

Question Booklet Code :

Register
Number

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2019
AGRICULTURAL ENGINEERING
(DEGREE Std.)

Time Allowed : 3 Hours]

[Maximum Marks : 300

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. The applicant will be supplied with Question Booklet 15 minutes before commencement of the examination.
2. This Question Booklet contains **200** questions. Prior to attempting to answer, the candidates are requested to check whether all the questions are there in series and ensure there are no blank pages in the question booklet. **In case any defect in the Question Paper is noticed, it shall be reported to the Invigilator within first 10 minutes and get it replaced with a complete Question Booklet. If any defect is noticed in the Question Booklet after the commencement of examination, it will not be replaced.**
3. Answer **all** questions. All questions carry equal marks.
4. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
5. An answer sheet will be supplied to you, separately by the Room Invigilator to mark the answers.
6. You will also encode your Question Booklet Code with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, action will be taken as per Commission's notification.
7. Each question comprises *four* responses (A), (B), (C) and (D). You are to select **ONLY ONE** correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
8. In the Answer Sheet there are **four** circles (A), (B), (C) and (D) against each question. To answer the questions you are to mark with Blue or Black ink Ball point pen **ONLY ONE** circle of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. e.g. If for any item, (B) is the correct answer, you have to mark as follows :

(A) ● (C) (D)
9. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the time of examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
10. **Do not make any marking in the question booklet except in the sheet before the last page of the question booklet, which can be used for rough work. This should be strictly adhered.**
11. Applicants have to write and shade the total number of answer fields left blank on the boxes provided at side 2 of OMR Answer Sheet. An extra time of 5 minutes will be given to specify the number of answer fields left blank.
12. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.

SEAL

SPACE FOR ROUGH WORK



1. It is the art of measuring slope, horizontal and vertical distances between objects
- (A) Surveying (B) Levelling
(C) Chaining (D) Contouring
2. Sources of groundwater development are
- (A) rainfall and surface ponds
(B) canal water, reservoirs etc
 (C) rainfall, surface ponds, canal water, reservoirs etc
(D) tube wells
3. Direct runoff is the sum of
- (A) the surface run off and the base flow
(B) the base flow and ground water runoff
(C) the delayed subsurface runoff and the deep percolation
 (D) the surface runoff and the prompt subsurface runoff
4. Infiltration capacity of the soil is defined as
- (A) The depth of water absorbed on the soil during the storm
(B) The intensity of rainfall above which the rainfall volume equals the observed runoff volume
 (C) The maximum rate at which it is capable of soil absorbs water
(D) The permeability of the soil in vertical direction
5. What is the average daily evaporation loss from a reservoir with an average water spread area of 15 km^2 in a month having lake evaporation of 20 cm
- (A) $3,00,000 \text{ m}^3$ (B) $2,00,000 \text{ m}^3$
(C) $1,50,000 \text{ m}^3$ (D) $1,00,000 \text{ m}^3$

6. The total number of links available in a 20 m chain is
- (A) 100 (B) 200
(C) 300 (D) 400
7. In pacing, the approximate step length of an average individual is considered as
- (A) 55 cm (B) 65 cm
 (C) 75 cm (D) 85 cm
8. The ratio of soil loss from land cropped under specified conditions to corresponding soil loss from continuous fallow on identical soil, slope and rainfall conditions
- (A) Crop management factor
(B) Conservation practice factor
(C) Topographic factor
(D) Erodibility factor
9. The rainfall erosivity index is given by
- (A) $\frac{EI_{30}}{100}$ (B) EI
(C) $\frac{EI_{60}}{100}$ (D) E
10. Batter slope used in loose and stable soils
- (A) 1 : 1 (B) $\frac{1}{2} : 1$
(C) $1 : \frac{1}{2}$ (D) $1\frac{1}{2} : 1$

11. Soil Erosion is a _____ phase phenomena.
(A) two (B) three
(C) four (D) one
12. The design consists of determining the dimensions of different components of the structure
(A) Hydrologic design
 (B) Hydraulic design
(C) Structural design
(D) Hydrologic + Hydraulic + Structural design
13. The increase in rate of soil erosion as wind blows farther across the field is called as
 (A) Avalanching (B) Suspension
(C) Saltation (D) Siltation
14. The most common cause of failure of contour bund is
(A) lack of outlet facilities (B) improper alignment
 (C) improper design (D) excessive spacing between bunds
15. System of soil and crop management in regions of low and uncertain rainfall is called
(A) protected farming (B) dry farming
(C) energy farming (D) natural farming
16. Natural process of downward and outward movement of soil in steep hill area during high rainfall is called
(A) rill erosion (B) gully erosion
 (C) sheet erosion (D) landslide erosion
17. Contour bunding cannot be taken up in _____ soils successfully
(A) sandy (B) red soil
(C) loamy soil (D) black cotton

18. The Drought Prone Area Programme (DPAP) was initiated by GOT during
- (A) 1966-69
 - (B) 1969-74
 - (C) 1974-78
 - (D) 1978-80
19. Watershed development is
- (A) Block development
 - (B) Taluk development
 - (C) District development
 - (D) Development of land and water resources of a watershed
20. For a groundwater basin, the water balance equation can be written as
- (A) $\text{Inflow} + \text{change in storage} = \text{outflow}$
 - (B) $\text{Inflow} + \text{outflow} = \text{change in storage}$
 - (C) $\text{Inflow} - \text{outflow} = \text{change in storage}$
 - (D) $\text{Inflow} \times \text{outflow} = \text{change in storage}$
21. Soils of the group having moderate infiltration rate, when thoroughly wetted.
- (A) Group A Soils
 - (B) Group B Soils
 - (C) Group C Soils
 - (D) Group D Soils

