| Question Booklet No. : |
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# CEAE/2022

*Register Number* | | | | | | | | | | |

## 2022

## PAPER – I

## AGRICULTURAL ENGINEERING

## (Degree Standard)

**Duration : Three Hours]** **[Total Marks : 300**

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

### IMPORTANT INSTRUCTIONS

1. You will be supplied with this question booklet 15 minutes prior to the commencement of the examination.
2. This question booklet contains **200** questions. Before answering the questions, you shall check whether all the questions are printed serially and ensure that there are no blank pages in the question booklet. **If any defect is noticed in the question booklet, it shall be reported to the invigilator within the first 10 minutes and get it replaced with a complete question booklet. If the defect is reported after the commencement of the examination, it will not be replaced.**
3. Answer **all** the questions. All the 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 shade the answers. Instructions regarding filling of answers etc., which are to be followed mandatorily, are provided in the answer sheet and in the memorandum of admission (Hall Ticket).
6. You shall write and shade your question booklet number in the space provided on page one of the answer sheet with **BLACK INK BALL POINT PEN.** If you do not shade correctly or fail to shade the question booklet number, your answer sheet will be invalidated.
7. Each question comprises of five responses (answers) : i.e. (A), (B), (C), (D) and (E). You have to select ONLY ONE correct answer from (A) or (B) or (C) or (D) and shade the same in your answer sheet. If you feel that there are more than one correct answer, shade the one which you consider the best. **If you do not know the answer, you have to mandatorily shade (E).** In any case, choose ONLY ONE answer for each question. If you shade more than one answer for a question, it will be treated as a wrong answer even if one of the given answers happens to be correct.
8. 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 room during the time of the examination. After the examination, 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.
9. **You should not make any marking in the question booklet except in the sheets before the last page of the question booklet, which can be used for rough work. This should be strictly adhered to.**
10. Failure to comply with any of the above instructions will render you liable for such action as the Commission may decide at their discretion.

SEAL

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## SPACE FOR ROUGH WORK

1. The main components of social forestry.

(A) Farm forestry

(B) Rural forestry

(C) Urban forestry

(D) All the above

(E) Answer not known

2. ———— is produced when carbon monoxide and steam react with cellulose at 300-400°C and 100 atmospheric pressure.

(A) Heavy oils

(B) Ethanol

(C) Pyroligneous acid

(D) Char

(E) Answer not known

3. ———— thermal conversion process utilizes oxidants below its stoichiometric requirements.

(A) Anaerobic digestion

(B) Combustion

(C) Gasification

(D) Transesterification

(E) Answer not known

4. Ratio of maximum gasification rate to minimum gasification rate is called as

(A) Equivalence ratio
(B) Co firing ratio
(C) Turn down ratio
(D) Gasification ratio
(E) Answer not known

5. Lift type rotors often use tapered and / or twisted blades to reduce the bending strains on ————————.

(A) tips of the blades
(B) roots of the blades
(C) side of the blades
(D) tower of the wind turbine
(E) Answer not known

6. Doubling the diameter of the rotor will result in ———————— in the available wind power that can be extracted by wind turbine.

(A) four-fold increase
(B) eight fold increase
(C) four fold decrease
(D) eight fold decrease
(E) Answer not known

7. ———————— limits the wind turbine wheel diameter of large size.

(A) Axial force
(B) Circumferential force
(C) Yaw control
(D) Magnus effect
(E) Answer not known

8. The advantages of solar concentrating collectors over flat plate collectors

(i) Reflecting surfaces require less material

(ii) The absorber area of a concentrator system is smaller for same solar energy collection

(iii) Little or no anti-freeze is required to protect the absorber.

(iv) They use both beam and diffuse solar radiation

(A) (i), (ii) and (iii) only
(B) (ii), (iii) and (iv) only
(C) (i), (ii) and (iv) only
(D) (i), (iii) and (iv) only
(E) Answer not known

9. The performance of solar air heaters can be improved by

(i) polishing the rear of the absorber plate to promote turbulance
(ii) adding fins to increase the heat transfer surface.
(iii) apply selective coating in the glass

(A) (i) only
(B) (ii) only
(C) (i) and (ii) only
(D) (i) and (iii) only
(E) Answer not known

10. Transmissivity of glass in solar flat plate collector depends on its _____ content.

(A) iron
(B) copper
(C) aluminium
(D) polymer
(E) Answer not known

11. If the moisture content of paddy on wet basis is 20%, then the moisture content on dry basis will be ———————%.

(A) 20

(B) 25

(C) 30

(D) 35

(E) Answer not known

12. The most important factor which affect the viability of seeds during storage is

(A) Relative humidity

(B) Temperature

(C) Moisture content

(D) Angle of repose

(E) Answer not known

13. The storage structure is said to be deep, if

(A) $h < L\tan\left(\frac{90+\phi}{2}\right)$

(B) $h > L\tan\left(\frac{90+\phi}{2}\right)$

(C) $h < L\tan\left(\frac{90\times\phi}{2}\right)$

(D) $h > L\tan\left(\frac{90\times\phi}{2}\right)$

(E) Answer not known

14. Engle berg huller removes ———————— from paddy.

(A) husk

(B) bran

(C) husk and bran

(D) aleurone layer of paddy

(E) Answer not known

15. Find the correct statement regarding parboiled rice

(i) parboiled rice needs lesser degree of polishing

(ii) parboiled rice will have higher fat content than raw rice

(iii) par boiled rice needs more cooking time than raw rice

(A) (i) and (ii) are correct

(B) (i) and (ii) are not correct

(C) (i), (ii) and (iii) are correct

(D) (i), (ii) and (iii) are not correct

(E) Answer not known

16. The type of screen used in coarsest and rough separation

(A) Grizzly screen

(B) Shaking screen

(C) Rotary screen

(D) Revolving screen

(E) Answer not known

17. Which of the following statement is incorrect?

(A) Falling rate period of drying is independent of the product and moisture movement within the material

(B) Changes in air velocity have much smaller effect in falling rate period than constant rate period drying

(C) In constant rate period drying rate of evaporation is same as the rate of evaporation from free liquid surface

(D) In constant rate period of drying the rate of evaporation is independent of the solid

(E) Answer not known

18. ———— equation provides the EMC values of grains having relative humidity ranges from 20 to 90%.

