

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

Test Booklet Series

T. B. C. : AAE – 1/19

A

TEST BOOKLET

ASSISTANT AGRICULTURE ENGINEERS

Sl. No. **1321**

PAPER – I

Time Allowed : 2 Hours

Maximum Marks : 100

: INSTRUCTIONS TO CANDIDATES :

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SEAL

1. Mechanization level is measured normally in terms of :
 - (A) kW
 - (B) MJ
 - (C) kW/ha
 - (D) kW/h

2. In indigenous plough, _____ is a narrow steel bar attached to the upper surface of which penetrates into the soil and breaks it.
 - (A) Share
 - (B) Body
 - (C) Handle
 - (D) Landside

3. The stage of farm mechanization, cropping system is modified to facilitate mechanization of subsequent operations is known as :
 - (A) Motive power substitution
 - (B) Human control substitution
 - (C) Automation of agricultural production
 - (D) Cropping system adaptation

4. In MB plough, _____ is the part of the plough, to which all other parts are attached.
 - (A) Mould Board
 - (B) Frog
 - (C) Gunnel
 - (D) Landside

5. The _____ tillage is the preparation of soil in such a way that plant residues or other mulching materials are specially left on or near the surface.
 - (A) Mulch
 - (B) Strip
 - (C) Mulch
 - (D) Combined

6. The _____ is the combination of rigid or resistant bodies having definite motions and capable of performing useful work.
 - (A) Tool
 - (B) Implement
 - (C) Machine
 - (D) None of these

7. In tillage, _____ is a raised ridge left at the centre of the strip of land when ploughing started from centre to side.
 - (A) Furrow
 - (B) Back furrow
 - (C) Dead furrow
 - (D) Channel

8. The _____ consists of dropping the seeds in furrow lines in a continuous flow and covering them by soil.
- (A) Drilling
(B) Planting
(C) Dibbling
(D) Transplanting
9. In seed drill, cup feed mechanism is associated with :
- (A) Fertilizer drilling
(B) Seed metering system
(C) Power transmission
(D) Rotation of wheel
10. The _____ is the ratio of number of weeds destroyed per unit area to total number of weeds per unit area before weeding.
- (A) Field capacity
(B) Field efficiency
(C) Weeding efficiency
(D) Weeding capacity
11. In sprayers, _____ is intended to break up the liquid into spray which issues out through an aperture in the disc.
- (A) Boom
(B) Nozzles
(C) Lance
(D) None of these
12. Defoliation in cotton crop is done so as to :
- (A) Minimize green leaf stains
(B) Better adherence of seed cotton to spindles
(C) Better removal of cotton from the spindles
(D) Maintain optimal moisture content
13. In severely lodged crops the hay recovery is maximum in :
- (A) Cutter bar mower
(B) Flail shredders
(C) Rotary cutters
(D) All of these
14. In a pitman drive mower with a 105 cm pitman rod and 30 cm offset, the pitman rod angle at the start and end of the stroke will be :
- (A) 14.3°
(B) 13.3°
(C) 16.6°
(D) 15.5°

15. The uncut crop is separated from the crop to be cut in a grain combine by:

- (A) Divider
- (B) Reel
- (C) Feeder conveyor
- (D) Straw walker

16. In case of combine harvesters, the reel index should be in the range of:

- (A) 1.4 to 1.6
- (B) 1.25 to 1.5
- (C) 1.75 to 2.0
- (D) 1.0 to 1.25

17. The threshing cylinder which is a modification of the chaff cutter is:

- (A) Wire loop type
- (B) Rasp bar type
- (C) Syndicator type
- (D) Spike tooth type

18. The threshing cylinder in small rice threshers are usually of:

- (A) Wire loop type
- (B) Rasp bar type

- (C) Syndicator type
- (D) Spike tooth type

19. The _____ is defined as analysis of behaviour of machine when compared with standard code under ideal and repeated conditions.

- (A) Validation
- (B) Testing
- (C) Evaluation
- (D) None of these

20. If number of knives in a cylindrical cutter head is doubled then the theoretical capacity in a forage harvester will be:

