

**COMBINED TECHNICAL SERVICES EXAMINATION
(NON-INTERVIEW POST)**

COMPUTER BASED TEST

DATE OF EXAM: 09.08.2025 AN

**PAPER – II – AGRICULTURAL, MECHANICAL,
AUTOMOBILE AND CIVIL ENGINEERING**

(DEGREE STANDARD) (CODE: 562)

1. Coefficient of permeability is obtained from the equation when a = sectional area

t = time

L = Soil specimen length

A = Cross sectional area

h_0 = initial reading

h_1 = final reading

(A) $K = 2.3 \frac{AL}{at} \log \frac{h_0}{h_1}$

(B) $K = 2.3 \frac{aL}{At} \log \frac{h_1}{h_0}$

(C) $K = 2.3 \frac{at}{AL} \log \frac{h_1}{h_0}$

(D) ✓ $K = 2.3 \frac{aL}{AL} \log_{10} \frac{h_0}{h_1}$

(E) Answer not known

2. Non leaky artesian formula is given by

$W(u)$ = well function, dimensionless

Where S = Draw down in the observation well

S = Storage coefficients at radius (r)

Q = Pumping rate

T = Transmissibility coefficient

t = time after pumping started

r = Distance of the observation well from the pumping well

(A) ✓ $S = \frac{Q}{4\pi t} W(u)$ and $u = \frac{r^2 s}{4Tt}$

(B) $S = \frac{Wu4\pi T}{Q}$ and $u = \frac{4Tt}{r^2 s}$

(C) $S = \frac{Q}{Wu} 4\pi T$ and $u = \frac{r^2}{4Tts}$

(D) $S = \frac{QT}{Wu4\pi}$ and $u = \frac{r^2 s}{4Tts}$

(E) Answer not known

3. The ground water flow is calculated as

- (A) ☒ Cross sectional area of aquifer $\times$ Slope of ground water table $\times$ permeability of the aquifer
- (B) Cross sectional area of aquifer $\times$ slope of ground water table $\times$ transmissibility of the aquifer
- (C) Width of aquifer $\times$ slope of piezometer surface $\times$ transmissibility of aquifer
- (D) Width of aquifer $\times$ slope of ground water table $\times$ permeability of aquifer
- (E) Answer not known

4. Ground water flow

Where K = coefficient permeability

i = hydraulic gradient

A = Gross sectional area of the aquifer

W = Width of the aquifer

b = Saturated thickness of the aquifer

T = Transmissibility of the aquifer

(A) ☒ $Q = Kwb \frac{\Delta h}{L}$

(B) $Q = \frac{KwbL}{\Delta h}$

(C) $Q = \frac{wbL}{K\Delta h}$

(D) $Q = \frac{wb\Delta h}{KL}$

(E) Answer not known

5. The specific capacity of a well is confined aquifer under equilibrium conditions and within the working limits of drawdown
- (A) can be taken as constant
 - ☒ (B) decreases as the drawdown increases
 - (C) increases as the drawdown increases
 - (D) increases or decreases depending upon the size of the well
 - (E) Answer not known
6. Which statement is wrong in the development process of well
- (i) Increasing the specific capacity of the well
 - (ii) Preventing sand flowing
 - (iii) Maximum well life
 - (iv) Increasing the porosity of well
- ☒ (A) (iv) (B) (ii)
 - (C) (i) and (ii) (D) (ii) and (iii)
 - (E) Answer not known
7. Which types of boring is most suitable for unconsolidated strata and for depth over 163m
- ☒ (A) Hydraulic Rotary method
 - (B) Cable Tool method
 - (C) Wash boring method
 - (D) Water jet boring method
 - (E) Answer not known

8. The average annual rainfall in India is
- (A) 189 cm (B) 319 cm
(C) 89 cm (D) 118 cm
(E) Answer not known
9. A self - recording rain - gauge
- (A) Records by hourly depth of rain
(B) Records the rainfall intensity
(C) Records the onset and cessation of rainfall
(D) Records the cumulative depth of rainfall
(E) Answer not known
10. Lithosphere is the Environment which is
- (A) Below the Hydrosphere
(B) Above the Hydrosphere
(C) Below the Atmosphere
(D) Above the Atmosphere
(E) Answer not known
11. Which of the following does not affect Runoff?
- (A) Climatic factors
(B) Irrigation
(C) Geological factors
(D) Physiographic factors
(E) Answer not known

12. The annual rainfall at any given stations varies from

- (A) Month to month
- (B) Weekly basis
- (C) Quarterly
- ☒ (D) Year to Year
- (E) Answer not known

13. Plane angular measurement of a full circle is

- (A) π - radian
- ☒ (B) 2π - radians
- (C) 3π - radians
- (D) 4π - radians
- (E) Answer not known

14. In the Barometer, difference in elevation between the two stations may be obtained by the formula where

H : the difference in elevation in m between the two stations

h_1 = the barometer reading in cm @ the lower station

h_2 = the barometer reading in cm @ the higher station

T_1 = the temperature of the air in degrees centigrade @ the lower station

T_2 = the temperature of the air in degree centigrade @ the higher station

(A) $H = 18336.3 (\log h_1 + \log h_2) \left[1 + \frac{T_1 + T_2}{500} \right]$

(B) $H = 18336.3 (\log h_1 - \log h_2) \left[1 + \frac{T_1 + T_2}{500} \right]$

(C) $H = 18336.3 (\log h_1 - \log h_2) \left[1 - \frac{T_1 + T_2}{500} \right]$

(D) $H = 18336.3 \left(\log h_1 - \log h_2 \left[1 + \frac{T_1 + T_2}{500} \right] \right)$

(E) Answer not known

15. The straight line tangential to the longitudinal curve of the level tube at the centre of the tube is called as

(A) Axis of telescope

(B) Axis of level tube

(C) Axis of transverse

(D) Axis of vertical

(E) Answer not known

16. In chain surveying the individual chain link diameter is
(A) 3 mm (B) ☒ 4 mm
(C) 5 mm (D) 6 mm
(E) Answer not known
17. In total station, data is located in
(A) Pen drive (B) ☒ Micro processor
(C) Data card (D) External hardware
(E) Answer not known
18. Least count of vernier transit theodolite is
(A) 30" (B) ☒ 20"
(C) 1" (D) 15"
(E) Answer not known
19. Which method is preferable for open traversing?
(A) Method of direct angles (B) Method of exterior angles
(C) ☒ Method of deflection angles (D) Method of interior angles
(E) Answer not known
20. In theodolite, the axis about which the telescope can be rotated in a vertical plane is
(A) Vertical axis (B) Axis of telescope
(C) ☒ Horizontal axis (D) Axis of level tube
(E) Answer not known