22. The feature of land drainage marked as free from mottling in the surface and sub soil
- (A) Poorly drained (B) Improperly drained
(C) Moderately well drained (D) Well drained
23. Lands with very severe limitations, suited for occasional cultivation or limited cultivation
- (A) Land capability class III (B) Land capability class IV
(C) Land capability class V (D) Land capability class VIII
24. The dams generally constructed at the valley head, without the provision of checking the percolation losses
- (A) Dugout ponds (B) Embankment type reservoirs
 (C) Percolation pond (D) Irrigation dam
25. Short term runoff harvesting techniques
- (A) contour bund (B) farm pond
(C) percolation pond (D) irrigation dams
26. If drop height exceeds 4m with chance of silt accumulation, the spillways preferred
- (A) Drop spillway (B) Drop inlet spillway
(C) Vegetative spillway (D) Emergency spillway
27. The maximum value of runoff coefficient can be upto
- (A) 1.0 (B) 0.8
(C) 0.5 (D) 0.75

28. The recommended mesh size of the filter to remove the clogging materials in drip irrigation system is
- (A) 100 micron (B) 150 micron ✓
 (C) 200 micron (D) 250 micron
29. The approximate amount of irrigation, water to be added to soil during each irrigation for crops with medium rooted (60-90 cm) in loamy soil is in the range of
- (A) 2.5 to 5.0 cm (B) 10 to 15 cm ✓
 (C) 15 to 20 cm (D) 25 to 35 cm
30. How many hectares of crop can be irrigated by a Persian wheel having a discharge of 11000 litres per to hour, if the depth of irrigation is 5 cm and the irrigation interval is 15 days? The Persian wheel is worked for 10 hours each day
- (A) 1.3 ha (B) 2.3 ha
 ✓(C) 3.3 ha (D) 4.3 ha
31. The boundary between shallow wells and deep wells is probably fixed _____ by pumping water level from well at a depth of
- (A) 4 m (B) 6 m ✓
 (C) 8 m (D) 10 m
32. The centrifugal pumps are also known as
- ✓(A) Non-positive pumps (B) Positive pumps
 (C) Piston pumps (D) Plunger pumps
33. Shrinking and swelling dark clay soils which in dry season develop deep, wide cracks are called as
- (A) Alfisols (B) Inceptisols
 ✓(C) Vertisols (D) Mollisols

34. The commonly used methods of determining the elevation of a series of points at measured intervals along a selected line

- (A) Differential levelling
- (B) Profile levelling
- (C) Check levelling
- (D) Levelling

35. The law which states that the flow of water through porous media is proportional to the hydraulic gradient is

- (A) Darcy's Law
- (B) Dirichlet's Law
- (C) Bernaulis Law
- (D) Archimedi's Law

36. Match the following :

- | | |
|------------------------------|--------------------------------|
| (a) Hargreaves equation | 1. Solar Radiation |
| (b) Stefan-Boltsman constant | 2. Evapotranspiration |
| (c) Aebedo | 3. Air Humidity |
| (d) Water vapour | 4. FAO-Penman montieth formula |

- | | (a) | (b) | (c) | (d) |
|--------------------------------------|-----|-----|-----|-----|
| <input type="radio"/> (A) | 1 | 2 | 3 | 4 |
| <input checked="" type="radio"/> (B) | 2 | 4 | 1 | 3 |
| <input type="radio"/> (C) | 4 | 3 | 2 | 1 |
| <input type="radio"/> (D) | 3 | 1 | 4 | 2 |

37. The crest extends across the full width of the channel for _____ weirs.

- (A) contracted
- (B) suppressed
- (C) converged
- (D) submerged

38. The farm structure used to store animal fodder is called

- (A) silage
- (B) silo
- (C) godown
- (D) stalkage

39. The type of dairy barn where the cows are housed and milked in the same building is

- (A) loose housing barn
- (B) milking house barn
- (C) loafing barn
- (D) stanchion barn

40. Underground pipe lines are being widely used for conveyance of irrigation water from
 (A) canal irrigation projects (B) tank irrigation projects
 (C) lift irrigation projects (D) spring irrigation projects
41. The minimum side slope of an earth channel for polyethylene lining are
 (A) 2 : 1 (B) 2.5 : 1
 (C) 3 : 1 (D) 4 : 1
42. Greenhouse is covered with UV - stabilized Polyethylene sheet of thickness about
 (A) 50 micron (B) 75 micron
 (C) 100 micron (D) 200 micron
43. The structure which is economical when a channel has to cross a wide depression or where the road surface lies close to the field surface is
 (A) culverts (B) flumes
 (C) inverted siphons (D) check dams
44. When the irrigation channel has to pass through steep slopes _____ are used to convey water from a higher elevation to a lower elevation.
 (A) drop structures (B) chute spillways
 (C) culvert (D) junction box
45. A structure is used at junctions, in the underground pipe line system, when the branch line takes off from the main line in different directions is called _____.
 (A) Pump stand (B) Gate stand
 (C) Air vents (D) Hydrants
46. Water conveyance structures helps in
 (i) Proper distribution of water to different parts of the field.
 (ii) The channels or pipelines to cross roads, depressions, high spots, drainage channels.
 (iii) Erosion control of the field.
 (A) (i) and (ii) only (B) (ii) and (iii) only
 (C) (i) and (iii) only (D) (i), (ii) and (iii)