- (A) Doubled
- (B) Halved
- (C) Same
- (D) One-fourth

21. If an engine operates at 500 rpm, it is considered as _____ speed engine.

- (A) High
- (B) Medium
- (C) Low
- (D) Very high

22. In spark ignition engines, the compression ratio is in range of :
- (A) 4 : 1 and 8 : 1
 (B) 14 : 1 and 20 : 1
 (C) 20 : 1 and 25 : 1
 (D) 16 : 1 and 24 : 1
23. In 4-stroke diesel engine, if the values of cylinder speed, stroke and bore are 24 m/min, 30 mm and 25 mm respectively, the cylinder speed will be _____ rpm.
- (A) 400
 (B) 480
 (C) 300
 (D) 500
24. In otto cycle, if the values of air standard efficiency and thermal efficiency are 80% and 60% respectively, its relative efficiency will be _____ %.
- (A) 80
 (B) 64
 (C) 75
 (D) 56
25. In carburetor, the _____ is a butterfly valve operated by hand lever or sometimes automatic to restrict the air flow and hence increasing the proportion of fuel in air fuel mixture.
- (A) Choke
 (B) Throttle
 (C) Nozzle
 (D) Pin
26. Lowest temperature to which fuel must be heated to produce an ignitable vapour-air mixture above the liquid fuel when exposed to an open flame is known as _____ of fuel.
- (A) Cloud point
 (B) Pour point
 (C) Flash point
 (D) Transition point
27. In the spark plug used in battery ignition system of SI engine, the voltage supplied for producing spark is in the range of _____ V.
- (A) 2000 and 2400
 (B) 20 and 24
 (C) 20000 and 24000
 (D) 1000 and 1200

28. The _____ type of cooling system is used in tractors and stationary engines which works on the principle that hot water rises up and cold water goes down due to its heavier weight.
- (A) Thermo-syphon
 - (B) Direct
 - (C) Forced circulation
 - (D) Air cooling
29. In lubricants, _____ indicate the rate at which it thins out as temperature rises or it gets heavier as temperature falls.
- (A) Viscosity index
 - (B) Puddling index
 - (C) Viscosity
 - (D) Consistency index
30. In tractor, complete path of power transmission from engine to wheel is called :
- (A) Power train
 - (B) Power chain
 - (C) Valve train
 - (D) Transmission train
31. Band brakes are commonly used in automobiles for :
- (A) Reducing speed of vehicle
 - (B) Stopping the moving vehicle
 - (C) Keeping the vehicle stationary during parking
 - (D) All of these
32. Which of the following is a component of power transmission system of rear wheel drive tractor ?
- (A) Differential
 - (B) Front axle
 - (C) Flywheel
 - (D) Belt and Pulley
33. In case of a multiple disc clutch, if N_1 are the number of discs on the driving shaft and N_2 are the number of the discs on the driven shaft, then the number of pairs of contact surfaces will be :
- (A) $N_1 + N_2 - 1$
 - (B) $N_1 + N_2$
 - (C) $N_1 + N_2 + 1$
 - (D) $N_1 - N_2$

34. Hydraulic brakes function on the principle of :
- (A) Law of conservation of momentum
 - (B) Law of conservation of energy
 - (C) Pascal's law
 - (D) Bernoulli's law
35. Weight transfer in a tractor implement system is caused by :
- (A) Application of pull
 - (B) Tractive force
 - (C) Traction coefficient
 - (D) All are correct
36. Coefficient of traction is defined as :
- (A) Ratio of BHP to IHP
 - (B) Ratio of BHP to PTO HP
 - (C) Ratio of drawbar pull to dynamic loads
 - (D) Inverse ratio of BHP to IHP
37. In tractor, three-point hitch is operated by :
- (A) Clutch system
 - (B) Gear system
 - (C) Hydraulic system
 - (D) Electrical system
38. An average man can develop maximum power of about _____ for doing farm work.
- (A) 74.6 W
 - (B) 56 W
 - (C) 37 W
 - (D) 44.6 W
39. If values of theoretical speed and slip are 0.40 m/s and 20%, its actual speed will be _____ m/s.
- (A) 0.36
 - (B) 0.28
 - (C) 0.32
 - (D) 0.40
40. The additives used in lubricants, to reduce the temperature at which oil becomes too thick, are called _____.
- (A) Anti-oxidants
 - (B) Pour point depressant
 - (C) Metal deactivator
 - (D) Oil thinner

41. The sound pressure is normally measured in terms of :
- (A) Sone
 - (B) N/mm^2
 - (C) Decibel
 - (D) None of these
42. The _____ is the machine's property which expresses the measure of capability to fulfil stated objectives of the object.
- (A) Durability
 - (B) Reliability
 - (C) Cost of operation
 - (D) Consumption ability
43. The _____ time can be defined as a total sum of times when an equipment is out of operation due to a defect.
- (A) Idle
 - (B) Down
 - (C) Repair
 - (D) Storing
44. Traction coefficient is maximum in a field when :
- (A) The field is dry
 - (B) The field is cultivated
 - (C) The field is irrigated
 - (D) The field is at optimum moisture content
45. In tractor tyre, _____ is the dimension measured from the axle center line to the ground when the tyre is under load.
- (A) Static loading radius
 - (B) Section width
 - (C) Section height
 - (D) Front angle
46. If body weight and height of a person are 80 kg and 160 cm respectively, on the basis of Body-Mass Index (BMI), the person is classified as _____.
- (A) Normal
 - (B) Class-I obese
 - (C) Underweight
 - (D) Class-II obese
47. In anthropometry, the _____ is straight line point to point measurement between anatomical landmarks.
- (A) Distance
 - (B) Curvature
 - (C) Reach
 - (D) None of these