(A) Henderson

(B) Chung and Fost

(C) Harkins and Juva

(D) Kelvin

(E) Answer not known

19. Wet and dry bulb temperature can be determined by using a single unit of

(A) psychrometer

(B) sling psychrometer

(C) moisture meter

(D) hygrometer

(E) Answer not known

20. The material left by harvesting machine is

(A) Windrow
(B) Swath
(C) Sheaves
(D) Windrower
(E) Answer not known

21. The reciprocating cutter bar that are commonly used for harvesting paddy / wheat use the principle of

(A) Slicing action
(B) Tearing action
(C) Two element scissors action
(D) Shearing action
(E) Answer not known

22. The size of a combine is indicated by

(A) the height of the combine
(B) the width of cut it makes
(C) length of the combine
(D) output capacity of the combine
(E) Answer not known

23. The pitman arm in harvester moves the knife back and forth, the centre of the knife section must stop in the centre of the guard on each stroke. This is called

(A) Registration
(B) Allignment
(C) Central stroke
(D) Pivotting
(E) Answer not known

24. In roller feed type fertilizer distributor the flow of fertilizer can be controlled by

(A) speed of rotation of the rollers
(B) spacing between the rollers
(C) changing the rollers
(D) hocking the rollers
(E) Answer not known

25. For spraying large volume of liquid upto 500 lit/min at low pressure ———— pumps are ideal.

(A) Gear pump
(B) Roller-vane pump
(C) Centrifugal pump
(D) Diaphragm pump
(E) Answer not known

26. Nozzle made of ———— material is used for spraying abrasive material such as suspensions of wettable powders

(A) Brass
(B) Plastic
(C) Tungsten carbide
(D) Aluminium
(E) Answer not known

27. The method in which the spacing between the rows is the same as that between the plants

(A) Check rowing
(B) Dibbling
(C) Drilling
(D) Hill dropping
(E) Answer not known

28. For complete and through ploughing of a field, the indegenous plough must be operated

(A) one time

(B) two times

(C) four times

(D) three times

(E) Answer not known

29. A long mouldboard with gentle curvature which lifts and inverts the unbroken furrow slice is called as

(A) Slat type

(B) Stubble type

(C) Sod type

(D) General purpose

(E) Answer not known

30. The field capacity of indigenous plough is 0.2-0.3 ha per day and its draft requirement is about

(A) 20-30 kg

(B) 160-170 kg

(C) 50-70 kg

(D) 500-600 kg

(E) Answer not known

31. A drainage canal discharges water at the rate of $0.2 m^3/s$ and drains 200 ha. What is the drainage coefficient of this land?

(A) 8.64 cm

(B) 8.64 mm

(C) 3.6 mm

(D) 3.6 cm

(E) Answer not known

32. Calculate the time required (in hours) to irrigate a check basin of 20 m long and 15 m wide to depth of 5 cm with a stream of 7.5 l/s

(A) 2000

(B) 33.3

(C) 2

(D) 0.56

(E) Answer not known

33. The water flowing continuously throughout the season to irrigate the given area in acres is termed as _____.

(A) Duty

(B) Delta

(C) AI/DC

(D) All the above

(E) Answer not known

34. Match the following :

| | | | |
|---|---|---|---|
| (a) | Unconfined Aquifer | 1. | 3cm to 10cm diameter |
| (b) | Confined Aquifer | 2. | 1.5 to 4.5m diameter |
| (c) | Dug wells | 3. | Phreatic Aquifer |
| (d) | Driven wells | 4. | Artesian Aquifer |

| | (a) | (b) | (c) | (d) |
|---|---|---|---|---|
| (A) | 4 | 3 | 1 | 2 |
| (B) | 4 | 3 | 2 | 1 |
| (C) | 3 | 4 | 1 | 2 |
| (D) | 3 | 4 | 2 | 1 |

(E) Answer not known

35. The depth of irrigation is calculated on the basis of

(A) Available moisture holding capacity of the soil in the crop root zone at different layers and the soil moisture extraction pattern of the crop in its root depth.

(B) Amount of rainfall

(C) Soil moisture depletion

(D) Infiltration rate

(E) Answer not known

36. Cut-Off ratio for border irrigation method is decided by

(A) Slope of the border and texture of soil

(B) Length of border and texture of soil

(C) Width of border and flow rate

(D) Stream size

(E) Answer not known

37. 'Duty and Delta' concept is used for

(A) Designing of irrigation projects
(B) Determining critical stage of plants
(C) Net irrigation requirement
(D) Calculating gross irrigation requirement
(E) Answer not known

38. Match the following :

| | |
|---|---|
| (a) Tensiometer | 1. Irrigation supplies |
| (b) Consumptive use | 2. In situ measurement |
| (c) Gross duty | 3. Water distribution efficiency |
| (d) Neutron moisture meter | 4. Lysimeter |
| (e) Average numerical deviation of depth of water | 5. 0.85 atmosphere |

| | (a) | (b) | (c) | (d) | (e) |
|---|---|---|---|---|---|
| (A) | 4 | 5 | 2 | 1 | 3 |
| (B) | 3 | 1 | 2 | 5 | 4 |
| (C) | 4 | 3 | 2 | 5 | 1 |
| (D) | 5 | 4 | 1 | 2 | 3 |

(E) Answer not known

39. If the exchangeable sodium percentage (ESP) is more than 15, then the soil is a _____.

(A) Saline soil
(B) Saline-Alkali soil
(C) Alkali soil
(D) Clay soil
(E) Answer not known

40. Mechanical surging is meant for

(A) Well log
(B) Well development
(C) Well screen
(D) Well drilling
(E) Answer not known

41. In the design of a tube well, the velocity of water entering a well screen should be kept to about

(A) 1 cm/s
(B) 3 cm/s
(C) 5 cm/s
(D) 7 cm/s
(E) Answer not known

42. The double mass curve technique is adopted to

(A) Check the consistency of raingauge records
(B) To find the average rainfall over a number of years
(C) To find the number of raingauge required
(D) To estimate the missing rainfall data
(E) Answer not known