21. Identify the correct representation of depreciation of machine (D) in hours.

where,

C – Initial cost of machinery

$J \rightarrow$ Salvage value

$L \rightarrow$ Life of machinery (years)

$H \rightarrow$ Working hours of machine (h /year)

(A) $D = C + \frac{J}{L} \times H$

(B) $D = C - \frac{J}{L} \times H$

(C) $D = L \times \frac{H}{(C - J)}$

(D) $D = C - \frac{J}{L + H}$

(E) Answer not known

22. The type of cylinder which has straight (or) inclined feed trough is _____ for threshers.

(A) Wire loop cylinder

(B) Spike tooth cylinder

(C) Flail cylinder

(D) Smooth drum

(E) Answer not known

23. The _____ plant characteristics that directly affects the efficiency of a cotton stripper.

(A) Colour of leaves

(B) Boll maturity

(C) Root length

(D) Stem thickness

(E) Answer not known

24. The kind of sugarcane planting pattern helps the machines to harvest more efficiently is
- (A) Zigzag rows (B) Cluster planting rows
(C) ☒ Bedded rows (D) Circular bed
(E) Answer not known
25. The ————— part of celery plant is harvested.
- (A) ☒ Roots (B) Leaves only
(C) ☒ Stalks (D) Flowers
(E) Answer not known
26. The type of pump used for high pressure applications in power sprayer is
- (A) Diaphragm pump (B) Screw pump
(C) Centrifugal pump (D) ☒ Piston pump
(E) Answer not known
27. Increasing sprayer speed without adjusting nozzle output will
- (A) Increase application rate (B) ☒ Decrease application rate
(C) Not effect application rate (D) Clean the nozzles
(E) Answer not known
28. The function of nozzle in a sprayer is
- (A) Measure pressure (B) Store chemicals
(C) ☒ Break liquid into droplets (D) Increase tank capacity
(E) Answer not known

29. Rocker sprayers are usually operated by
- (A) Hand lever
 - (B) Battery
 - (C) Pneumatic pressure
 - (D) Hydraulic fluid
 - (E) Answer not known
30. The working principle of an anger type fertilizer metering mechanism is
- (A) It uses air to move the fertilizer
 - (B) It drops fertilizer by shaking the hopper
 - (C) It uses a rotating screw to push the fertilizer
 - (D) It uses water to move the fertilizer
 - (E) Answer not known
31. The main function of cono weeder is
- (A) Harvesting Paddy
 - (B) Spraying Pesticides
 - (C) Uprooting and burying weeds
 - (D) Sowing seeds
 - (E) Answer not known
32. The common width of sweeps for weed control ranges from
- (A) 6-8 cm
 - (B) 8-10 cm
 - (C) 10-15 cm
 - (D) 15-20 cm
 - (E) Answer not known

33. The VMD stand for in spray technology is
- (A) Variable Measurement Device
 - (B) Velocity Mean Distribution
 - (C) Volume Measuring Distance
 - ☒ (D) Volume Mean Diameter
 - (E) Answer not known
34. The following subsoiler types which is best for minimizing draft force is
- (A) Rigid
 - (B) Straight shank
 - ☒ (C) Parabolic
 - (D) Spring loaded
 - (E) Answer not known
35. The disc plough is most suitable than the mould board plough in
- (A) Light sandy soil
 - ☒ (B) Wet and sticky soil
 - (C) Loamy well drained soil
 - (D) Dry arid soils
 - (E) Answer not known

36. The type of mould board plough suitable for grassy land is
- (A) General purpose
 - (B) Slat type
 - ☒ (C) Sod type
 - (D) Stubble type
 - (E) Answer not known
37. The earth moving equipment used for pushing large quantities of soils is
- (A) Excavator
 - ☒ (B) Bull dozer
 - (C) Loader
 - (D) Scraper
 - (E) Answer not known
38. The primary purpose of cultivator is to
- (A) Prepare seedbed by deep soil inversion
 - ☒ (B) Control weeds and loosen soil after crop emergence
 - (C) Harvest crop efficiently
 - (D) Irrigate the fields
 - (E) Answer not known

39. Which of the following implement is most commonly associated with primary tillage?
- (A) Rotavator
 - (B) Seed drill
 - ☒ (C) Moldboard plough
 - (D) Harrow
 - (E) Answer not known
40. The main purpose of puddler in paddy field is to
- (A) Drain excess water
 - (B) Create a dry seed bed
 - ☒ (C) Reduce water percolation and prepare soft bed
 - (D) Control insects in the soil
 - (E) Answer not known
41. In bar chart, which colour is used to show the actual progress.
- ☒ (A) Green
 - (B) Yellow
 - (C) Red
 - (D) Blue
 - (E) Answer not known

42. The rate of use of a particular raw material from stores is 20 units per year. The cost of placing and receiving an order is Rs. 40. The cost of each unit is Rs. 100. The cost of carrying inventory in percent per year is 0.16 and it depends upon the average stock. Determine the economic order quantity. If the lead time is 3 month, calculate the reorder point.
- (A) 10 and 5 units
 - (B) 5 and 10 units
 - (C) 15 and 5 units
 - (D) 5 and 15 units
 - (E) Answer not known
43. _____ are used to represent activity in a network diagram.
- (A) Circles
 - (B) Squares
 - (C) Arrows
 - (D) Rectangles
 - (E) Answer not known
44. Critical ratio (CR) in dynamic sequencing rules is
- (A) $CR = (\text{need date} - \text{today's date}) / \text{days required to complete the job}$
 - (B) $CR = (\text{today's date} - \text{need date}) / \text{days required to complete the job}$
 - (C) $CR = (\text{No. of non-working days}) / \text{days required to complete the job}$
 - (D) $CR = (\text{No. of working hr/day}) / \text{days required to complete the job}$
 - (E) Answer not known