48. In case of anthropometry, variation in anthropometric data over decades or centuries is called _____ variability.
- (A) Transient
(B) Secular
(C) Age
(D) Temporary
49. The _____ is a fundamental process to take nutrients in the form of food and drinks and convert their chemical energy into mechanical energy.
- (A) Metabolism
(B) Electromyography
(C) Aerobic capacity
(D) None of these
50. The area within which manual tasks can be performed easily is defined as :
- (A) Clearance
(B) Reach
(C) Reach envelope
(D) Clearance envelope
51. The average orientation of body parts over time is defined as :
- (A) Pronation
(B) Adduction
(C) Posture
(D) None of these
52. Most individuals will be comfortable when effective temperature of the tractor cab is between _____ °C.
- (A) 15 to 20
(B) 30 to 35
(C) 24 to 27
(D) 32 to 37
53. Anthropometer is used to measure :
- (A) Vibration
(B) Sound
(C) Body dimensions
(D) BMI
54. A branch of science which deals with design of machines, operations and work environment to match with human capabilities and limitations is known as _____.
- (A) Anthropometry
(B) Acoustics
(C) Ergonomics
(D) Physiology

55. Biogas produced from anaerobic fermentation contains :
- (A) CH_4 and CO_2
 (B) CH_4 and CO
 (C) CH_4 , CO_2 and N_2
 (D) CH_4 and N_2
56. Methane forming bacteria works best in temperature range of _____ $^\circ\text{C}$.
- (A) 10 and 20
 (B) 40 and 50
 (C) 20 and 50
 (D) 25 and 35
57. Energy in wind is proportional to _____ of wind velocity.
- (A) Cube
 (B) Square
 (C) Directly
 (D) Inverse square
58. The line of pull of 25 kN is making an angle is 12° with horizontal and 15° in vertical plane with the direction of travel of MB plough. The draft will be :
- (A) 23.6 kN
 (B) 6.32 kN
 (C) 25 kN
 (D) 26.22 kN
59. The specific gravity of diesel is _____.
- (A) > 1
 (B) $= 1$
 (C) < 1
 (D) $> 1 < 2$
60. For a linear programming equations, convex set of equations is included in the region of :
- (A) Feasible solutions
 (B) Disposed solutions
 (C) Profit solutions
 (D) Loss solutions
61. Objective of linear programming for an objective function is to :
- (A) Subset or proper set modeling
 (B) Maximize or minimize
 (C) Row or column modeling
 (D) Adjacent modeling

62. For the products X & Y, which of the following could be a linear programming objective function ?
- (A) $C = X + 2Y^2$
 (B) $C = X + 2X/Y$
 (C) $C = X/Y$
 (D) $C = X + 2Y$
63. PERT analysis is based on :
- (A) Optimistic time
 (B) Most likely time
 (C) Pessimistic time
 (D) All of these
64. Which of the following aggregate planning methods does not work if hiring and layoffs are possible ?
- (A) Linear decision rule
 (B) Management coefficients model
 (C) Transportation method
 (D) Charting method
65. The center of resistance in a 2 bottom MB plough bottom usually assumed to be located at :
- (A) Half of width of cut
 (B) $1/4^{\text{th}}$ of width of cut
 (C) $1/4^{\text{th}}$ W from wing of the share
 (D) $2/3$ from share point
66. Disk angle of the disc plow varies in the range of :
- (A) 15° to 25°
 (B) 42° to 45°
 (C) 25° to 35°
 (D) 52° to 55°
67. Moving the centre of gravity of a tractor towards its rear wheel creates the problem of :
- (A) Overturning
 (B) Instability
 (C) Steering
 (D) None of these
68. If number revolution of ground wheel of a seed drill is N and diameter D, the seed spacing will be :
- (A) $2\pi DN$
 (B) $\pi DN/4$
 (C) $\pi DN/2$
 (D) πDN