47. Standard dimensions of chains which are common on agricultural machines have been developed by
- (A) ASAE (B) AME
 (C) BIS (D) AMSE
48. V – belts are employed extensively in agricultural machinery applications but not found suitable for
- (A) Heavy loads at high speed (B) Heavy loads at low speed
(C) Low loads at low speed (D) Heavy loads at moderate speed
49. This is the least expensive type of chain is used extensively an agricultural implement and well suited for moderate loads at speeds not exceeding
- (A) 4 to 7.5 m/s (B) 3 to 4 m/s
 (C) 2 to 2.5 m/s (D) 6 to 8 m/s
50. Tapered Roller bearings are designed to take
- (A) Thrust loads only (B) Radial loads only
 (C) Both radial and thrust loads (D) Compression load
51. The system governing the angular movement of front wheels of a tractor is called
- (A) Lifting system (B) Dragging system
(C) Rotating system (D) Steering system
52. It is the point on the tractor body at which its weight may be considered as acting.
- (A) Balancing (B) Centre of gravity
(C) Suspension (D) Weighing

53. It is a control valve used in the tractor cooling system to control the flow of water when activated by a temperature signal
- (A) Water jacket (B) Thermostat valve
(C) Forced circulation (D) Thermosiphon
54. The idea air cleaner should possess the following character
- (i) High efficiency in dust removal from the air
(ii) Low cost
(iii) Small size
(iv) Durability
- (A) (i) only (B) (ii) and (iii)
 (C) (i), (ii), (iii) and (iv) (D) (iv) only
55. In general, governors for internal combustion engines are of
- (A) centrifugal type
 (B) centrifugal force spring loaded type
(C) spring loaded type
(D) mechanical device
56. It is the ratio of work output to the work applied to it at the axle
- (A) Drawbar efficiency (B) Tractive efficiency
(C) Torque efficiency (D) Power take off efficiency
57. The pressure of the pneumatic tyres used in power tiller ranges from
- (A) 2 to 4 kg/cm² (B) 3 to 5 kg/cm²
(C) 0.5 to 1.0 kg/cm² (D) 1.1 to 1.4 kg/cm²

58. The diameter of spray droplet which divides the droplet spectrum in to two portions such that the total volume of all droplets smaller than this diameter is equal to the total volume of all droplets larger than this diameter. The diameter is referred as
- (A) Number median diameter
 - (B) Volume median diameter
 - (C) Average diameter
 - (D) Spray particle diameter
59. Name the spraying unit which requires a small quantity of liquid chemicals by increasing the density of liquid chemicals in use
- (A) Hand atomiser
 - (B) Fogger
 - (C) Mest blower
 - (D) Knapsack sprayer
60. Dusting machines is preferred for controlling of pests when the wind speed is
- (A) less than 12 kmph
 - (B) 12-15 kmph
 - (C) 15-20 kmph
 - (D) more than 20 kmph

61. Hill dropping is a sowing method in which
- (A) the seeds are dropped in the furrow made by furrow opener in the field
 - (B) the seeds is sown such that plant to plant and row to row spacing is maintained
 - (C) the seeds are thrown in the field in a random manner
 - (D) the seeds are sown in lines at fixed spacing
62. Smoothers are
- (A) Harvesting equipments
 - (B) Primary tillage implement
 - (C) Secondary tillage implement
 - (D) Used for traveling irrigated fields
63. The tractors for rotary tillers, when used for primary tillage, should have
- (A) 0.3 kW per centimetre of tilling width
 - (B) 1 kW per centimetre of tilling width
 - (C) 2 kW per centimetre of tilling width
 - (D) 0.5 kW per centimetre of tilling width
64. In a disc barrow, the use of cut-away discs are
- (A) to reduce weight
 - (B) to increase disc angle
 - (C) to reduce disc concavity
 - (D) to take care of thick growth of grass on the surface
65. One of the following is a type of drag harrow
- (A) Offset disc harrow
 - (B) Bakhar
 - (C) Triangular harrow
 - (D) Cultivator

66. Heat flow through a solid surface to a fluid is given as

- (A) $q = hA(T_1 - T_2)$
- (B) $q = hK(T_1 - T_2)$
- (C) $q = hL\Delta T$
- (D) $q = hAK / \Delta T$