45. Consider the following operations involved in forging a hexagonal bolt from a round bar stock, whose diameter is equal to the bolt diameters. Find the correct sequence of the operations

- (A) Up setting – Swaging – Cambering – Flattening
- (B) Up setting – Flattening – Swaging – Cambering
- (C) Swaging – Up setting – Flattening – Cambering
- (D) Flattening – Up setting – Swaging – Cambering
- (E) Answer not known

46. Match the following :

- | | |
|--------------------------------|---|
| (a) Neutral flame | 1. Application are similar to electro gas welding |
| (b) Oxidizing flame | 2. Stick welding |
| (c) Carburizing flame | 3. Small and narrow |
| (d) Shielded metal arc welding | 4. Inner cone of 3040-3300°C |
| (e) Electro slag welding | 5. Blue envelope |

- | | (a) | (b) | (c) | (d) | (e) |
|-----|------------------|-----|-----|-----|-----|
| (A) | 4 | 3 | 5 | 2 | 1 |
| (B) | 3 | 4 | 5 | 2 | 1 |
| (C) | 5 | 2 | 4 | 3 | 1 |
| (D) | 3 | 4 | 5 | 1 | 2 |
| (E) | Answer not known | | | | |

47. Gun metal is an alloy of
- (A) Aluminium and Copper
 - (B) Copper and Tin
 - ☒ (C) Copper, Tin and Zinc
 - (D) Aluminium, Cobalt and Zinc
 - (E) Answer not known
48. A Crude Oil of kinematic viscosity 0.4 stoke is flowing through a pipe of diameter 300 mm at the rate at 300 litre per second. Find the velocity of flow.
- (A) 4.14 m/s
 - ☒ (B) 4.24 m/s
 - (C) 4.34 m/s
 - (D) 4.44 m/s
 - (E) Answer not known
49. The loss of head at the entrance of a pipe is
- ☒ (A) $0.5 V^2/2g$
 - (B) $V^2/2g$
 - (C) $(V_1 - V_2)^2/2g$
 - (D) $KV^2/2g$
 - (E) Answer not known
50. Cavitation in centrifugal pump due to
- ☒ (A) Pressure drops below the Vapour Pressure of the liquid
 - (B) Pressure rises above the Vapour Pressure of the liquid
 - (C) Fluctuation in speed of the pump impeller
 - (D) Rotation of the pump impeller in the opposite direction
 - (E) Answer not known

51. Rankine's theory is used for

- (A) Brittle materials
- (B) Ductile materials
- (C) Elastic materials
- (D) Plastic materials
- (E) Answer not known

52. One torr pressure is equivalent to

- (A) 1 mm of mercury
- (B) 1 atmosphere
- (C) 1 pascal
- (D) 10 m of water
- (E) Answer not known

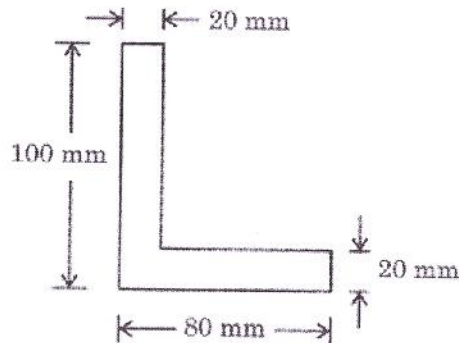
53. The work done by impeller of a centrifugal pump on water per second per unit weight of water is given by

- (A) $\frac{1}{g} \times V_{w_1} U_1$
- (B) $\frac{1}{g} \times V_{w_2} U_2$
- (C) $\frac{1}{g} \times (V_{w_2} U_2 - V_{w_1} U_1)$
- (D) $\frac{1}{g} \times V_{w_1} U_1^2$
- (E) Answer not known

54. The continuity equation $\frac{\partial y}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0$ is valid for

- (A) Ideal fluid flow only
- (B) Incompressible fluids, whether the flow is steady or unsteady
- (C) Steady flow, whether compressible or incompressible
- (D) Incompressible fluids and steady flow only
- (E) Answer not known

55. Find the centroid of an unequal angle section $100 \text{ mm} \times 80 \text{ mm} \times 20 \text{ mm}$.



- (A) $\bar{x} = 25 \text{ mm}$ and $\bar{y} = 35 \text{ mm}$ (B) $\bar{x} = 35 \text{ mm}$ and $\bar{y} = 25 \text{ mm}$
 (C) $\bar{x} = 30 \text{ mm}$ and $\bar{y} = 20 \text{ mm}$ (D) $\bar{x} = 20 \text{ mm}$ and $\bar{y} = 30 \text{ mm}$
 (E) Answer not known
56. A rigid body is treated as a particle when it is applied with
 (A) Concurrent forces (B) Coplanar forces
 (C) Non-concurrent forces (D) Non-coplanar forces
 (E) Answer not known
57. A block of mass 30 kg is on an inclined plane of 30° and is supported by a force F acting parallel to the plane. The magnitude is
 (A) 14.715 N (B) 147.15 N
 (C) 300 N (D) 3000 N
 (E) Answer not known

58. Two surfaces A and B are in contact. Surface B is being pulled over surface A, which is fixed, the direction of frictional force on A is
- (A) In the direction of the motion of B
 - (B) Opposite to the direction of the motion of B
 - (C) Not depending on the direction of motion of B
 - (D) Either in the direction of the motion of B (or) opposite to it.
 - (E) Answer not known
59. The planes, which have no shear stress are known as
- (A) Principal planes
 - (B) Parallel planes
 - (C) Shear strain
 - (D) Normal stress
 - (E) Answer not known
60. A square section with side ' x ' of a beam is subjected to a shear force ' S ' the magnitude of shear stress is developed
- (A) at the centre of the web
 - (B) at the top of edge of the top flange
 - (C) at the bottom edge of the top flange
 - (D) at the middle third of web
 - (E) Answer not known
61. Which among the following is one of the widely practised method between production and marketing of perishable agricultural commodities towards extended shelf life?
- (A) Cold storage
 - (B) Sterilization
 - (C) Pasteurization
 - (D) Canning
 - (E) Answer not known

62. Which one of the following is not the component of a refrigeration system?

- (A) Evaporator
- (B) Condenser
- (C) Compressor
- (D) Cartilage
- (E) Answer not known

63. Which of the following statements are true about evaporators?

Statement I : Open pan evaporators have poor evaporation capacity.