69. Load carrying capacity of tires increases with :
- (A) Inflation pressure
 - (B) Loading pattern
 - (C) Tire type
 - (D) All of these
70. The percentage of unthreshed grain discharged at the rear of the combine is known as :
- (A) Cylinder loss
 - (B) Processing loss
 - (C) Shoe loss
 - (D) Walker loss
71. Which linear structure has a provision of Last-In-First-Out (LIFO) mechanism for its elements ?
- (A) Stack
 - (B) Queue
 - (C) Both (A) and (B)
 - (D) None of these
72. Where is the root directory of a disk placed ?
- (A) Anywhere on the disk
 - (B) At a fixed location on the system disk
 - (C) At a fixed address in main memory
 - (D) None of these
73. Translator which is used to convert codes of assembly language into machine language is termed as :
- (A) Assembler
 - (B) Attempter
 - (C) Compiler
 - (D) Debugger
74. Higher-order functions are not built into the :
- (A) Object oriented programming
 - (B) Structural language
 - (C) Java
 - (D) C++
75. Data type is shifted from short type to long type when :
- (A) Value range decreases
 - (B) Value range becomes zero
 - (C) Value range increases
 - (D) Value range become infinite
76. The accuracy of micrometers, calipers, dial indicators can be checked by a :
- (A) Feeler gauge
 - (B) Slip gauge
 - (C) Ring gauge
 - (D) Plug gauge

77. In arc welding, the electric arc is produced between the work and the electrode by :
- (A) Voltage
 - (B) Contact resistance
 - (C) Flow of current
 - (D) All of these
78. In forehand welding, the weld is made :
- (A) From left to right
 - (B) From right to left
 - (C) First from left to right and then from right to left
 - (D) Either from left to right or from right to left
79. The diameter of the drill is 15 mm and rpm of drill is 5. Find the value of cutting speed in meter/minute :
- (A) 235.5
 - (B) 0.075
 - (C) 0.75
 - (D) 0.2355
80. The instrument used to measure external and internal diameter of shafts, thickness of parts and depth of holes, is :
- (A) Vernier caliper
 - (B) Inside micrometer
 - (C) Depth gauge micrometer
 - (D) None of these
81. Lathe spindle has got _____.
- (A) Internal Threads
 - (B) Taper Threads
 - (C) External Threads
 - (D) No Threads
82. In long and short wall method of estimation, the length of long wall is the centre to centre distance between the walls and :
- (A) Breadth of the wall
 - (B) Half breadth of wall on each side
 - (C) One-fourth breadth of wall on each side
 - (D) None of these
83. The modular dimensions of a brick are :
- (A) 200 mm × 100 mm × 100 mm
 - (B) 200 mm × 90 mm × 90 mm
 - (C) 190 mm × 90 mm × 90 mm
 - (D) 190 mm × 100 mm × 90 mm

84. Excess silica in cement :
- (A) Weakens the strength of cement
 - (B) Decreases the setting time
 - (C) Increases the setting time
 - (D) Does not affect setting time
85. The lime content in Portland Cement is :
- (A) 60% to 70%
 - (B) 40% to 50%
 - (C) 30% to 40%
 - (D) Less than 30%
86. Which of the following is not a primary quantity ?
- (A) Mass (M)
 - (B) Temperature (θ)
 - (C) Time (T)
 - (D) None of these
87. What are the dimensions of force ?
- (A) $[MLT^{-2}]$
 - (B) $[MLT^{-1}]$
 - (C) $[ML^2T^{-2}]$
 - (D) $[ML^2T^2]$
88. Which of the following quantities has the dimensions $[M^0L^0T^0]$?
- (A) Density
 - (B) Strain Rate
 - (C) Strain
 - (D) Stress
89. Which of the following is a dimensionless equation ?
- (A) Reynold's equation
 - (B) Euler's equation
 - (C) Weber's equation
 - (D) All of these
90. If there are 6 physical quantities and 3 fundamental units, then the number of pi terms are :
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
91. The universal gate is _____.
- (A) NAND gate
 - (B) AND gate
 - (C) OR gate
 - (D) None of these
92. A single transistor can be used to build _____ gates.
- (A) OR gate
 - (B) AND gate
 - (C) NOT gate
 - (D) NAND gate

93. A transistor has _____ no. of pn junction.
- (A) 1
(B) 2
(C) 3
(D) 4
94. A Zener diode is used as :
- (A) Voltage regulator
(B) Amplifier
(C) Rectifier
(D) Multivibrator
95. A strain gauge is a passive transducer and is employed for converting :
- (A) Pressure into displacement
(B) Force into a displacement
(C) Pressure into a change of resistance
(D) Mechanical displacement into a change of resistance
96. Closed contours with lower values inside the loop indicate a :
- (A) Hill
(B) Saddle
(C) Depression
(D) Summit
97. Contours make an angle of _____ with a ridge or a valley line.
- (A) 190°
(B) 60°
(C) 99°
(D) 90°
98. The number of links in a 5 m long metric chain are _____.
- (A) 150
(B) 100
(C) 50
(D) 25
99. The orientation of green house in Odisha should be :
- (A) North-South
(B) East-West
(C) South West-North East
(D) None of these
100. The Unit of Kinematic Viscosity in SI unit is :
- (A) m^2/s
(B) Stokes
(C) m/s^2
(D) Poise