43. The most accurate method of finding the average depth of rainfall over an area is

(A) Arithmetic mean method
(B) Thiessen polygon method
(C) Isohyetal method
(D) Double mass curve method
(E) Answer not known

44. The instrument used for centering the table over the plotted point is _____.

(A) Aldidade
(B) Plane table
(C) Corrpass
(D) Plumbing fork
(E) Answer not known

45. Clinometer is

(A) Hand Level
(B) Wey Level
(C) Abney Level
(D) Tilting level
(E) Answer not known

46. Telescope is fixed in spindle alone in care of _____ level.

(A) Dumpy
(B) Wye
(C) Reversible
(D) Tilting
(E) Answer not known

47. Simple levelling is the process which just determines the _____ between two points.

(A) Level difference
(B) Distance
(C) Area available
(D) Volume of cut and fill
(E) Answer not known

48. In chain surveying 'one link' means the distance

(A) between two ends of the chain
(B) from centre to ceutre of middle rings
(C) from centre to centre of inner rings
(D) from centre to centre of outer rings
(E) Answer not known

49. It is a rule that assumes that the short lengths of the boundaries between the ordinates are parabolic areas, called

(A) The average ordinate rule
(B) Mid ordinate rule
(C) The Trapezoidal rule
(D) Simpson's rule
(E) Answer not known

50. The preliminary inspection of the area to be surveyed is known as

(A) Basic survey
(B) Primary survey
(C) Reconnaissance survey
(D) Preliminary survey
(E) Answer not known

51. One ton of refrigeration is equal to ———— kcal/h

(A) 50
(B) 3000
(C) 300
(D) 60
(E) Answer not known

52. Which of the following methods are used to separate oil from its source.

(A) distillation
(B) filtration
(C) solvent extraction
(D) extrusion
(E) Answer not known

53. In a dry air, considering the mixture of nitrogen and oxygen and neglecting the small percentage of other gases, the molecular mass of dry air is

(A) 26.966
(B) 28.966
(C) 24.966
(D) 22.966
(E) Answer not known

54. _____ is an intrinsic property of a food material to measure the materval's ability to dissipate electrical energy.

(A) Disintegration factor
(B) Dielectric constant
(C) Dielectric loss factor
(D) Loss tangent
(E) Answer not known

55. In twin screw extruder, the throughput is _____ of feed rate.

(A) dependent
(B) independent
(C) same
(D) constant
(E) Answer not known

56. In cyclone separator, gravitational and _____ forces can be combined for separation of particles from liquids as well as from gases.

(A) impact
(B) abrasive
(C) compressive
(D) centrifugal
(E) Answer not known

57. Instrument used to measure flow properties of food is

(A) Thermometer
(B) Viscometer
(C) Hygrometer
(D) Lactometer
(E) Answer not known

58. Steam economy of an evaporator is improved by adding

(A) Thermal recompression
(B) High temperature steam
(C) Turbine booster
(D) High pressure steam
(E) Answer not known

59. The steam economy of triple effect evaporator is _____ than single effect evaporator.

(A) more
(B) less
(C) equal
(D) unpredictable
(E) Answer not known

60. The percentage of tractor wheel slip will be calculated as

(A) $\frac{\text{Distance travelled without load}}{\text{Distance travelled while working}} \times 100$

(B) $\frac{\text{Distance travelled with load}}{\text{Distance travelled without load}} \times 100$

(C) $\frac{\left(\begin{matrix}\text{Distance travelled}\\ \text{without load}\end{matrix}\right) - \left(\begin{matrix}\text{Distance travelled}\\ \text{when working}\end{matrix}\right)}{\text{Distance travelled without load}} \times 100$

(D) $\frac{\left(\begin{matrix}\text{Distance travelled}\\ \text{without load}\end{matrix}\right) + \left(\begin{matrix}\text{Distance travelled}\\ \text{when working}\end{matrix}\right)}{\text{Distance travelled without load}} \times 100$

(E) Answer not known

61. If the tractor runs in dusty condition, then change the oil in oil bath air cleaner for every

(A) 10 – 12 hour
(B) 40 – 50 hour
(C) 60 – 80 hour
(D) 70 – 90 hour
(E) Answer not known

62. The tractor is pulling a load of 16 kN on concrete road at a forward speed of 7.2 km/h. The axle power of tractor is 35 kW. Calculate the tractive efficiency?

(A) 75.12%
(B) 91.43%
(C) 94.5%
(D) 88.6%
(E) Answer not known

63. ———— hydraulic pumps is most prefered / employed for Pressures upto 14 MPa in agricultural machines.

(A) Piston pump

(B) Plunger pump

(C) External gear pump

(D) Gear pump

(E) Answer not known

64. The following are the enemies of Hydraulic system

(i) Inadequate oil in the system

(ii) Leaky Hoses

(iii) Incorrect Graded Oil

(iv) Foreign Matters

(A) (i) only

(B) (ii) and (i) are correct

(C) (ii), (iii) and (i) are correct

(D) (ii), (iii), (iv) and (i) are correct

(E) Answer not known

65. Tractor manufacturing was started in India in the year 1961 by first manufacturer

(A) M/s. Eicher Good Earth

(B) M/s. TAFE

(C) M/s. Mahindra and Mahindra

(D) M/s. John Deere

(E) Answer not known

66. Name the shaft of an engine which converts the reciprocating motion of the piston into rotary motion of the flywheel

(A) Cam shaft
(B) Input shaft
(C) Crank shaft
(D) Output shaft
(E) Answer not known

67. The most preferred nozzle used on tractor engine is of the following type

(A) Single hole type
(B) Double hole type
(C) Multiple hole type
(D) Pinte nozzle type
(E) Answer not known

68. The space that supports the crank shaft in the cylinder block is called

(A) journal
(B) crank journal
(C) cam journal
(D) main journal
(E) Answer not known

69. In IC engine inlet valve opens _____ before T.D.C.

(A) 5 to 10 degree
(B) 10 to 15 degree
(C) 15 to 20 degree
(D) 0 to 5 degree
(E) Answer not known

70. The structure used to carry irrigation water across streams or gullies is called

(A) Culverts
(B) Flumes
(C) Siphons
(D) Turnout box
(E) Answer not known

71. Chezy's formula for finding out the mean velocity of flow is given by

(A) $V = C\sqrt{RS}$
(B) $Q = C\sqrt{RS}$
(C) $V = n\sqrt{RS}$
(D) $V = \sqrt{8gRS}$
(E) Answer not known