Statement II : Pan evaporators have low surface/volume ratio.

- (A) I and II
- (B) I
- (C) II
- (D) None of the statements are true
- (E) Answer not known

64. The average level of sugar in flavoured milk is _____ %.

- (A) 4%
- (B) 10%
- (C) 15%
- (D) 7%
- (E) Answer not known

65. Vacuum packaging used to prevent _____ in the food products.
- (i) lipid oxidation
 - (ii) loss of vitamins
 - (iii) loss of pigments
 - (iv) oxidative browning
- (A) (i), (iii) only (B) (i), (iv) only
(C) (i), (ii), (iii) and (iv) (D) (ii), (iii) only
(E) Answer not known
66. The major carbohydrate present in milk is
- (A) Lactose (B) Glucose
(C) Sucrose (D) Fructose
(E) Answer not known
67. Different types of polyethylene used in food packaging industry is/are
- (A) LDPE (B) HDPE
(C) LLDPE (D) (A), (B) and (C)
(E) Answer not known
68. Law used to measure the gas or vapour permeability for one-dimensional diffusion is
- (A) Fick's law (B) Henry's law
(C) Hook's law (D) Arrhenius theory
(E) Answer not known

69. The irradiation dose level applied in radappertisation is _____ kGy.
- (A) 10-25 (B) 2-5
(C) 0.1-0.2 (D) 0.1-6.0
(E) Answer not known
70. The drawback of using X-rays in food preservation is
- (A) their high efficiency (B) high cost of production
(C) they are untotoxic (D) greater penetration power
(E) Answer not known
71. The critical temperature of carbon dioxide gas is _____ °C. This is the highest temperature at which liquid carbon dioxide is observed.
- (A) 35.6°C (B) 40.2°C
(C) 26.5°C (D) 31.1°C
(E) Answer not known

72. Match the types of Dryer used for various food and foods by-products.

- | | |
|------------------------------|--------------------------------------|
| (a) Fruits and vegetables | 1. Spray dryer |
| (b) Instant coffee and tea | 2. Compartment and tunnel tray dryer |
| (c) Breakfast cereals | 3. Film drum |
| (d) Predigested infant foods | 4. Conveyor band |

- | | (a) | (b) | (c) | (d) |
|---|------------------|-----|-----|-----|
| (A) ☒ | 2 | 1 | 4 | 3 |
| (B) ☐ | 3 | 4 | 1 | 2 |
| (C) ☐ | 2 | 4 | 1 | 3 |
| (D) ☐ | 1 | 4 | 3 | 2 |
| (E) ☐ | Answer not known | | | |

73. Dryer used in micro encapsulation process is

- | | |
|---|---|
| (A) ☐ Drum dryer | (B) ☐ Belt dryer |
| (C) ☒ Spray dryer | (D) ☐ Tray dryer |
| (E) ☐ Answer not known | |

74. The time and temperature used in ultra high temperature technology is _____ °C and _____ seconds.

- | | |
|--|--|
| (A) ☐ 120°C, 5 seconds | (B) ☒ 135°C, 3 seconds |
| (C) ☐ 145°C, 10 seconds | (D) ☐ 140°C, 10 seconds |
| (E) ☐ Answer not known | |

75. A typical L/D ratio for extruder is
- (A) 10 (B) 15
(C) 20 (D) 25
(E) Answer not known
76. Smaller milk powder particles carried away by the air stream during spray drying can be collected using
- (A) Centrifugal separators (B) Magnetic separators
(C) Cyclone separators (D) Particle separators
(E) Answer not known
77. Facts about radiation heat transfer
- (i) Electromagnetic radiation wavelength is 10^{-7} to 10^{-4} m
(ii) Intensity of radiation depends on temperature of the source
(iii) Does not require any material medium
(iv) Transport energy in the form of waves
- (A) (i), (iv) only true
(B) (ii), (iii) and (iv) only true
(C) (i), (ii), (iii) and (iv) are true
(D) Only (i), (ii) and (iii) are true
(E) Answer not known

78. Which statement is true about thermal conductivity?

- (I) It varies with temperature
- (II) It is pressure dependent in case of gases
- (III) SI unit is W/mK
- ☒ (A) I, II and III
- (B) Only I, II
- (C) Only II and III
- (D) Only I and III
- (E) Answer not known

79. Which of the statement is true about heat exchangers?

- (I) Fouling reduces efficiency of heat exchange
- (II) Burnt pulp, denatured protein cause fouling
- (III) Fouling cannot be eliminated
- ☒ (A) I and II
- (B) II and III
- (C) I and III
- (D) I, II and III
- (E) Answer not known

80. Method used for partial compensation of aroma loss caused by evaporation process is

- | | |
|----------------------|---|
| (A) Aroma recovery | (B) Cut back method |
| (C) Concentration | ☒ (D) (A), (B) only |
| (E) Answer not known | |

81. In India green house technology was started in _____ mainly for Research and Development activities.
- ☒ (A) 1980's (B) 1970's
(C) 1960's (D) 1990's
(E) Answer not known
82. _____ operation is done to remove the minor humps and depression for the efficient surface drainage
- (A) Land grading ☒ (B) Land smoothing
(C) Land ploughing (D) Land covering
(E) Answer not known
83. In _____ system of surface drainage the laterals are constructed parallel to each other and they are connected to main drain when the land is perfectly level.
- ☒ (A) Regular (B) Random
(C) Terrace (D) Bedding
(E) Answer not known
84. _____ are air vents located at gradient change points to remove entrapped air.
- (A) Junction box (B) Relief walls
(C) Mole drains ☒ (D) Breathers
(E) Answer not known

85. _____ refers to the drainage effect of the high rate of withdrawal of ground water by certain plants.
- (A) Ground water drainage (B) Land drainage
(C) Water withdrawal ~~(D) Bio drainage~~
(E) Answer not known
86. The highly deteriorated _____ have very low infiltration rate.
- (A) Saline soils ~~(B) Alkaline soils~~
(C) Nutrient rich soils (D) Dry soils
(E) Answer not known
87. Boron concentration more than _____ may be injurious to crops it used on heavy soils.
- (A) 0.002 ppm (B) 0.02 ppm
(C) 0.2 ppm ~~(D) 2 ppm~~
(E) Answer not known
88. It is safer to use irrigation water of poorer quality in _____ than in soils with higher clay content
- (A) Loamy soil (B) Clayey Loam soil
~~(C) Sandy soil~~ (D) Silty clay
(E) Answer not known