SPACE FOR ROUGH WORK

SEAL

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Sl. No. **2389**

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1. Paddy need to be stored for larger period at an optimum moisture content of (in '%') :
 - (A) 10
 - (B) 12
 - (C) 14
 - (D) 20
2. Losses in case of fruits and vegetables generally varies from (in '%') :
 - (A) 1 to 10
 - (B) 10 to 30
 - (C) 35 to 50
 - (D) 50 to 60
3. Porosity of corn regardless of variety and moisture content, ranges from (in '%') :
 - (A) 25.5 to 30.5
 - (B) 31.6 to 37.6
 - (C) 38.5 to 47.6
 - (D) 47.9 to 52.4
4. Storage life of non-perishable fruits exceeds (in 'weeks') :
 - (A) 6
 - (B) 8
 - (C) 10
 - (D) 12
5. More careful controls of the quality of the finished product is permitted by :
 - (A) Drier
 - (B) Dehydrator
 - (C) Evaporator
 - (D) Homogenizer
6. For preparation of fruit squash for 1000 g of fruit juice the recommended sugar amount is (in 'g') :
 - (A) 1000
 - (B) 1200
 - (C) 1500
 - (D) 2000
7. The most important substance required for fruit jelly is :
 - (A) Acid
 - (B) Sugar
 - (C) Pectin
 - (D) Sucrose
8. While preparing fruit jam the end point temperature is kept as (in $^{\circ}\text{C}$) :
 - (A) 100
 - (B) 102.5
 - (C) 105.3
 - (D) 108.5

9. The maximum produced vegetable crop in India is :
- (A) Onion
 - (B) Potato
 - (C) Okra
 - (D) Tomato
10. A grain sprouts only when its moisture content exceeds certain limit of moisture content of (in '%') :
- (A) 30 to 35
 - (B) 10 to 15
 - (C) 5 to 10
 - (D) 40 to 50
11. In flat bed batch dryer air flow rate varies per 1000 kg of raw paddy (in 'm³/min') :
- (A) 10 to 20
 - (B) 20 to 40
 - (C) 40 to 50
 - (D) 100 to 110
12. Unit operation which includes removal of heat is :
- (A) Freezing
 - (B) Drying
 - (C) Fermentation
 - (D) Stabilization
13. Storage of food at very low temperatures is called as :
- (A) Drying
 - (B) Cryogenics
 - (C) Size reduction
 - (D) Packaging
14. One of the key factors that influences blanching process is :
- (A) Size of product
 - (B) Density
 - (C) Porosity
 - (D) Viscosity
15. Type of blanching in which pieces of produce are spread in a thin layer on a rapidly moving mesh belt passing through a steam chest is :
- (A) Steam blanching
 - (B) Microwave blanching
 - (C) In-can blanching
 - (D) IQB
16. In cryogenic freezing of foods, refrigerant used is :
- (A) Freon
 - (B) Ammonia
 - (C) Liquid nitrogen
 - (D) Liquid helium

17. In inclined draper, the major factors to cause separation of grain are :
- (A) Size and shape
 - (B) Shape and surface structure
 - (C) Shape and weight
 - (D) Weight and size
18. Parboiled bran contains oil of (in '%') :
- (A) 22 to 25
 - (B) 30 to 45
 - (C) 10 to 15
 - (D) 20 to 28
19. In thin layer drying the thickness of grain bed is (in 'cm') :
- (A) 14
 - (B) 20
 - (C) 10
 - (D) 12
20. Capacity of L. S. U. dryer varies from (in 'tonnes') :
- (A) 2 to 12
 - (B) 15 to 20
 - (C) 1 to 5
 - (D) 25 to 35
21. In Bond's law work index is expressed in :
- (A) cm
 - (B) kW/h
 - (C) m
 - (D) kJ/kg
22. Slope of the line drawn between the shear rate and shear stress is :
- (A) Viscosity
 - (B) Fluidity
 - (C) Consistency
 - (D) Modulus
23. Energy absorbed by a material in a cycle of loading and unloading is called as :
- (A) Mechanical hysteresis
 - (B) Dynamic angle of repose
 - (C) Resilience
 - (D) Viscosity
24. Rheology is well expressed by :
- (A) Force and deformation alone
 - (B) Force alone
 - (C) Force, deformation and time
 - (D) Time and force alone