67. The refrigerant 717 is _____.

- (A) air
- (B) water
- (C) ammonia
- (D) carbon dioxide

68. Homogenization of milk is carried out using _____ pump.

- (A) Double acting
- (B) Triplex
- (C) High Pressure
- (D) Ultra high pressure

69. Radappertisation refers to

- (A) Pasteurization
- (B) Sterilization
- (C) Heating
- (D) Cooking

70. Spray dryers are used for drying
- (A) grain (B) liquid foods
(C) pulses (D) milk products
71. Which method of drying should be adopted for high moisture harvested grain which cannot be stored for longer period?
- (A) Un-heated air
(B) Un heated air with supplemental heat
(C) heated air drying
(D) using low temperature air
72. Conductive heat transfer in a tubular pipe is
- (A) $q_r = \frac{2\pi LK(T_i - T_o)}{l_n(r_i/r_o)}$ (B) $q_r = \frac{2\pi LK(T_i - T_o)}{l_n(r_o/r_i)}$
(C) $q_r = \frac{2\pi LK(T_o - T_i)}{l_n(r_o/r_i)}$ (D) $q_r = \frac{2\pi LK(T_o - T_i)}{l_n(r_i/r_o)}$
73. Whipping cream has _____ percent milk fat
- (A) 30 - 40 (B) 65 - 85
(C) 20 - 25 (D) 10 - 15
74. Sweet condensed milk has
- (A) 9% milk fat, 30% total milk fat, 40% cane sugar
(B) 9% milk fat, 30% total milk solids and 40% cane sugar
(C) 9% milk fat, 31% total milk fat and 39% cane sugar
(D) 9% milk fat, 31% total milk solids and 40% cane sugar
75. The increase in boiling point of solution over that of water is determined by using
- (A) Boiling rule (B) Boil's law
(C) Roult's Law (D) Dühring rule

76. In deep bed drying through bottom plenum chamber, the moisture removal rate is
 (A) Uniform from bottom to top (B) higher from bottom to top
 (C) lower from bottom to top (D) very high at the centre path
77. Name the storage bin, if whole relative dimension are such that the plane rupture meets the grain surface before it strikes the opposite side
 (A) Deep bin (B) Shallow bin
 (C) Plane of rupture (D) Silo
78. During sensible heating and cooling, the humidity ratio
 (A) remains constant (B) changes with heating and cooling
 (C) coincides with relative humidity (D) coincides with enthalpy
79. For transportation of grain, cotton seed etc. in belt conveyors, the following system is most preferred.
 (A) Flat belt idlers
 (B) Troughing idlers with 20° trough
 (C) Troughing idlers with 35° and 45° trough
 (D) Troughing idlers with 60° and 80° trough
80. Separation of particles in such a way that the largest particles of under flow is just smaller than screen opening, while the smaller particle of overflow is just larger than screen opening is known as
 (A) Actual screen (B) Ideal screen
 (C) Perfect screen (D) Theoretical concept of screening
81. Which of the following is not representing drying curve
 (A) moisture content vs drying time (B) drying rate vs drying time
 (C) weight loss vs moisture content (D) drying rate vs moisture content
82. Burr mill works based on the mechanism of
 (A) Impact and friction (B) Impact and crushing
 (C) compression (D) compression and shear

83. Paddy grain has _____ % bran

(A) 18-22%

(B) 4-6%

(C) 1-3%

(D) 10-12%

84. The Critical speed of a ball mill is determined by using

(A) $\frac{1}{2\pi} \sqrt{\frac{g}{R}}$

(B) $\frac{1}{2\pi} \sqrt{\frac{g-r}{R}}$

(C) $\frac{1}{2\pi} \sqrt{\frac{g}{R-r}}$

(D) $\frac{1}{2\pi} \sqrt{\frac{g-R}{r}}$

85. Determine the degree of grinding, if the overall surface area of the product is 150mm² and the overall surface area of the feed is 100 mm².

(A) More than 15

(B) 15

(C) 1.5

(D) 150

86. As per _____ law, Energy required in crushing is proportional to the square of the common linear dimension.

(A) Rittinger

(B) Kicks

(C) Bonds

(D) Fineness modulus

87. The Centrifugal and gravitational forces are used in _____ separator.

(A) Indented Cylinder

(B) Disk

(C) Cyclone

(D) Pneumatic

88. Gasification has thermochemical conversion efficiency in the range of _____ %. Which is highest among various alternative?
- (A) 90 to 100 % (B) 70 to 90 %
(C) 50 to 70 % (D) 30 to 50 %
89. _____ is one of the physical process used for biomass conversion process.
- (A) Combustion (B) Anaerobic reduction
(C) Liquefaction (D) Briquetting
90. Bulk density of biomass affects the effective utilisation in the form of
- (A) Calorific value per unit weight (B) Logistic and storage
(C) Corrosion (D) Ash melting behaviour
91. _____ is a procedure for generating electric power and useful heat in a single installation.
- (A) Electricity Production (B) Thermal Power production
 (C) Co-generation (D) Co-digestion
92. _____, _____ and _____ are the sequence of solar cell types arranged from higher efficiency to lower efficiency.
- (A) Mono crystalline silicon, Amorphous silicon and poly crystalline silicon
(B) Poly crystalline silicon, Amorphous silicon and mono crystalline silicon
(C) Amorphous silicon, mono crystalline silicon and poly crystalline silicon
 (D) Mono crystalline silicon, Poly crystalline silicon and Amorphous silicon
93. Rated power a solar Pv module in _____ the actual output power.
- (A) Greater than (B) Equal to
(C) Lesser than (D) Not related to
94. Porous absorber types are used in solar
- (A) Air heaters only (B) Water heaters only
(C) Both Air and Water heaters (D) Cookers only