89. _____ can be used in leaching of soil when the landslope is more.
- (A) Level border (B) Rectangular checks
☒ (C) Contour checks (D) Sprinkler irrigation
(E) Answer not known
90. _____ are usually more salt tolerant than legumes
- (A) Pulses (B) Grains
☒ (C) Cereals (D) Maize
(E) Answer not known
91. In _____ irrigation only root zone is saturated during irrigation.
- (A) Sprinkler (B) Check flooding
(C) Furrow ☒ (D) Drip
(E) Answer not known
92. _____ is defined as the highest velocity at which water may be carried in channel.
- (A) Maximum velocity (B) Minimum velocity
(C) Moderate velocity ☒ (D) Permissible velocity
(E) Answer not known
93. Spoil bank is also known as
- (A) Counter Berm (B) Bank width
☒ (C) Waste bank (D) Dowel
(E) Answer not known

94. A bridge and a culvert is distinguished from each other on the basis of
- | | |
|----------------------|----------------------------|
| (A) Water way | (B) Span length |
| (C) Scour depth | (D) Decking slab |
| (E) Answer not known | |
95. Molitor sterenson formula for design of freeboard in earthen dam for a fetch our 32 Km is
- | |
|---|
| (A) $FB = 1.5 (0.032 \sqrt{Fr})$ |
| (B) $FB = 0.5 (0.0032 \sqrt{Fr})$ |
| (C) $FB = 0.05 (0.0032 \sqrt{Fr})$ |
| (D) $FB = 1.5 (0.32 \sqrt{Fr})$ |
| (E) Answer not known |
96. _____ are structures for sheltering and restricting dairy animals.
- | | |
|-------------------------|-----------------|
| (A) Milking parlours | (B) Cow stall |
| (C) Pen barn | (D) Water bowls |
| (E) Answer not known | |
97. Steel reinforcement is provided in concrete to with stand
- | | |
|-----------------------|------------------------------|
| (A) Compressive loads | (B) Tensile loads |
| (C) Creep load | (D) Cracking load |
| (E) Answer not known | |

98. _____ is one of the important consideration in selecting a site for poultry house.
- (A) ☒ Dampness (B) Dust
(C) Fog (D) Smoke
(E) Answer not known
99. In reciprocating pump _____ is equal to the difference of theoretical discharge and actual discharge.
- (A) Percentage slip (B) Positive slip
(C) Negative slip (D) ☒ Slip
(E) Answer not known
100. Which types houses use to built in warm regions for birds?
- (A) Wire floored houses (B) Deep litter houses
(C) ☒ Case house (D) All the above
(E) Answer not known
101. Soil is a _____ phase system.
- (A) One (B) Two
(C) ☒ Three (D) Four
(E) Answer not known

102. A clay soil has a high percentage of fine particles and is referred to as
- (A) Coarse (or) light soil (B) Medium textured soil
~~(C)~~ Fine (or) heavy soil (D) Good soil
 (E) Answer not known
103. The force of mutual attraction of water molecules in the air water interface is known as
- (A) Surface tension (B) Capillary force
~~(C)~~ Cohesive force (D) Adhesive force
 (E) Answer not known
104. _____ is the time in days between first watering of a crop at the time of sowing to its last watering before harvesting.
- (A) Crop period ~~(B)~~ Base period
 (C) Duty (D) Delta
 (E) Answer not known
105. The relationship between Duty, Delta and Base period is given by
- (A) $\Delta = 8.64 \frac{B}{D} \text{ cm}$ ~~(B)~~ $\Delta = 864 \frac{B}{D} \text{ cm}$
 (C) $\Delta = 864 \frac{D}{B} \text{ cm}$ (D) $\Delta = 8.64 \frac{D}{B} \text{ cm}$
 (E) Answer not known

106. _____ is the common method for irrigating row crops.
- (A) Contour farming (B) Basin flooding
(C) Zigzag method ☒ (D) Furrow method
(E) Answer not known
107. A _____ weir is constructed at the offtake canal across the river to raise the water level for feeding the canal.
- (A) Division (B) Storage
☒ (C) Pickup (D) Waste
(E) Answer not known
108. In the surface irrigation, the lowest irrigation efficiency is
- (A) 40% (B) 45%
☒ (C) 50% (D) 55%
(E) Answer not known
109. _____ is a low water intensity crop.
- (A) Sugar cane (B) Beans
(C) Cotton ☒ (D) Wheat
(E) Answer not known
110. The area irrigated by a unit discharge of water flowing continuously for the duration of the base period of crop is known as
- (A) Delta (B) Discharge
☒ (C) Duty (D) Base period
(E) Answer not known

111. The two basic components of remote sensing are data acquisition and
- (A) data transmission
 - (B) data storing
 - ☒ (C) data processing
 - (D) data scattering
 - (E) Answer not known
112. _____ is a useful tool to predict drought.
- (A) Geo informatics
 - (B) Geo information system
 - (C) Global positioning system
 - ☒ (D) Remote sensing
 - (E) Answer not known
113. GIS coupled with _____ have numerous applications in soil and water management.
- (A) Data sensing
 - (B) Data processing
 - (C) Data storing
 - ☒ (D) Remote sensing
 - (E) Answer not known
114. _____ microwave sensors also have the capability of gathering data during the day and the night.
- (A) Active
 - ☒ (B) Passive
 - (C) Infrared
 - (D) Radar
 - (E) Answer not known
115. _____ microwave sensors are called radiometers.
- (A) Active
 - ☒ (B) Passive
 - (C) Imaging
 - (D) Non imaging
 - (E) Answer not known

116. It has been estimated in India that about _____ hectares of land are degraded by Gully and ravine erosion
- (A) 2 Million (B) 3 Million
(C) 4 Million (D) 5 Million
(E) Answer not known
117. _____ and large gullies may not be economically viable for reclamation.
- (A) Small (B) Medium
(C) Average (D) Deep
(E) Answer not known
118. Farm ponds constructed on _____ can results in acidic water.
- (A) Alkaline Soils (B) Acid Sulphide Soils
(C) Acid Sulphate Soils (D) Acid Nitric Soils
(E) Answer not known
119. _____ helps in water harvesting, moisture control and ground water recharge.
- (A) Seepage (B) Gravity weirs
(C) Small weirs (D) Nalla bunding
(E) Answer not known