72. Shotcrete lining is done by using

(A) The mixture of cement, sand and water
(B) Cement and gravel
(C) Cement and plastic membrane
(D) Travel and plastic membrane
(E) Answer not known

73. The room where the cows are milked is called

(A) Pen barn
(B) Community barn
(C) Loose housing barn
(D) Milking parlour
(E) Answer not known

74. It is recommended that septic tank should be more than _____ from any source of water supply.

(A) 10 m
(B) 20 m
(C) 25 m
(D) 30 m
(E) Answer not known

75. Slump test is performed to measure the

(A) Plasticity of the concrete
(B) Soundness of the concrete
(C) Compressive strength of the concrete
(D) Curing period of the concrete
(E) Answer not known

76. Cement concrete has the property of high

(A) tensile strength
(B) shearing strength
(C) bending strength
(D) compressive strength
(E) Answer not known

77. Minimum depth of shallow foundation is

(A) 500 mm
(B) 800 mm
(C) 1000 mm
(D) 1500 mm
(E) Answer not known

78. Method of assigning a numeric value to links in a stream network of watershed is called

(A) Contouring

(B) Stream ordering

(C) Delineation

(D) Linking

(E) Answer not known

79. Universal transverse Mercator (UTM) method is used for ———— objects in Remote sensing

(A) Sensing

(B) Locating

(C) Scaling

(D) Mapping

(E) Answer not known

80. In India, most of the aerial photographs available for use are generally of ———— scale

(A) 1 : 5000

(B) 1 : 10000

(C) 1 : 30000

(D) 1 : 1 million

(E) Answer not known

81. The top width of an earthern embankment (W) of a farm pond is calculated by _____ if H is maximum height of the dam.

(A) $W = 1.105H^{1/2} + 0.19$

(B) $W = 11.05H^{3/4} + 0.91$

(C) $W = 1.105H^{3/4} + 0.91$

(D) $W = 1.105H^{1/2} + 0.91$

(E) Answer not known

82. The recommended upstream side slope for farm pond embankments constructed of homogenous well graded material is

(A) 2:1

(B) 2.5:1

(C) 3:1

(D) 3.5:1

(E) Answer not known

83. _____ of the emergency spill way should be fixed at the maximum expected water level for selected frequency of runoff.

(A) Bottom

(B) Top

(C) Middle

(D) 2/3 Height

(E) Answer not known

84. For classifying the land capability in the field, the notation $\frac{l-d_5}{B-e_s}$ in the alluvial soil, B represents

(A) Soil depth

(B) Soil type

(C) Slope

(D) Erossion class

(E) Answer not known

85. When a second order stream join a third order stream, the resultant will be a

(A) First order stream

(B) Second order stream

(C) Third order stream

(D) Fourth order stream

(E) Answer not known

86. NWDPRA stands for

(A) National Wasteland Development Programme for Rainfed Areas

(B) National Watershed Development Project for Rainfed Areas

(C) National Watershed Development Programme for Rural Areas

(D) National Watershed Development and Management Project for Rainfed Areas

(E) Answer not known

87. The information on the existing infrastructures in the watershed and their relevance to the community is provided by

(A) Venn diagram
(B) Time Line
(C) Matrix ranking
(D) Resource mapping
(E) Answer not known

88. Choose incorrect statement from watershed management programmes in India.

I. DPAP – Drought Prone Area Programme
II. HADP – Horticultural Area Development Programme
III. IWDP – Integrated Waste Land Development Programme
IV. PMKSY – Prime Minister Krishi Sinchayee Yojana

(A) I
(B) II
(C) III
(D) IV
(E) Answer not known

89. A multislot devisor is used to

(A) Measure irrigation water
(B) Measure solid loss
(C) Measure overland flow
(D) Measure infiltration
(E) Answer not known

90. Choose incorrect statement about wind turbulence

I. It is lower over the rough surface

II. It is more pronounced, where change of surface temperature is more

III. Adjacent to soil surface the wind turbulence is more

IV. It is major factor for keeping the soil particles in suspension

(A) I
(B) II
(C) III
(D) IV
(E) Answer not known

91. The soil conservation programme and practices should start from _____ direction of the watershed unit.

(A) East to West
(B) North to South
(C) Topmost and downwards
(D) Downwards to topmost
(E) Answer not known

92. Gully Erosion and deepening of gully beds can be prevented by use of small check dams called

(A) Stilling basin
(B) Gully bank
(C) Gully plugs
(D) Ravines
(E) Answer not known

93. Contour trenching contour bunds, terraces, etc are the _____ measures of soil and water conservation.

(A) Agronomical

(B) Mechanical

(C) Biological

(D) Physiological measures

(E) Answer not known

94. The Terraces are constructed in the form of alternate series of shelves and risers to cultivate the steep slopes are called as

(A) Diversion terrace

(B) Retention terrace

(C) Bench terrace

(D) Broad base terrace

(E) Answer not known

95. Terraces constructed in the areas of heavy rainfall and less permeable soils is called as

(A) Bench terraces

(B) Level bench terrace

(C) Bench terraces sloping outward

(D) Bench terraces sloping inward

(E) Answer not known

96. Transition stage between ———— and ———— is called rill for Erosion.

(A) Splash and sheet

(B) Sheet and Gully

(C) Splash and Gully

(D) Gully and Ravine

(E) Answer not known

97. In deep clay soil, the clay content is more than

(A) 15%

(B) 20%

(C) 25%

(D) 30%

(E) Answer not known

98. ———— energy are associated in the process of soil erosion

(A) Kinetic and potential

(B) Kinetic energy and mechanical

(C) Potential and mechanical

(D) Kinetic, potential and mechanical

(E) Answer not known

99. Commercially available biodiesel or biodiesel blended with diesel must conform with ———— standards.

(A) ASTM D 877-82
(B) ASTM E 871-82
(C) ASTM D 6751-07
(D) ASTM E 6751-07
(E) Answer not known