95. The Bench mark established by the survey of India is known as the
- (A) Arbitrary Bench Mark (B) Temporary Bench Mark
 (C) Vertical Bench Mark (D) GTS Bench Mark
96. Lysimeter is used to measure
- (A) Infiltration (B) Evaporation
 (C) Evapotranspiration (D) Vapour pressures
97. A series of closed contours with higher values inside the loop is termed as
- (A) A pond (B) A depression
 (C) A hill (D) A sloping ground
98. The process of making some intermediate points in a survey line joining the two end points in the field so that the length between them may be measured correctly is called
- (A) centering (B) levelling
 (C) ranging (D) orientation
99. Relative humidity of the air is defined as the ratio of
- (A) actual vapour pressure to the saturation vapour pressure at 0°C
 (B) weight of water in unit volume of air to the weight of air in the same volume
 (C) actual vapour pressure to the saturation vapour pressure at the air temperature
 (D) actual vapour pressure to the atmospheric pressure
100. "Well log" is the
- (A) formation characteristics
 (B) presentation of formation characteristics with respect to depth
 (C) soil density
 (D) aquifer yield

101. One cumec-day of volume is equal to
 (A) 864 m³ (B) 8640 m³
 (C) 86,400 m³ (D) 8,64,000 m³
102. The stage in the river is defined as
 (A) the average depth of flow in the stream
 (B) the hydraulic radius of the stream cross-section
 (C) the hydraulic depth of the stream cross-section
 (D) the elevation of the water surface above an arbitrary datum
103. The arithmetic check in the rise and fall system of finding reduced level during levelling is
 (A) $\Sigma \text{B.S} - \Sigma \text{F.S} = \text{Last R.L.} - \text{First RL}$
 (B) $\Sigma \text{B.S} - \Sigma \text{F.S} = \Sigma \text{Rise} - \Sigma \text{Fall}$
 (C) $\Sigma \text{Rise} - \Sigma \text{Fall} = \text{Last R.L.} - \text{First RL}$
 (D) $\Sigma \text{B.S} - \Sigma \text{F.S} = \Sigma \text{Rise} - \Sigma \text{Fall} = \text{Last RL} - \text{First RL}$
104. The operation of keeping the plane table parallel to the position it occupied at the previous location is known as
 (A) Centering (B) Levelling
 (C) Orientation (D) Shifting
105. It is a method of surveying in which the field work and plotting are done simultaneously, called
 (A) Chain surveying (B) Compass surveying
 (C) Plane table surveying (D) Theodolite surveying
106. The optical square consists of horizontal mirror and index mirror placed to each other at one angle of
 (A) 15° (B) 30°
 (C) 45° (D) 60°
107. A point whose vertical distance above or below some arbitrarily assumed level surface or datum is called
 (A) elevation (B) grade
 (C) contour (D) zenith

108. The terraces constructed with embankment and channel occupying a width of about 15 m
- (A) Narrow based terrace ✓ (B) Broad based terrace
(C) Diversion terrace (D) Bench terrace
109. The crop strips are laid parallel, across the land slope and is a modified form
- (A) Contour strip cropping ✓ (B) Field strip cropping
(C) Buffer strip cropping (D) Wind strip cropping
110. The structures used at the places of high depression in the gully bed for storing the water
- (A) Chute spillways (B) Drop spillways
✓ (C) Drop inlet spillways (D) Gabious
111. The advance and last stage of water erosion
- (A) Sheet erosion (B) Rill erosion
✓ (C) Gully erosion (D) Raindrop erosion
112. The kinetic energy of rain drop is directly proportional to
- (A) Terminal velocity of rainfall
✓ (B) Square of the terminal velocity of rainfall
(C) Surface roughness
(D) Topographic factors
113. The mechanical break down of loads due to the collision of particles with each other
- (A) Hydraulic action (B) Solution
✓ (C) Attrition (D) Abrasion

114. Any type of barrier for protection from winds and refers to any mechanical or vegetative barriers of buildings, gardens, orchards is called

- (A) Wind break (B) Shelter belts
(C) Strip Cropping (D) Mulching

115. The minimum Velocity of wind required to initiate movement of a given size of soil particle is known as

- (A) wind velocity (B) erosion velocity
 (C) threshold velocity (D) transportation velocity

116. Terrace spacing is also expressed as

- (A) vertical interval
(B) terrace width
(C) vertical interval and terrace width combined together
(D) percentage

117. Bench terraces have the shape of a

- (A) Ridge (B) Channel
 (C) Platform (D) Valley

118. Contour farming is recommended for lands with close range of

- (A) 0-1% (B) 2-7%
(C) 7-12% (D) 12-24%

119. The National Watershed Development Programme for Rainfed Agriculture (NWDPA) was launched in 99 districts of India during.

- (A) 1985 (B) 1987
(C) 1989 (D) 1991

120. Stream order

- (A) is a dimensionless term
(B) has dimension as 'L'
(C) has dimension as '%'
(D) has dimension as ' $\frac{1}{L}$ '

121. A stream, through which all discharge and sediment of basin pass is

- (A) Lowest order stream
(B) Middle order stream
 (C) Trunk order stream
(D) Zero order stream

122. The ratio of basin area to the square of the basin length

- (A) Drainage density
(B) Circulatory ratio
 (C) Form factor
(D) Elongation ratio

123. Ponds constructed by excavating the soil from the ground, relatively in level areas.

- (A) Embankment type farm ponds
 (B) Dug out type farm ponds
(C) Creek fed ponds
(D) Off-stream storage ponds