120. Seepage losses in well graded coarse grained soil may be reduced by addition of
- (A) Kaolite (B) Dolomite
(C) Gypsum ~~(D) Bentonite~~
(E) Answer not known
121. _____ method is commonly used for slope analysis land capability survey of watershed.
- (A) Intervention method (B) Grid method
(C) Radial method ~~(D) Circle interception method~~
(E) Answer not known
122. _____ is the summit (or) boundry line separating watershed (or) basins.
- (A) Watershed degradation (B) Watershed community
(C) Watershed management ~~(D) Watershed divide~~
(E) Answer not known
123. The day today activities of a watershed development project are carried out by the
- (A) Watershed Association
(B) Watershed Development Team
~~(C) Watershed Committee~~
(D) Users Group
(E) Answer not known

124. _____ have important roles in planning the watershed development projects at village level.
- (A) Block Officer (B) District Panchayat
(C) Village Officer ~~(D) Village Panchayats~~
(E) Answer not known
125. The _____ contain all the topographical features along with the relevant benchmark of watershed.
- (A) Social (B) Google map
(C) Resource map ~~(D) Base map~~
(E) Answer not known
126. Which one of the following tea is not fermented?
- (A) Oolong Tea (B) Black Tea
~~(C) Green Tea~~ (D) Yellow Tea
(E) Answer not known
127. The electronic moisture meter developed by Central Plantation Crop Research Institute, Kasaragod can read moisture content of Copra from _____ to _____%.
- ~~(A) 5 to 40~~ (B) 0 to 100
(C) 0 to 25 (D) 5 to 75
(E) Answer not known

128. Identify the intrinsic factor that determines the safe storage of grains

- ☒ (A) Moisture content
- (B) Insects
- (C) Temperature
- (D) Relative humidity
- (E) Answer not known

129. The system most applicable for fumigation in stored gains is

- (A) Condensation system
- ☒ (B) Aeration system
- (C) Evaporation system
- (D) Solar system
- (E) Answer not known

130. High dead weight, thickness of bin walls and possible air bubbles on the interior walls are the same of the disadvantages in _____

- (A) Metal bins
- (B) Wooden bins
- ☒ (C) Concrete bins
- (D) Synthetic bins
- (E) Answer not known

131. A screw conveyor of 0.1 m diameter revolves at 600 rpm. Estimate the peripheral speed (tangential speed) of the screw

- (A) 31.4 m/s
- ☒ (B) 3.14 m/s
- (C) 314 m/s
- (D) 3.942 m/s
- (E) Answer not known

132. Dredging effect is quite common in ——— material handling equipment

- (A) Belt conveyor
- (B) Screw conveyor
- ☒ (C) Bucket elevator
- (D) Pneumatic conveyor
- (E) Answer not known

133. Trough idlers are associated with this material handling equipment

- (A) Bucket elevator
- (B) Screw conveyor
- ☒ (C) Belt conveyor
- (D) Pneumatic conveyor
- (E) Answer not known

134. Which of the following properties are related with raw rice production?

- (i) More gruel loss
 - (ii) Quick cooking
 - (iii) Less oil content in bran
 - (iv) More prone to insect infestation
- (A) (i) and (ii)
 - (B) (i), (ii) and (iii)
 - (C) (i), (iii) and (iv)
 - ☒ (D) (i), (ii), (iii) and (iv)
 - (E) Answer not known

135. Rubber roll Sheller is working on the principle of
- (A) Impact force
 - ☒ (B) Shear force
 - (C) Impact and tensile force
 - (D) Impact and compaction force
 - (E) Answer not known
136. The two processes used to remove the bran layer from the brown rice are
- (A) Abrasion and impact
 - ☒ (B) Abrasion and friction
 - (C) Tensile and friction
 - (D) Compaction and abrasion
 - (E) Answer not known
137. The separation of cleaned product into various quality fractions that may be defined on the basis of size, shape, density texture and colour is called as
- ☒ (A) Sorting
 - (B) Grading
 - (C) Cleaning
 - (D) Scalping
 - (E) Answer not known
138. The velvet roll separator or roll mill separates grains on the basis of
- (A) Shape and size
 - ☒ (B) Shape and surface texture
 - (C) Shape and moisture content
 - (D) Shape and colour
 - (E) Answer not known

139. The equilibrium moisture content of grains is dependent on _____ of the storage ambience
- (A) Temperature and Humidity ratio
 - (B) Relative humidity and wet bulb depression
 - (C) Dew point temperature and Humidity
 - ☒ (D) Drybulb temperature and Relative Humidity
 - (E) Answer not known
140. Thin layer and deep bed drying is mainly differentiated based on
- (A) Type of dryer used
 - ☒ (B) Existence of drying zone and drying front
 - (C) Air velocity
 - (D) Temperature for drying
 - (E) Answer not known

141. Which of the following statements are true about the moisture content of grains?

- (i) Dry basis moisture content is higher than wet basis moisture content
- (ii) Direct methods of moisture determination is more precise than in-direct methods
- (iii) Infra red method of moisture determination is classified under in-direct method

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

142. Psychrometry deals with the ————— properties of dry air-water vapour mixture

- | | |
|----------------------|------------------------------|
| (A) Physical | (B) Chemical |
| (C) Thermal | (D) Thermodynamic |
| (E) Answer not known | |

143. Which one of the following is not a direct method of moisture estimation?

- | | |
|----------------------|--------------------------------|
| (A) Air oven method | (B) Vacuum oven method |
| (C) Infra red method | (D) Chemical method |
| (E) Answer not known | |

144. Identify the property which is not related to mechanical properties?
- (A) Hardness (B) Impact resistance
(C) Shear resistance (~~D~~) Density
(E) Answer not known
145. Diameters of largest inscribing and smallest circumscribing circle are required to determine
- (A) Geometric mean diameter (B) Equivalent diameter
(~~C~~) Sphericity (D) Roundness
(E) Answer not known
146. _____ type of shelterbelt considerably reduces the wind velocity by 30 to 40 % of original wind speed.
- (A) Impermeable (B) Partially penetratable
(~~C~~) Fully penetratable (D) Stoppable
(E) Answer not known
147. Universal soil loss equation (USLE) is _____ and it does not illustrate the actual soil erosion process.
- (A) Mathematical (~~B~~) Emphirical
(C) Physical (D) Critical
(E) Answer not known