100. The yeast Saccharomyces cerevisiae is poisoned by ———— concentration greater than 10%.

(A) Methanol
(B) Ethanol
(C) Sugar
(D) Starch
(E) Answer not known

101. Oceans are the ———— sink containing about 50 times more carbon than the atmosphere

(A) $CO_2$ – Carbon dioxide
(B) CO – Carbon monoxide
(C) CFC – Chlorofluro carbon
(D) PFC – Perfluro carbon
(E) Answer not known

102. Largest human related sources of perflurocarbon is

(i) Aluminium production
(ii) Semiconductor production
(iii) Wind blade production

(A) (i) and (ii) only
(B) (ii) and (iii) only
(C) (iii) and (i) only
(D) (iii) only
(E) Answer not known

103. Advantages of floating drum biogas plant

(i) Less scum troubles

(ii) Do not require a separate pressure equalizing device

(iii) Higher gas production per cum of the digester volume

(iv) No corrosion trouble

(A) (i), (ii) and (iii) only

(B) (ii), (iii) and (iv) only

(C) (i), (iii) and (iv) only

(D) (i), (ii) and (iv) only

(E) Answer not known

104. Choose the right answer in respect of usage of biogas in internal combustion engines

(i) Biogas is substituted in both SI and CI engines with little modifications

(ii) SI engines develop full rated power on biogas whereas CI Engine develop 85% of full power

(iii) The ignition time of SI engine shall be advanced by 4 to 5 degree for better engine performance

(A) (i) and (ii) true and (iii) false

(B) (i) and (iii) true and (ii) false

(C) (ii) and (iii) true and (i) false

(D) (i) true and (ii) and (iii) false

(E) Answer not known

105. Match the following :

| | |
|---|---|
| (a) Insovents | 1. Design speed of wind rotor |
| (b) Isodytion | 2. Wind energy potential of a place |
| (c) Power duration curve | 3. Contours of constant average wind velocity |
| (d) Frequency distribution curve | 4. Contours of constant wind power |

| | (a) | (b) | (c) | (d) |
|---|---|---|---|---|
| (A) | 1 | 2 | 4 | 3 |
| (B) | 4 | 3 | 2 | 1 |
| (C) | 3 | 4 | 2 | 1 |
| (D) | 2 | 1 | 3 | 4 |

(E) Answer not known

106. In India, one square metre of fixed array kept facing south yields nearly ———— of electrical energy on a normal sunny day.

(A) 0.5 kWh
(B) 5.0 kWh
(C) 50 kWh
(D) 500 kWh
(E) Answer not known

107. PV modules are rated by its ————.

(A) Efficiency
(B) Peak power output
(C) Current at maximum power point
(D) Fill factor
(E) Answer not known

108. ———— is the angle between a line extending from the centre of the sun to the centre of the earth and the projection of this line upon the earth's equatorial plane

(A) Sun's declination
(B) Hour angle
(C) Azimuth angle
(D) Latitude
(E) Answer not known

109. Recommended temperature for product quality maintenance during frozen storage is

(A) 0°C
(B) –2°C
(C) –10°C
(D) –18°C
(E) Answer not known

110. Match the following with respect to the processing of spices :

| | |
|---|---|
| (a) Essential oil | 1. Solvent extraction |
| (b) Ohoresin | 2. Fractionation |
| (c) Absolute form | 3. Steam distillation |
| (d) Enriched form | 4. Alcohol extraction |

| | (a) | (b) | (c) | (d) |
|---|---|---|---|---|
| (A) | 3 | 1 | 4 | 2 |
| (B) | 2 | 4 | 1 | 3 |
| (C) | 3 | 1 | 2 | 4 |
| (D) | 4 | 3 | 1 | 2 |

(E) Answer not known

111. The power requirement of seven conveyor for horizontal operation may be determined by

(A) $\frac{QLWF}{4560}$

(B) $47.2\left(D^2 - d^2\right) \times p \times n$

(C) $\frac{QHF}{4562}$

(D) $\frac{WV^2}{g.r}$

(E) Answer not known

112. Dehusking based on the principle of friction of grain on an abrasive surface is done in

(A) Rubber roller shellers

(B) Hollander

(C) Centrifugal type shellers

(D) Concave type husker

(E) Answer not known

113. Pitting is the process carried out during milling of pulses to facilitate

(A) better cleaning of pulses before milling

(B) better grinding of pulses

(C) subsequent germ recovery

(D) subsequent oil penetration for husk loosening

(E) Answer not known

114. For effective screening, the length of the screen surface should be

(A) 3 to 4 times of width

(B) 4 to 5 times of width

(C) 2 to 3 times of width

(D) 1 to 2 times of width

(E) Answer not known

115. Calculate the fraction of clean seed in foreign matter outlets such as blower outlet - 0.2% clean seed, over flow - 1% clean seed and under flow 0.5% of clean seed

(A) 1.7

(B) 0.17

(C) 0.017

(D) 0.0017

(E) Answer not known

116. The most and best suited dryer for drying liquid food products is

(A) Cabinet dryer

(B) Tunnel dryer

(C) Fluidized bed dryer

(D) Spray dryer

(E) Answer not known

117. In thin layer drying, the thickness of the grain bed is

(A) 5-10 cm

(B) 5-10 mm

(C) 150 mm-200 mm

(D) 15 mm-20 mm

(E) Answer not known

118. Ratio of weight of water present in 1 kg of dry air at any temperature and pressure; and the weight of water present in 1kg dry air which is saturated with water vapour at the same temperature and pressure is

(A) Humid volume
(B) Percentage humidity
(C) Relative humidity
(D) Humid heat
(E) Answer not known

119. In St. Venant body, the flow of material does not start until a limiting value of ———— is reached.

(A) Shear rate
(B) Zero friction
(C) Yield stress
(D) Kinetic friction
(E) Answer not known

120. Identify the variable cost among the following

(A) Depreciation
(B) Insurance
(C) Taxes
(D) Repair and maintenance
(E) Answer not known

121. In ———— method the depreciation for any year is a constant percentage of the remaining value at the beginning of the year

(A) Straight line
(B) Declining balance
(C) Estimated value
(D) Sum of the year digits
(E) Answer not known