25. Flow, in which the solid flows towards outlet in a channel formed within solid itself is called as :
- (A) Mass flow
(B) Bulk flow
(C) Funnel flow
(D) Critical flow
26. Unit of thermal diffusivity is :
- (A) $m^2/s \cdot kg$
(B) m^2/s
(C) m^3/s
(D) m/s^2
27. Following is example for visco-elastic material :
- (A) Water
(B) Fruit Juice
(C) Wheat flour dough
(D) Alcohol
28. Work required to cause rupture in materials is called as :
- (A) Resilience
(B) Toughness
(C) Stiffness
(D) Rigidity
29. When a grain is heaped, radius of heap base is 10 cm and heap height is 10 cm, then the angle of repose of grain is :
- (A) 90°
(B) 30°
(C) 60°
(D) 45°
30. Terminal velocity of wheat grain is (in 'm/s') :
- (A) 20 to 30
(B) 30 to 40
(C) 9 to 11
(D) 60 to 70
31. In belt conveyors, the belt speed for grain conveying is in the range of (in 'm/s') :
- (A) 0.5 to 1.0
(B) 1.0 to 1.5
(C) 2.0 to 2.5
(D) 2.5 to 2.8
32. The trough angle for paddy and most other grains in belt conveyor is :
- (A) 20°
(B) 40°
(C) 45°
(D) 5°

33. The effective tension of belt in belt conveyor is expressed as (if $P =$ Power and $S =$ Speed) :
- (A) S/P
 - (B) $P \times S$
 - (C) P/S
 - (D) $P - S$
34. The magnitude of the centrifugal force in bucket elevator which is oriented outward is :
- (A) WV^2/r
 - (B) WV/r^2
 - (C) $WV^2/g.r$
 - (D) W^2V/r
35. The relation between pitch and diameter of screw is ($P =$ Pitch and $D =$ Diameter) :
- (A) $P = D$
 - (B) $P = 2D$
 - (C) $P = 1.3 D$
 - (D) $P = 0.4 D$
36. The average duration of a particle of water to pass through a phase of the hydrologic cycle :
- (A) Residence time
 - (B) Storage time
 - (C) Runoff time
 - (D) Retard time
37. Rainfall mainly affects the soil erosion by its property :
- (A) Direction
 - (B) Volume
 - (C) Intensity
 - (D) Depth
38. The base flow causes :
- (A) Bank erosion
 - (B) Rill erosion
 - (C) Sheet erosion
 - (D) Gully erosion
39. Drainage density is expressed in :
- (A) sq-m
 - (B) m^2/s
 - (C) $m/sq.m$
 - (D) m^3/m
40. In rational formula, time of concentration is used for computing :
- (A) Rainfall intensity
 - (B) Effective rainfall
 - (C) Runoff coefficient
 - (D) Direct runoff

41. Empirical formula for estimating the peak rate of runoff from large watersheds :

(A) $Q = C \cdot A^{3/4}$

(B) $Q = C^2 \cdot A^{1/2}$

(C) $Q = \frac{C}{A^{1/2}}$

(D) $Q = \sqrt{C \cdot A}$

42. In EI_{30} , I_{30} stands for :

(A) Rainfall intensity as 30 cm

(B) Maxi. rainfall intensity for 30 min

(C) Rainfall intensity at 30 min interval

(D) Rainfall intensity at 30 s interval

43. Evapo-transpiration in a crop field surrounded by dry fallow land by vegetation due to :

(A) Conduction of heat

(B) Oasis effect

(C) Clothes line effect

(D) Convection of heat

44. If area of catchment is 10 km^2 and effective rainfall duration is 5 h, then the equilibrium discharge of S-curve Unit Hydrograph is (in ' m^3/h ') :