148. A good _____ maintains the soil structure and conserves the moisture in the soil and act as wind erosion control.
- (A) ☒ Crop rotation (B) Grazing
 (C) Dry land (D) Harvested land
 (E) Answer not known
149. The straight drop spillway design the height of longitudinal sill(s) is computed by
- (A) $S = \frac{4}{h}$ (B) ☒ $S = \frac{h}{4}$
 (C) $S = \frac{h}{2}$ (D) $S = \frac{2}{h}$
 (E) Answer not known
150. _____ type failure is very common in chute spillway.
- (A) stilling (B) ☒ piping
 (C) overturning (D) sliding
 (E) Answer not known
151. _____ outlet is most suitable to use in the chute spillway especially where channel grade below the structure is being unstable.
- (A) simply supported type (B) continuous type
 (C) strut type (D) ☒ cantilever type
 (E) Answer not known

152. _____ spillways have the dual purpose of gully and flood control.
- (A) chute (B) box inlet
(C) drop inlet (D) earthen
(E) Answer not known
153. The staggered trenches are constructed for _____ length compared to graded trenches.
- (A) shorter (B) larger
(C) wider (D) graded
(E) Answer not known
154. _____ type terrace is constructed by taking the soil from both sides of the embankment.
- (A) Retention terrace (B) Broad base terrace
(C) Nicholas type (D) Magnum type
(E) Answer not known
155. _____ bench terraces are adopted in low rainfall areas with permeable soil.
- (A) level (B) sloping outward
(C) sloping inward (D) irrigated type
(E) Answer not known

156. _____ is a special type of bench terrace which is constructed by filling the soil behind the stone wall made at outer edge of the terrace width.
- (A) Bench terrace sloping inward
 - (B) Bench terrace sloping outward
 - ☒ (C) Bench terrace supported by stone wall
 - (D) Level bench terrace
 - (E) Answer not known
157. _____ gullies are found in the alluvial plains.
- (A) V shaped
 - ☒ (B) U shaped
 - (C) Active
 - (D) Inactive
 - (E) Answer not known
158. Strip cropping is done to control erosion caused by
- (A) Snow fall
 - (B) Glaciers
 - ☒ (C) Run off
 - (D) Channel erosion
 - (E) Answer not known
159. _____ is the application of any plant residues or other materials to cover the top soil surface.
- (A) Tillage
 - (B) Ploughing
 - (C) Weeding
 - ☒ (D) Mulching
 - (E) Answer not known

160. Plastic mulches are suitable for _____ in semi arid and arid regions.

- (A) Taller plants
- (B) Nurseries
- (C) Taller vegetation
- (D) Garden plants
- (E) Answer not known

161. The Lambda sensor in an engine is used to measure

- (A) Fuel pressure
- (B) Exhaust gas temperature
- (C) Oxygen content in exhaust gas
- (D) Engine oil level
- (E) Answer not known

162. Manometers measure the pressure by

- (A) measuring the temperature changes in liquid
- (B) measuring height difference of liquid columns
- (C) noting the deflection of a pointer
- (D) using sound wave reflections
- (E) Answer not known

163. The purpose of air-bleeding in hydraulic brake systems is

- (A) To prevent brake pedal failure
- (B) To remove air bubbles from the brake fluid
- (C) To prevent the brake fluid contamination
- (D) To increase the brake oil temperature
- (E) Answer not known

164. The inner end of the axle shaft is splined to the
(A) ☒ Sun gear (B) Planet Pinion
(C) Crown wheel (D) Differential case
(E) Answer not known
165. The tractor engine transmission oil is checked _____ for maintenance.
(A) Every 10 working hours (B) Every 50 working hours
(C) Every 75 working hours (D) ☒ Every 750 working hours
(E) Answer not known
166. The specific energy of battery is expressed in
(A) Δh (B) w/kg
(C) ☒ wh/kg (D) wh
(E) Answer not known
167. Spark-plug gap is measured by using
(A) ring gauge (B) ☒ feeler gauge
(C) standard gauge (D) poker gauge
(E) Answer not known
168. Turbo charging of two-stroke engine eliminate the
(A) Cooling system (B) Lubrication system
(C) ☒ Crankcase Scavenging (D) Crankcase Ventilization
(E) Answer not known

169. High injection pressure in CI engine gives
- ☒ (A) Good atomization and mixing rates
 - (B) Reduce heat losses
 - (C) Increase the volumetric efficiency
 - (D) Low CO₂ emission
 - (E) Answer not known
170. Why tractors engine are heavier in construction is
- (A) due to high efficiency
 - (B) due to high power
 - (C) due to high speed
 - ☒ (D) due to high compression ratio
 - (E) Answer not known
171. In square engine, L-stroke length, D-diameter of bore
- (A) $L > D$
 - (B) $L < D$
 - (C) $L = 1.5 D$
 - ☒ (D) $L = D$
 - (E) Answer not known

172. _____ nozzle is used for better cold starting.

- ☒ (A) Pintaux
- ☐ (B) Pintle
- ☐ (C) Single hole
- ☐ (D) Multi-hole
- ☐ (E) Answer not known

173. Fuel filters do not use generally

- ☐ (A) Oil
- ☒ (B) Paper
- ☐ (C) Cloth
- ☐ (D) Felt
- ☐ (E) Answer not known

174. Simplest form of a centrifugal governor.

- ☒ (A) Watt Governor
- ☐ (B) Hartnell governor
- ☐ (C) Hartung governor
- ☐ (D) Pickering governor
- ☐ (E) Answer not known

175. A centrifugal clutch is to be designed to transmit 15 Kw at 900 rpm. The inside radius of the Pulley rim is 150 mm. Find the angular running speed.
- (A) $w = 92.26 \text{ rad/s}$
 - ☒ (B) $w = 94.26 \text{ rad/s}$
 - (C) $w = 96.26 \text{ rad/s}$
 - (D) $w = 98.26 \text{ rad/s}$
 - (E) Answer not known
176. What is the function of sector gear in recirculating ball steering gear?
- ☒ (A) Actuate the link rod through drop arm
 - (B) Steers the road wheels through link rod
 - (C) Steers the road wheels through steering arms
 - (D) Reduce the friction during the movement of the nut on the worm
 - (E) Answer not known
177. Calculate the vertical height of a watt governor when it rotates at 60 RPM. Also find the change in vertical height when its speed increases to 61 RPM.
- (A) 6 mm
 - ☒ (B) 8 mm
 - (C) 9.5 mm
 - (D) 12 mm
 - (E) Answer not known

178. The load on the engine increases, the engine and governor speed

- ☒ (A) decreases
- (B) increases
- (C) remain constant
- (D) depends on the soil condition
- (E) Answer not known

179. _____ is the over drive located.