122. How many hectares per day of 10 hours can be cut by a combine with 4 m cutter bar, when it is running at 4 km/h.

(A) 1.6 ha
(B) 16 ha
(C) 0.8 ha
(D) 8 ha
(E) Answer not known

123. In peg tooth cylinder type thresher, the peripheral speed of the cylinder varies between

(A) 200 and 300 m per minute
(B) 600 and 800 m per minute
(C) 1500 and 1800 m per minute
(D) 50 and 100 m per minute
(E) Answer not known

124. In tractor operated rotarators , the shaft fitted with 'L' shaped blades rotate at a speed of ———— rpm

(A) 100-180
(B) 200-300
(C) 350-450
(D) 500-600
(E) Answer not known

125. The type of nozzle used for spraying systemic herbicides and fertilizer solutions are

(A) Hollow cone nozzle
(B) Solid cone nozzle
(C) Rotary nozzle
(D) Flood nozzle
(E) Answer not known

126. Edge drop seed metering device is recommended for

(A) Seed drill
(B) Seed planter
(C) Transplenter
(D) Pneumatic seed drill
(E) Answer not known

127. Furrow opener which works well in trashy soils where the seed beds are not smoothly prepared

(A) Dibbler
(B) Sweep type
(C) Shoe type
(D) Plough type
(E) Answer not known

128. In standard disc plough the diameter of the steel disc ———— cm

(A) 20 to 50 cm
(B) 60 to 90 cm
(C) 90 to 100 cm
(D) about 200 cm
(E) Answer not known

129. Looks like a miniature plough, turn over a small ribbon like furrow slice directly in front of the main plough bottom is called as

(A) Jointer
(B) Coulter
(C) Land wheel
(D) Gauge wheel
(E) Answer not known

130. Field measurement of hydraulic conductivity is done by

(A) Constant head permeameter
(B) Variable head permeameter
(C) Auger hole method
(D) Tile drain method
(E) Answer not known

131. Herring bone drainage system is

(A) connecting scattered drain areas
(B) consist of parallel laterals connecting main line
(C) consist of parallel laterals connecting mainline from one side
(D) cut-off drains to break the slope
(E) Answer not known

132. The rate of change of piezometric head with distance is called

(A) Moisture equivalent
(B) Hydraulic conductivity
(C) Hydraulic gradient
(D) Basic infiltration rate
(E) Answer not known

133. The national commission on agriculture (1976) defined water logged areas as those areas which have water table depth lesser than ————————m below soil surface

(A) 0.5
(B) 1.5
(C) 2.0
(D) 2.5
(E) Answer not known

134. Water from sprinkler nozzle breaks up into fine drops and fall very near to sprinkler is due to

(A) Low pressure
(B) Satisfactory pressure
(C) High Pressure
(D) Wind distortion
(E) Answer not known

135. NCPA stands for

(A) National Commission for Pollution in Agriculture
(B) National Committee on Plastics in Agriculture
(C) National Convention on Plastics in Agriculture
(D) National Committee on Polymers in Agriculture
(E) Answer not known

136. Choose correct statement

(i) In surface drip irrigation system, drippers and lateral lines are laid on the land surface

(ii) In sub-surface drip irrigation system, the droppers and lateral lines are laid below the ground level and beyond the root zone of the crop.

(A) Only (i) is correct
(B) Only (ii) is correct
(C) Both (i) and (ii) are correct
(D) Both (i) and (ii) are incorrect
(E) Answer not known

137. Franci's formula is used to compute _____.

(A) Velocity across a weir

(B) Discharge through a parshall flume

(C) Discharge through a rectangular weir

(D) Discharge through an orifice

(E) Answer not known

138. If $C_o$ is the original tracer concentration in the stream, $C_1$ is the actual tracer concentration in the bottle, $C_2$ is the tracer concentration down stream, $q_1$ is the tracer injection rate, the discharge 'Q' in the stream can be calculated by the formula

(A) $Q=q_1\left(\frac{C_2-C_1}{C_2-C_0}\right)$

(B) $Q=q_1\left(\frac{C_2-C_1}{C_0-C_2}\right)$

(C) $Q=q_1\left(\frac{C_0-C_2}{C_2-C_1}\right)$

(D) $Q=q_1\left(\frac{C_1-C_2}{C_0-C_2}\right)$

(E) Answer not known

139. End contraction of a weir is

(A) Horizontal distance from the ends of crest to the side of the channel

(B) Bottom edge of a weir notch

(C) Vertical distance over the crest

(D) Sheet of water passing through edges of notch

(E) Answer not known

140. Match the following :

| | | | |
|---|---|---|---|
| (a) | Bulk Density | 1. | Unfilled porosity |
| (b) | True Density | 2. | Ratio of volume of pores to total volume of soil |
| (c) | Total porosity | 3. | Mass of soil solid per unit volume of soil solid |
| (d) | Air porosity | 4. | Mass per unit volume of soil excluding liquid phase |

| | (a) | (b) | (c) | (d) |
|---|---|---|---|---|
| (A) | 3 | 4 | 1 | 2 |
| (B) | 3 | 4 | 2 | 1 |
| (C) | 4 | 3 | 1 | 2 |
| (D) | 4 | 3 | 2 | 1 |

(E) Answer not known

141. Perched aquifer is located

(A) above the main water-table
(B) below the main water-table
(C) just below the water-table
(D) in the same level of main water-table
(E) Answer not known

142. A soil sample was found to have a porosity of 40%. For an aquifer of this material, the specific yield is

(A) > 60%
(B) > 40%
(C) < 40%
(D) < 60%
(E) Answer not known

143. Return period is _____ to probability of a hydrologic event

(A) Directly related

(B) Inversely related

(C) Equal

(D) Not related

(E) Answer not known

144. Match the following :

| | | | |
|---|---|---|---|
| (a) | Thiessen polygon | 1. | Infiltration equation |
| (b) | Observation wells | 2. | Evapotranspiration |
| (c) | Blancy-criddle formula | 3. | Mean areal depth of precipitation |
| (d) | Horton | 4. | Groundwater table fluctuations |

| | (a) | (b) | (c) | (d) |
|---|---|---|---|---|
| (A) | 4 | 2 | 3 | 1 |
| (B) | 2 | 1 | 4 | 3 |
| (C) | 3 | 4 | 2 | 1 |
| (D) | 1 | 2 | 3 | 4 |

(E) Answer not known

145. The recording type raingauge records the observations in the form of

(A) hyetograph

(B) mass curve

(C) double mass curve

(D) histogram

(E) Answer not known

146. Irregular area in a map may be computed by an instrument known as

(A) pentagraph
(B) planimeter
(C) passometer
(D) pedometer
(E) Answer not known

147. The staff reading taken on a point of known elevation is termed as _____ reading.

(A) Fore sight
(B) Back sight
(C) Inter sight
(D) Charge point
(E) Answer not known

148. The principle of plane table is

(A) Traversing
(B) Triangulation
(C) Levelling
(D) Parallelism
(E) Answer not known

149. Sum of first and last ordinae plus twice the sum of intermediae ordinate multiplied by half of common distance between ordinates gives required area. This rule is called as _____.