(A) 4×10^2

(B) 2×10^4

(C) 2×10^2

(D) 4×10^5

45. Low annual rainfall region in India receives rainfall :

(A) 250-1000 mm

(B) $> 1000 \text{ mm}$

(C) $< 100 \text{ mm}$

(D) $< 250 \text{ mm}$

46. What is soil erodibility if the percentage of sand, silt and clay as 50, 40 and 10 is :

(A) 7

(B) 8

(C) 9

(D) 10

47. The total flood prone area of India is estimated to be about (in 'million ha') :

(A) 20

(B) 30

(C) 40

(D) 50

48. The usual value of curve number for wetland paddy is :

(A) 80

(B) 85

(C) 90

(D) 95

49. The most important factor causing water erosion is :
- (A) Rainfall concentration
 - (B) Vegetative cover
 - (C) Topography
 - (D) Soil properties
50. When the velocity of overland flow is doubled its erosive capacity is increased :
- (A) Twice
 - (B) 4 times
 - (C) 6 times
 - (D) 32 times
51. The size of the soil particles prone to saltation ranges from :
- (A) 0.01-0.005 mm
 - (B) 0.05-0.5 mm
 - (C) 0.5-0.75 mm
 - (D) 0.75-1.0 mm
52. The minimum wind velocity at 30 cm height from the ground surface required to initiate of the soil particle (in 'kmph') :
- (A) 4
 - (B) 6
 - (C) 12
 - (D) 16
53. Land under different capabilities are classified into :
- (A) 2 groups
 - (B) 3 groups
 - (C) 4 groups
 - (D) 8 groups
54. The class III land consists slope :
- (A) 1-3 %
 - (B) 3-5 %
 - (C) 5-10 %
 - (D) 10-15 %
55. What is the vertical interval between bunds in a bench terrace if width of terrace is 4.5 m and land slope of 20% ?
- (A) 1.125 m
 - (B) 2.125 m
 - (C) 3.125 m
 - (D) 4.125 m
56. The most important soil property influencing the erodibility characteristic of soil as revealed from soil survey :
- (A) Permeability
 - (B) Infiltration
 - (C) Soil moisture
 - (D) Soil structure

57. The grass species deforming a vegetative barrier is usually a :
- (A) Soil building crop
 - (B) Soil binding crop
 - (C) Soil maintaining crop
 - (D) Soil depleting crop
58. The maximum longitudinal slope of a bench terrace is :
- (A) 0.25%
 - (B) 0.5%
 - (C) 0.75%
 - (D) 1%
59. To enable the movement of farm machinery, the side slope of vegetated waterways should not exceed :
- (A) 2 : 1
 - (B) 3 : 1
 - (C) 4 : 1
 - (D) 6 : 1
60. The All India Soil and Land Use Survey has delineated watershed maps for an area of :
- (A) > 50,000 ha
 - (B) 25,000 ha
 - (C) 10,000 ha
 - (D) 5,000 ha
61. In the construction of dug wells it is desirable to fill the space between the well curb and the sides of the excavation with :
- (A) Clay
 - (B) Sand
 - (C) Sand and gravel
 - (D) Broken stones or bricks
62. The diameter of tubewells for irrigation and water supply usually ranges from :
- (A) 15 to 45 cm
 - (B) 45 to 50 cm
 - (C) 50 to 55 cm
 - (D) 55 to 60 cm
63. The most common method of tube-well drilling in alluvial formations is :
- (A) Cable tool drilling
 - (B) Rotary drilling
 - (C) Reverse rotary drilling
 - (D) Down the hole drilling

64. An Archimedian screw is suitable to lift water from open bodies heights ranging from :
- (A) 0.5 to 1.2 m
 - (B) 1.2 to 2.0 m
 - (C) 2.0 to 3.0 m
 - (D) 3.0 to 4.0 m
65. For pumping sewage water the most suitable type of impeller is :
- (A) -Open
 - (B) Semi-open
 - (C) Closed
 - (D) Non-clog
66. Rational formula computes :
- (A) Runoff rate
 - (B) Direct runoff
 - (C) Peak runoff rate
 - (D) Rainfall excess
67. Which of the following action causes soil erosion due to wave action ?
- (A) Attrition
 - (B) Tunneling
 - (C) Beating
 - (D) Swelling
68. Splash erosion is associated with :
- (A) Rainfall intensity
 - (B) Sheet flow
 - (C) Wind velocity
 - (D) Slope steepness
69. The V-shaped gullies are very common in :
- (A) Hilly areas
 - (B) Desert regions
 - (C) Level lands
 - (D) Humid tropics
70. The fan shape watersheds are common in :
- (A) Plane areas
 - (B) Hilly terrains
 - (C) Humid regions
 - (D) Arid zones
71. Which of the following watershed is classified based on the climate ?
- (A) Humid
 - (B) Tribal settlement
 - (C) Highland
 - (D) Red soil
72. The shape of watershed is expressed by :
- (A) Shape index
 - (B) Compactness coefficient
 - (C) Bifereation ratio
 - (D) Form factor