- (A) Between transmission and engine
- (B) Between transmission and rear axle
- ☒ (C) Between transmission and propeller shaft
- (D) Between transmission and differential
- (E) Answer not known

180. What is the function of the differential lock on a tractor?

- (A) Creating lower tractive force
- (B) Improve fuel efficiency with less pollution
- ☒ (C) Prevent overheating with less pollution
- ☒ (D) Synchronize wheel speeds
- (E) Answer not known

181. The feed stocks which is used to produce Bio diesel is

- (A) Corn starch
- ☒ (B) Vegetable oils
- (C) Coal
- (D) Natural gas
- (E) Answer not known

182. _____ stage of biofuel life cycle is responsible for most emissions.
- ☒ (A) Feedstock cultivation
 - (B) Fuel combustion
 - (C) Fuel transportation
 - (D) Fuel storage
 - (E) Answer not known
183. For conversion of lignocellulosic biomass to ethanol which of the following is essential.
- (A) Yeast only
 - (B) Mould only
 - (C) Yeast and Mould
 - ☒ (D) Yeast and Enzymes
 - (E) Answer not known
184. Estimate the amount of CO₂ produced in kg per kilogram of ethanol, during complete combustion.
- (A) 1.9
 - ☒ (B) 0.96
 - (C) 3.9
 - (D) 4.9
 - (E) Answer not known

185. In a hydro power plant identify the correct order of occurrence of components along the flow

- ☒ (A) Fore bay – Penstock – Surge tank – Tail race
- (B) Fore bay – Surge tank – Penstock – Tail race
- (C) Tail race – Surge tank – Pen stock – Fore bay
- (D) Tail race – Penstock – Surge tank – Fore bay
- (E) Answer not known

186. The core forms about _____% of the earth's mass.

- (A) 16.67
- ☒ (B) 33
- (C) 25
- (D) 40
- (E) Answer not known

187. The ratio of energy density to power density of a wave for a period of 5 seconds is

- ☒ (A) 5
- (B) 1/5
- (C) 25
- (D) 1/25
- (E) Answer not known

188. The products of a Proton Exchange Membrane fuel cell are

- (A) Electricity Only
- (B) Heat Only
- (C) Water Only
- ☒ (D) Electricity, heat and water
- (E) Answer not known

189. Match the following thermal processes

List I	List II
(a) Torrefaction	1. excess amount of oxydant
(b) Pyrolysis	2. incomplete amounts of oxydant
(c) Gasification	3. absence of oxydant
(d) Combustion	4. pretreatment process

	(a)	(b)	(c)	(d)
(A)	4	3	2	1
(B)	3	4	1	2
(C)	2	1	4	3
(D)	1	2	3	4
(E)	Answer not known			

190. Determine the efficiency of converting a tonne of wood with a heating value of 21 MJ/kg to biomass of heating value 35 MJ/kg when the biomass yield is 50%.

- (A) 83.3% (B) 95%
(C) 60% (D) 66.67%
(E) Answer not known

191. In the production of ethanol from sugar crops, starch crops and lignocellulosic crops which of the following processes are common

- (A) Fermentation and distillation
(B) Saccharification and Fermentation
(C) Hydrolysis and fermentation
(D) Hydrolysis and distillation
(E) Answer not known

192. Charcoal is a major coproduct of the processes such as

- ☒ (A) Pyrolysis and gasification
- (B) Combustion and pulverisation
- (C) Gasification and combustion
- (D) Pyrolysis and combustion
- (E) Answer not known

193. Identify the Betz's law related to

- (A) Energy storage
- (B) Efficiency of solar panels
- ☒ (C) Maximum power extracted from wind
- (D) Fuel combustion
- (E) Answer not known

194. Which of the following is a horizontal axis wind turbine?

- (i) Savonius type
- (ii) Darrieus type
- (iii) Propeller type
- ☒ (A) (iii) only
- (B) (iii) and (ii)
- (C) (ii) and (i)
- (D) (ii) only
- (E) Answer not known

195. Nacelle of a wind turbine houses

- (A) The aerofoil blades
- ☒ (B) The generator, gear box hydraulics system and yawing mechanism
- (C) The tower and the transmission system
- (D) The power distribution system
- (E) Answer not known

196. Wind speed frequency distribution is generally described by _____ probability distribution.

- ☒ (A) Weibull
- (B) Poisson
- (C) Bernoulli
- (D) Gaussian
- (E) Answer not known

197. In a solar flat plate collector, the top loss coefficient can be determined by considering _____ and _____ losses from the absorber plate in the _____ direction.

- ☒ (A) Convection, radiation and upward
- (B) Conduction, radiation, upward
- (C) Convection, radiation, downward
- (D) Conduction, radiation, downward
- (E) Answer not known

198. The concentration ratio of a cylindrical parabolic solar concentrator of 2.5 m width and 9 m length when the outside diameter of the absorber tube is 6.5 cm is about
- (A) 12 (B) 24
(C) 36 (D) 06
(E) Answer not known
199. In a cabinet solar dryer which uses no external power source _____ air enters at the _____ and _____ air leaves at the _____.
- (A) Cool, bottom, hot, top
(B) Hot, bottom, cool, top
(C) Hot, top, cool, bottom
(D) Cool, top, hot, bottom
(E) Answer not known
200. The optimum band gap of a solar PV should be in the range
- (A) 1.1 to 2.3 eV (B) 1.1 to 2.3 V
(C) 0.6 to 2.3 eV (D) 0.6 to 2.3 V
(E) Answer not known
-