(A) Mid ordinate rule
(B) Average ordinate rule
(C) Trapezoidal rule
(D) Simpson rule
(E) Answer not known

150. When greater accuracy is required in measurement and the ground to be surveyed is not very rough, then this type of survey instrument can be used

(A) Chain
(B) Tapes
(C) Pacing
(D) Plane Table
(E) Answer not known

151. A property used to measure the quality of energy or irreversibility of the process is known as

(A) Enthalpy
(B) Humid heat
(C) Entropy
(D) Latent heat
(E) Answer not known

152. The volume of ice cream mix is 950 $m^3$ and the volume of ice cream is 1650 $m^3$, then the percentage of over run is

(A) 71.5%
(B) 75.0%
(C) 73.6%
(D) 77.7%
(E) Answer not known

153. The homogenized milk has the fat globule size of

(A) Less than 10 $\mu m$
(B) Less than 5 $\mu m$
(C) Less than 2 $\mu m$
(D) Less than 0.1 $\mu m$
(E) Answer not known

154. The process of removal of air or gases from the can in canning is called as

(A) lidding
(B) sucking
(C) vacuum creation
(D) exhausting
(E) Answer not known

155. Which of the following thermal processing products are not sterile because it is designed to remove only pathogenic bacteria and selected vegetative organisms

(A) Blanching
(B) Pasteurization
(C) Sterlization
(D) Evaporation
(E) Answer not known

156. Size reduction of food material increases its

(A) volume per unit mass
(B) porosity per unit mass
(C) a surface area per unit mass
(D) density per unit mass
(E) Answer not known

157. The energy requirement for size reduction is a function of common dimension of the material. The above assumption is made for _____ law of size reduction

(A) Fock's
(B) Bond's
(C) Rittinger's
(D) Kick's
(E) Answer not known

158. Match the following :

| | | | |
|---|---|---|---|
| (a) | Liquid/Liquid separation | 1. | Screens |
| (b) | Solid/Liquid separation | 2. | Cyclones |
| (c) | Solid/gas separation | 3. | Centrifugation |
| (d) | Solid/Solid separation | 4. | Press |

| | (a) | (b) | (c) | (d) |
|---|---|---|---|---|
| (A) | 4 | 1 | 2 | 3 |
| (B) | 4 | 3 | 1 | 2 |
| (C) | 3 | 4 | 2 | 1 |
| (D) | 4 | 3 | 2 | 1 |

(E) Answer not known

159. Which one of the following are incorrectly matched?

I. Tubular heat exchanger – Concentric tubes

II. Cooling tower – Indirect heat exchanger

III. Recuperator – Direct heat exchanger

IV. Cross flow – Mixing of fluids at right angles

(A) I and II
(B) II and III
(C) III and IV
(D) IV and I
(E) Answer not known

160. The property used to measure the gravity of energy or irreversibility of the process is called as:

(A) Enthalpy
(B) Entropy
(C) Energy coefficient
(D) Specific heat
(E) Answer not known

161. Newton's law of cooling is associated with which mode of heat transfer

(A) Conduction
(B) Convection
(C) Radiation
(D) Both (A) and (C)
(E) Answer not known

162. Which of the following law states that the thermal radiation emitted by a body is proportional to fourth power of its absolute temperature

(A) Weins law
(B) Kirchoff's law of radiation
(C) Fourier's law of heat conduction
(D) Stefan Boltzman's law
(E) Answer not known

163. Hydraulic brake system is based on the principle of

(A) Boyle's law
(B) Pascal's law
(C) Newton's law
(D) Charle's law
(E) Answer not known

164. In Tractor angular movement of _____ is further transmitted to steering arm through drag link and tie rods.

(A) King pin
(B) Pitman arm
(C) Front wheel
(D) Stub axle
(E) Answer not known

165. Soil pressure, P for a rubber tyre is given by

(A) $P = \frac{w}{bl}$
(B) $P = \frac{0.78\,W}{bl}$
(C) $P = \frac{W}{0.78\,bl}$
(D) $P = \frac{0.78\,bl}{W}$
(E) Answer not known

166. Ackermorm streering system has only

(A) Slinding pairs
(B) Rolling pairs
(C) Turning pairs
(D) Spherical pairs
(E) Answer not known

167. The _____ number of a gasoline is a measure of its tendency to resist detonation during combustion in an engine.

(A) Cetane
(B) Viscosity
(C) Octane
(D) Grade
(E) Answer not known

168. The process of preparing an air-fuel mixture away from the cylinders of an engine is called

(A) Fuel injection
(B) Carburetion
(C) Distribution
(D) Atomization
(E) Answer not known

169. Erratic variation of the speed of Governor when it over compensates for speed changes is termed as

(A) Speed drop
(B) Governor hunting
(C) Governor regulation
(D) Percentage regulation
(E) Answer not known

170. Find the percentage regulation in a Governor if speed at no load is 1600 rev/min. and speed at load is 1500 rev/min.

(A) 6.4%
(B) 64%
(C) 7.4%
(D) 74%
(E) Answer not known

171. Find the correct statement

Indicated Horse Power =

(i) $\frac{P \times L \times A \times n}{75 \times 60}$

(ii) IHP = $\frac{ALn}{75 \times 60}$

(iii) IHP is the total power equal to BHP.

(iv) Power is not connected to cylinders of an engine.