73. Which of the following parameter is used to evaluate the shape of basin ?
- (A) Form factor
(B) Circulatory ratio
(C) Elongation ratio
(D) Compactness coefficient
74. Commonly sprinkler irrigation method operates at a pressure of about (kg/cm^2):
- (A) 0.5 to 10
(B) 1.5
(C) 0.1 to 0.5
(D) 0.5 to 100
75. The minimum wind speed required for the operation of a wind mill (kmph):
- (A) 4-6
(B) 6-8
(C) 8-10
(D) 10-12
76. If 1 cm of water is added to ground water rise in ground water table will be (porosity 10%):
- (A) 1.0 cm
(B) 10.0 cm
(C) 0.1 cm
(D) 20 cm
77. In the rational formula $Q = 0.0028$ E. I. A., I is the intensity of rainfall in:
- (A) mm/h
(B) cm/h
(C) m/h
(D) cm/min
78. The movement of soil particles having sizes in the range of 0.05 to 0.5 mm through a series of bounces is known as:
- (A) Surface creep
(B) Surface transportation
(C) Saltation
(D) Suspension
79. The side slopes of a cippoletti weir is:
- (A) 4 in 1
(B) 1 in 4
(C) 4 : 1
(D) 4%
80. Soil erosion is more in:
- (A) Sandy soils
(B) Silty soils
(C) Clay lawn
(D) Difficult to say

81. For a well, yield per unit of drawdown is known as :
- (A) Specific capacity
 - (B) Specific yield
 - (C) Well yield
 - (D) Safe yield
82. The time of concentration of a watershed is proportional to :
- (A) $L^{1.77}$
 - (B) $S^{-0.385}$
 - (C) $L^{1.77} S^{-0.385}$
 - (D) $S^{0.385}$
83. The difference between a shallow tubewell and a deep tubewell is on the basis of:
- (A) Depth
 - (B) Water task
 - (C) Aquifer type
 - (D) Aquifer depth
84. The available net positive suction head of a pump depends on :
- (A) Suction lift
 - (B) Friction loss
 - (C) Vapour pressure
 - (D) All of these
85. Computation of evapo-transpiration by Blancy-Criddle method is based on the principle of :
- (A) Aerodynamics
 - (B) Energy balance
 - (C) Empirical approach
 - (D) Combination of these
86. If the impeller speed of a centrifugal pump is doubled the power consumption will be:
- (A) Same
 - (B) Doubled
 - (C) Four times
 - (D) Eight times
87. A watershed of 1000 ha is discharged through a drain at an average rate of $2 \text{ m}^3/\text{s}$, then the drainage coefficient of the watershed is :
- (A) 1.73 cm
 - (B) 1.93 cm
 - (C) 2.13 cm
 - (D) 3.93 cm
88. The major water course of a 3 sq.km watershed has a fall of 25 m in 2.5 km. The time of concentration will be :
- (A) 47.48 min
 - (B) 51.35 min
 - (C) 55.21 min
 - (D) 59.23 min

89. Mole drains are suitable for :
- (A) Very coarse soil
 - (B) Medium coarse soil
 - (C) Sandy loam soil
 - (D) Fine texture soil
90. Hydraulically most efficient cross section of open channel is :
- (A) Triangular
 - (B) Rectangular
 - (C) Semi-circular
 - (D) Trapezoidal
91. Chute spillway is used to control drop of :
- (A) 0-3 m
 - (B) 1-4 m
 - (C) 2-4 m
 - (D) 3-6 m
92. The equation used to design a subsurface drainage system under steady state condition is :
- (A) Krai Jenhoff equation
 - (B) Glover-Dumm equation
 - (C) Kirkham equation
 - (D) Hamad equation
93. The mass per unit volume of a liquid at standard temperature and pressure is called :
- (A) Specific weight
 - (B) Specific gravity
 - (C) Mass density
 - (D) Unit density
94. The falling drops of water become sphere due to :
- (A) Surface tension
 - (B) Compressibility
 - (C) Viscosity
 - (D) Capillarity
95. The pressure measured with the help of a Piezo meter tube is :
- (A) Atmospheric
 - (B) Gauge pressure
 - (C) Absolute pressure
 - (D) Vacuum pressure
96. A flow in which the velocities of liquid particles at all sections of the pipe are equal is called :
- (A) Uniform flow
 - (B) Streamline flow
 - (C) Steady flow
 - (D) Compressible flow

97. A venturimeter is used to measure :

- (A) Velocity of a flowing liquid
- (B) Pressure of a flowing liquid
- (C) Discharge of a flowing liquid
- (D) Weight of a flowing liquid

- (B) $\frac{d}{3}$
- (C) $\frac{d}{4}$
- (D) $\frac{d}{6}$

98. The ratio of loss of head at entrance to that at the exit of pipe is :

- (A) 0.375
- (B) 0.4
- (C) 0.5
- (D) 0.855

100. The total energy line lies over the hydraulic gradient line by an amount equal to :

- (A) $\frac{v^2}{2g}$
- (B) $\frac{v^2}{g}$
- (C) $\frac{v}{2g}$
- (D) $\frac{v}{g}$

99. The hydraulic mean depth for a circular pipe of diameter, d is :

- (A) $\frac{d}{2}$



SPACE FOR ROUGH WORK

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