124. An area, which contributes runoff to the main stream and distributaries

- (A) Command area
(B) Storage area
 (C) Drainage basin
(D) Water spread area

125. The involvement of the local community, to prepare the watershed resources map as perceived by the farmers
- (A) social mapping (B) matrix ranking
 (C) seasonality analysis (D) time line
126. Watershed size considered reasonable for agricultural development in the hills with regard to ease of surveys, investigations and planning
- (A) 500 to 1000 ha (B) 5000 ha to 10000 ha
 (C) 10000 ha to 20000 ha (D) 20000 ha to 100000 ha
127. Project implementing agency would carry out its activity with the involvement of multi disciplinary team called
- (A) watershed committee (B) watershed association
 (C) watershed development team (D) watershed user groups
128. Allowable maximum velocity of water in open ditches for stiff clay soil is
- (A) 0.75 m/sec (B) 0.90 m/sec
 (C) 1.20 m/sec (D) 1.50 m/sec
129. Which among the following crop is sensitive to salinity?
- (A) cotton (B) apple
 (C) sugar beet (D) barley
130. The drip irrigation system in which water is applied to the soil surface in a small stream is called
- (A) surface system (B) subsurface system
 (C) bubbler system (D) spray system
131. A lateral has 12 sprinklers spaced at 10 metres apart. The laterals one spaced 18 metres on the main line. Determine the amount of fertilizer to be applied at each setting when the recommended fertilizer dose is 120 kg/ha.
- (A) 25.92 kg (B) 26.92 kg
 (C) 27.92 kg (D) 28.92 kg

132. The slope of each side of the notch in a cipoletti weir is
 (A) 1 : 3 (B) 1 : 4
 (C) 1 : 5 (D) 1 : 1½
133. Express 1170 ppm sodium chloride salt concentration in meq/l.
 (A) 0.02 (B) 200
 (C) 0.2 (D) 20
134. It is proposed to irrigate 16ha of maize crop by sprinkler irrigation system. Determine the system capacity if the design moisture use rate is 5 mm/day; moisture replaced in the soil at each irrigation is 6 cm; irrigation efficiency is 70%; irrigation period is 10 days in a 12 day interval and the system is to be operated for 20 hours per day.
 (A) 19 litres/sec (B) 19 m³/hr
 (C) 19 m³/sec (D) 1.9 litres/sec
135. The steady state drainage equation for drain spacing was formulated by
 (A) Lacey (B) Kennedy
 (C) Hooghoudt (D) Hazen-William
136. The drainage system where field drains are constructed in parallel lines along the direction of slope and joins the main drain at its bottom is called
 (A) Herring bone system (B) Parallel system
 (C) Grid Iron system (D) Double system
137. The mole drain have a life of upto about _____ years.
 (A) 2 years (B) 3 years
 (C) 4 years (D) 5 years

138. Which of the following is/are not correct?

- I. The most economical channel cross section is the one which gives the maximum rate of discharge.
- II. For a given channel cross section the discharge is maximum when the velocity is maximum.
- III. The area remaining constant the method perimeter is maximum.

(A) I only (B) II only
 (C) III only (D) I and II only

139. The stilling basin in chute spillways helps in the _____ of falling water.

- (A) increasing water level (B) decreasing water level
 (C) energy dissipation (D) increasing velocity

140. Which of the following is/are not correct?

- I. A farm producing grain and vegetable crops uses fencing to keep wild animals away.
- II. In dairy farms, animals are confined within fence so that they cannot escape.
- III. Dead or live hedges are widely used as effective permanent fences.

(A) I only (B) II only
 (C) III only (D) I and II

141. The green house where the pipe arches or trusses are supported on pipe purlins are known as

- (A) lean to type (B) saw tooth type
 (C) quonset type (D) uneven span type

142. Water hammer in underground pipeline system could occur as a result of

- (i) Sudden stoppage of pump
 - (ii) Sudden release of air
 - (iii) Sudden valve closure
- (A) (i) and (ii) (B) (ii) and (iii)
 (C) (i) and (iii) (D) (i), (ii) and (iii)

143. For lined canals, the permissible flow velocity varies from

- (A) 3.0 to 3.25 m/s (B) 1.54 to 2.5 m/s
(C) 2.5 to 3.00 m/s (D) 1.25 to 1.5 m/s

144. Lining of canal serves
- (i) Reduces water loss due to seepage
 - (ii) Increases the carrying capacity
 - (iii) Maintenance cost of channel increases
- (A) (i) and (iii) (B) (ii) and (iii)
 (C) (i) and (ii) (D) (i), (ii) and (iii)
145. The most common type of water conveyance system in the farm is the
- (A) open channel (B) under ground pipe line channel
 (C) open pipe line (D) grassed water way
146. The advantage of face in type stanchion barn is
- (A) milking is easier (B) manure alley can be eliminated
 (C) easy in collection of manures (D) cleaning is easier
147. In a farm house various rooms should be so located as to provide
- (i) Adequate comfort
 - (ii) Minimum time in going farm one to other
 - (iii) Minimum energy wastage in going farm one to other
- (A) (i) and (ii) (B) (ii) and (iii)
 (C) (i) and (iii) (D) (i), (ii) and (iii)
148. The silo pits and feed storages should be located near the
- (A) field (B) animal shelters
 (C) residential building (D) farm roads
149. The purpose of providing a steering brake is
- (A) To disengage the clutch
 - (B) To rotate the clutch drum
 - (C) To stop the clutch drum from rotating after clutch has been disengaged
 - (D) To engage the clutch
150. The angle between the centre line of the king pin of the tractor and the vertical line is called
- (A) Camber angle (B) Track angle
 (C) Tilt angle (D) Caster angle