(A) (i) and (iii) are correct

(B) (ii) and (iv) are correct

(C) (ii) alone correct

(D) (i) alone correct

(E) Answer not known

172. If the weight of the draught animal is 600 kg, how much of kg the draught animal can exert for doing farm work

(A) 600 kg

(B) 100 kg

(C) 60 kg

(D) 300 kg

(E) Answer not known

173. Mechanization indicator is expressed as

(A) Ratio of total power over mechanical power used in farm

(B) Total power requirement used in farm

(C) Ratio of mechanical power over total power used in farm

(D) Mechanical power used in farm

(E) Answer not known

174. The special housing for sick animals is called

(A) Community barn
(B) Stanchion barn
(C) Main barn
(D) Pen barn
(E) Answer not known

175. The face in type barn gives a saving of _____ in floor area of the barn as compared to the face out type barn.

(A) 10%
(B) 20%
(C) 30%
(D) 40%
(E) Answer not known

176. The litter provided on the floor of a deep litter poultry house serves the purpose of avoiding frequent

(A) watering
(B) roosting
(C) cleaning
(D) feeding
(E) Answer not known

177. A single story farm residential building will have its ceiling at a height of about

(A) 5.5 m
(B) 4.4 m
(C) 3.3 m
(D) 2.2 m
(E) Answer not known

178. Which of the following is/are correct

I. Woven wire fences are more popular for general farm use

II. Barbed wire fencing is very effective against the goats and rabbits

III. The close – mesh type fence may be an ideal fence for poultry houses

(A) I only

(B) II only

(C) III only

(D) I and III

(E) Answer not known

179. The primary objectives of good planning for location of farmstead are

(i) Sanitation and well being of the human being and animals

(ii) Economy in labour management

(iii) Economy in initial cost and low cost of maintenance

(A) (i) and (ii)

(B) (ii) and (iii)

(C) (i) and (iii)

(D) (i), (ii) and (iii)

(E) Answer not known

180. In improved farm house design, a typical bed room of _____ will accommodate two single beds of 1×2 m

(A) 1.2×1.8 *m*

(B) 3×1.8 *m*

(C) 3.6×3 *m*

(D) 6×4.5*m*

(E) Answer not known

181. The relief or physical landscape of the area is known as

(A) Watershed

(B) Topography

(C) Land survey

(D) Remote sensing

(E) Answer not known

182. The process of collecting and storing water from an area that has been modified or treated to increase runoff from precipitation is called

(A) Water conservation

(B) Water harvesting

(C) Run off collection

(D) Sub soiling

(E) Answer not known

183. Injection well method of recharge have to be used under special condition like

(i) Demand on groundwater

(ii) Controlling intrusion of salt water

(iii) Reducing water table in water logged area

(A) (i) and (ii)

(B) (i) and (iii)

(C) (ii) and (iii)

(D) (i), (ii) and (iii)

(E) Answer not known

184. Which of the following ground water recharging techniques is suitable when an impervious layer is encountered at shallow depth?

(A) Water spreading

(B) Percolation pond

(C) Pits and shafts

(D) Induced recharge

(E) Answer not known

185. Lands under class I to class IV groups of land capability classification are

(A) Non Arable lands

(B) Arable lands

(C) Non cultivable lands

(D) Grazing lands

(E) Answer not known

186. In the land use capability classification, the texture of the surface soil is grouped into _____ classes.

(A) 8

(B) 6

(C) 4

(D) 12

(E) Answer not known

187. DPAP stands for

(A) Drought Prone Area Programme

(B) Drought Prone Area Project

(C) Desert Problem Area Programme

(D) Drought Prone Authority Project

(E) Answer not known

188. SWAT stands for

(A) Storm Water Assessment Technique

(B) Soil and Water Assessment Tool

(C) Saline Water Assessment Techniques

(D) Soil and Water in Agricultural Technology

(E) Answer not known

189. Find the incorrect statement about the characteristics of small watershed.

1. Overland flow is predominant
2. Large drainage networks
3. Channel flow is more

(A) 1 and 2 are wrong

(B) 1 and 3 are wrong

(C) 2 and 3 are wrong

(D) 1,2 and 3 are wrong

(E) Answer not known

190. The rainfall erosivity factor (R) is a function of

(A) Falling rain drops

(B) Falling rain drops and rainfall intensity

(C) Rainfall intensity

(D) Runoff rate

(E) Answer not known

191. ———— types of soil erosion is said to be in equilibrium with the soil forming process.

(A) Geologic erosion

(B) Accelerated erosion

(C) Glacier erosion

(D) Ravines

(E) Answer not known

192. The best location of wind break/shelter belt is

(A) in the wind direction

(B) across the wind blowing direction

(C) periphery of affected area

(D) along the slope direction

(E) Answer not known

193. Drop structures are erected or gully bed to control soil erosion at drops of _____

(A) 1 to 2 m
(B) 2 to 3 m
(C) 3 to 4 m
(D) 4 to 6 m
(E) Answer not known

194. The return period considered for the hydrologic design of a permanent gully control structure is

(A) 20 to 25 years
(B) 25 to 30 years
(C) 10 to 15 years
(D) 5 to 10 years
(E) Answer not known

195. Temporary check dams are constructed to check the gully erosion

(A) Loose rock dam and chute spillway
(B) Brush wood dam and chute spillway
(C) Chute spillway
(D) Loose rock and Brushwood dam
(E) Answer not known

196. The side slope of bund to be constructed in light sandy loam soil is about

(A) 1 : 2
(B) 1 : 5
(C) 2 : 1
(D) 2 : 5
(E) Answer not known

197. A significant soil building group of crops are

(A) Cereal crops
(B) Leguminous crops
(C) Fodder crops
(D) Tuber crops
(E) Answer not known

198. Mulching helps in

(A) Improving the infiltration rate
(B) Improving the soil topography
(C) Improving soil texture
(D) Improving hydraulic conductivity
(E) Answer not known

199. Strip cropping has alternate rows of

(A) Trees and grasses
(B) Trees and row crops
(C) Row crops and close growing crops
(D) Crop grown closely and evenly with trees
(E) Answer not known

200. Removal of fairly uniform layer of soil from land surface by action of rainfall is called

(A) Splash
(B) Sheet
(C) Rill
(D) Gully
(E) Answer not known

## SPACE FOR ROUGH WORK

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SEAL