow dominates the overland flow?

(A) Small watershed

(B) Large watershed

(C) Humid watershed

(D) Red soil watershed

91. If a IIIrd order stream joins to the IInd order stream, then order of resulting stream would be

(A) III

(B) IV

(C) V

(D) II

92. In which of the following watershed, an intense rainfall will cause peak runoff at outlet, very shortly?

(A) Small watershed

(B) Arid watershed

(C) Large watershed

(D) Black soil watershed

93. The hydrologic flood-routing methods use

(A) Energy equation

(B) Equation of motion

(C) Equation of continuity

(D) Momentum and continuity equations

94. If the irrigation efficiency is 80%, conveyance loss in canal is 20% and the actual depth of irrigation is 16cm, what should be the depth of water at the inlet of the canal?

(A) 10 cm

(B) 15 cm

(C) 20 cm

(D) 25 cm

95. In a chute spillway, the flow is usually

(A) Uniform

(B) Critical

(C) Subcritical

(D) Super critical

96. Which of the following factors does not affect the wind erosion?

(A) Moisture content of the soil

(B) Land gradient

(C) Soil texture

(D) Soil structure

97. Water present in an artesian aquifer is usually

(A) At atmospheric pressure

(B) Above atmospheric pressure

(C) At sub atmospheric pressure

(D) At 1.5 times the atmospheric pressure

98. The relation between transmissibility (T) and permeability (K) for an aquifer of thickness (b) is

(A) $K = T \times b$

(B) $T = K \times b$

(C) $T = K \times \log b$

(D) $T = K/b$

99. If the soil moisture tension for the soil is 15 atmosphere, then the soil is at

(A) Optimum moisture content

(B) Field capacity

(C) Permanent wilting point

(D) Gravity moisture content

100. The rainfall infiltration factor for an area of 3 km^2 is 0.2. If the normal rainfall of that area during the monsoon season is 300mm, what will be groundwater recharge during monsoon

(A) 18 m^3

(B) 90 m^3

(C) 90 ha-m

(D) 18 ha-m

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