151. It is a device for cooling the circulating water in the engine, known as
(A) Water pump (B) Radiator
(C) Water Jacket (D) Thermostat
152. There are two theories in existence regarding the application of lubricants on a surface. They are
(A) Rubbing theory and coating theory
(B) Immersion theory and spreading theory
 (C) Fluid film theory and Boundary layer theory
(D) Flashing theory and dusting theory
153. The interval between successive power strokes in different cylinders of the engine is called
(A) Timing (B) Firing interval
(C) Firing order (D) Output power
154. In comparison of 4 stroke and 2 stroke engine, the fuel consumption in 4 stroke engine is
(A) More (B) 15% more
 (C) Less (D) Equal
155. When the mechanical cycle of internal combustion engine is completed in two revolutions of the Crankshaft is called
(A) Two stroke cycle engine (B) Four stroke cycle engine
(C) Diesel cycle engine (D) Otto cycle engine
156. Power availability from a power tiller on the farm is considered for calculation purpose is
 (A) 7 kW (B) 10 kW
(C) 8 kW (D) 6 kW

157. Expansion of ASAE is
- (A) American Society of Automobile Engineers
 - (B) American Society of Automotive Engineers
 - (C) American Society of Agricultural Engineers
 - (D) American Society of American Engineers
158. For high pressure orchard spraying of mature trees, the application rate will be about
- (A) 900 to 3750 L/ha
 - (B) 1450 to 2900 L/ha
 - (C) 5600 to 7500 L/ha
 - (D) 800 to 1000 L/ha
159. The maximum operating pressure of boom-type field sprayers are
- (A) 275 to 690 kPa
 - (B) 1.7 to 5.5 MPa
 - (C) 1.7 to 5.5 kPa
 - (D) 275 to 690 MPa
160. The atomising principle in which the liquid is fed under low pressure to the center of a high-speed rotating device, is known as
- (A) Hydraulic atomization
 - (B) Low-velocity jet break-up
 - (C) Gas atomization
 - (D) Centrifugal atomization
161. The operating pressure for hydraulic nozzle other than the flooding type nozzle should be
- (A) below 140 kPa
 - (B) above 140 kPa
 - (C) between 50-100 kPa
 - (D) between 25-50 kPa

162. The hand operated spraying machines are operated at pressures ranging from
- (A) 12 to 15 kg/sq.cm ✓ (B) 1 to 7 kg/sq.cm
(C) 8 to 20 kg/sq.cm (D) 10 to 12 kg/sq.cm
163. The seed drill is used for sowing pre-germinated paddy seeds in paddled fields
- (A) Hill drop planter ✓ (B) Manual rice seeder
(C) Dibbler (D) Check row planter
164. The method which is not used for sugar cane planting is
- (A) Flat planting (B) Furrow planting
(C) Trench planting ✓ (D) Hill dropping
165. Identify the correct statement
- (A) Seed drills are used for sowing large seeds
(B) In hill drop planting, plant to plant distance and row to row distance will be same
✓ (C) Planters are provided with a seed hopper for each row
(D) In check row planting, row to row spacing will not be uniform
166. In fluted roller metering mechanism the amount of seed sown is changed by
- (A) increasing the speed of the ground wheel
✓ (B) by increasing or decreasing the length of groove in the roller exposed to the seed
(C) by increasing the forward speed of the seed drill
(D) by increasing the quantity of seed in the hopper

167. The cutting blade in a chisel plough is fixed that so that it will enter the soil at an angle of about 40° because

(A) It will penetrate easily taking the advantage of weakest plane lying between 35° and 45° for different soils

(B) It will not invert the soil

(C) It will be easy to cut the soil

(D) It is easier to fabricate

168. The type of plough in areas where climate is dry and land infested with heavy growth of vegetation for primary tillage is

(A) Disc plough

(B) Mould board plough

(C) Disc harrow

(D) Cultivator

169. The size of Mould board plough is expressed by

(A) Depth of furrow

(B) Width of furrow

(C) Throat clearance

(D) Curvature of mould board

170. _____ equation is most popular for predicting freezing time in freezing process.

(A) Henderson

(B) Arrhenius

(C) Plank

(D) Page

171. If two black bodies are at T_1 and T_2 temperatures, having same area 'A', then the radiant heat exchange will be
- (A) $Q = qA\sigma\Delta T^4$ (B) $Q = qA\Delta T^4$
 (C) $Q = \sigma A(T_0^4 - T_1^4)$ (D) $Q = \sigma A(T_1^4 - T_2^4)$
172. Ton of refrigeration is a unit of refrigeration and it is taken equal to the removal of heat at the rate of
- (A) 10 kJ/min (B) 110 kJ/min
 (C) 210 kJ/min (D) 310 kJ/min
173. The main disadvantage of the gravity type bottle filling in dairy industry is
- (A) slow filling speed (B) very costly in operation
 (C) requires huge space (D) requires highly skilled labour
174. The type of heat exchanger mostly used in large size dairies is
- (A) barrel type (B) internal tube type
 (C) surface type (D) plate type
175. Modern rice mills handling parboiled paddy use preferably
- (A) Recirculatory batch dryer
 (B) Bin dryer
 (C) LSU type continuous dryers
 (D) Non-mixing columnar dryers
176. Early harvest of paddy fetches higher field yields at the recommend moisture content of
- (A) below 20% (B) between 21 to 23%
 (C) between 24 to 26% (D) above 26%

177. What is the cold storage plant capacity, if the cooling load for apple is estimated as 7500 Kcal /hour
- (A) 3 tonnes (B) 1.5 tonnes
 (C) 2.5 tonnes (D) 5 tonnes
178. Air mass is equal to one, when sun is at
- (A) just above earth's atmosphere (B) 90° from observer head
(C) 60° from observer head (D) Zenith
179. If the lighting load in a cold storage is estimated as 418 W for one hour, then what is the heat load in Kcal/h?
- (A) 4.18 (B) 36.0
(C) 418 (D) 360
180. How much head load is required for cooling 1000 kg of potato from 25 to 15 °C, with a specific heat of 0.8 kcal 1kg °C?
- (A) 80000 kcal (B) 8000 kcal
(C) 1000 kcal (D) 800 kcal
181. Which of the following does not restrict the free flowing movement of the particles with respect to the surrounding particles during unloading from storage structure.
- (A) Mixture of large and small particles
(B) Irregular shaped particles
 (C) Regularly shaped particles
(D) Particles with higher internal friction
182. The screening efficiency is not improved by using
- (A) Screen brushes (B) Oil cloth cover
(C) Screen knockers (D) Solid balls

183. Cleaning efficiency is determined using the formula

(A)
$$\frac{(m_f - m_u)(m_o - m_f)m_o(1 - m_u)}{(m_o - m_u)^2(1 - m_f)m_u}$$

(B)
$$\frac{(m_f - m_u)(m_o - m_f)m_o(1 - m_u)}{(m_o - m_u)^2(1 - m_f)m_o}$$

(C)
$$\frac{(m_f - m_u)(m_o - m_f)m_o(1 - m_o)}{(m_o - m_u)^2(1 - m_f)m_f}$$

(D)
$$\frac{(m_f - m_u)(m_o - m_f)m_o(1 - m_u)}{(m_o - m_u)^2(1 - m_f)m_f}$$

184. In a cylindrical Silo of 5m diameter, calculate the hoop tension at the bottom of the Silo, 16 lateral pressure at the bottom is 100 kg/m².

(A) 25 kg

(B) 50 kg

(C) 250 kg

(D) 500 kg

185. Identify the incorrect statement

(A) Horizontal sheds for larger volume of grains provide low cost storage

(B) Higher hopper slope angles are necessary for reliable massflow

(C) Vertical silos are less costlier than storage sheds

(D) If gravity discharge is not required, flat bottom bins are cost saving

186. Engelberg huller generates

(A) 10-15% brokens

(B) 25-30% brokens

(C) 15-20% brokens

(D) 20-25% brokens

187. $\frac{4}{8}$ to $\frac{6}{8}$ of actual rice kernel portion is known as

(A) Head rice

(B) Very small broken

(C) Small broken

(D) Big broken

188. Cristallo process is one of the modern methods of

(A) Crystallization

(B) Food Freezing

(C) Paddy parboiling

(D) Pulse milling

189. In solar flat plate collector, infrared reflecting coating is given on
- (A) Upper absorber plate (B) Lower absorber plate
(C) Upper glass cover (D) Lower glass cover
190. Anti reflecting coating is given on _____ in flat plate solar collectors.
- (A) Transparent cover (B) Absorber plate
(C) Thermal insulation box (D) Fluid tube
191. Cover plate in solar flat plate collector is generally _____ to infrared re-radiation from the absorber.
- (A) Transparent (B) Opaque
(C) Translucent (D) Reflective
192. _____ is an instrument for the measurement of terrestrial radiation only.
- (A) Pyrgeometer (B) Pyrheliometer
(C) Pyradiometer (D) Sunshine recorder
193. At sunset, the Zenith angle value is
- (A) 90° (B) 0°
(C) 30° (D) 60°
194. _____ is the angle through which the earth must turn to bring the meridian of a point directly in line with the Sun's rays
- (A) Latitude (B) Hour angle
(C) Sun's declination (D) Azimuth angle

195. Ethanol is produced by _____ process from sugar.
- (A) Fermentation (B) Liquefaction
(C) Hydrogenation (D) Extraction
196. Each kilogram of dry organic material can be expected to yield _____ litres of biogas at atmospheric pressure.
- (A) 45 - 50 (B) 450 - 500
(C) 4.5 - 5.0 (D) 0.45 - 0.50
197. Production of methane directly from woody matter by treatment at high temperature and pressure with hydrogen gas is called
- (A) Steam gasification (B) Anaerobic digestion
(C) Biogas Production (D) Aerobic digestion
198. In cowdung based biogas plant equal amount of water is added to cowdung to bring moisture content of slurry to _____ %.
- (A) 16 - 20 (B) 8 - 10
 (C) 90 - 92 (D) 80 - 84
199. _____ biogas plant is constructed with bamboo and polythene sheet.
- (A) Janata (B) Deenabandhu
(C) Pragathi (D) Ganesh
200. The size of the biogas plant depends upon
- (A) Size of the family
(B) Availability of construction material
(C) Depth of water table
(D) Distance between biogas plant and kitchen.

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