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

Test Booklet Series

Sl. No. 19129

TEST BOOKLET
ASSISTANT SOIL CONSERVATION OFFICER
(AGRICULTURAL ENGINEERING)
(PAPER-II)

A

K-43

Time Allowed : 1 & ½ hrs.

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. IMMEDIATELY AFTER COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET OF SAME SERIES ISSUED TO YOU.
2. ENCODE CLEARLY THE TEST BOOKLET SERIES A, B, C OR D; AS THE CASE MAY BE, IN THE APPROPRIATE PLACE IN THE ANSWER SHEET USING BALL POINT PEN (BLUE OR BLACK).
3. You have to enter your **Roll No.** on the Test Booklet in the Box provided along side. **DO NOT** write *anything else* on the Test Booklet.
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5. This Test Booklet contains **100** items (questions). Each item (question) comprises four responses (answers). You have to select the correct response (answer) which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct response (answer), you should mark (darken) the response (answer) which you consider the best. In any case, choose **ONLY ONE** response (answer) for each item (question).
6. You have to mark (darken) all your responses **ONLY** on the **separate Answer Sheet** provided, by using **BALL POINT PEN (BLUE OR BLACK)**. See instructions in the Answer Sheet.
7. All items (questions) carry equal marks. All items (questions) are compulsory. Your total marks will depend only on the number of correct responses (answers) marked by you in the Answer Sheet.
8. Before you proceed to mark (darken) in the Answer Sheet the responses to various items (questions) in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your **Admission Certificate**.
9. After you have completed filling in all your responses on the Answer Sheet and after conclusion of the examination, you should hand over to the Invigilator the *Answer Sheet* issued to you. You are allowed to take with you the candidate's copy / second page of the Answer Sheet along with the **Test Booklet**, after completion of the examination, for your reference.
10. Sheets for rough work are appended in the Test Booklet at the end.

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1. Which of the following implements is most suitable for primary tillage operations in heavy clay soil?
 - (A) Disc Harrow
 - (B) Moldboard Plough
 - (C) Puddler
 - (D) Cultivator

2. What is the primary function of a sub-soiler in land preparation?
 - (A) Creating seed furrows
 - (B) Pulverizing soil clods
 - (C) Breaking up compacted layers below the surface
 - (D) Mixing fertilizers with soil

3. Which type of harrow is most effective for breaking up clods and providing a finer seedbed after ploughing?
 - (A) Disc Harrow
 - (B) Spring Tooth Harrow
 - (C) Spike Tooth Harrow
 - (D) Chain Harrow

4. Which of the following materials is most commonly used for manufacturing high-wear components like ploughshares and disc blades in agricultural machinery?
 - (A) Stainless Steel
 - (B) Cast Iron
 - (C) High-Carbon Steel
 - (D) Aluminum Alloy

5. Which factor is most likely to cause variability in the effective field capacity of a tillage implement during operation?
 - (A) Soil texture
 - (B) Tractor horsepower
 - (C) Implement weight
 - (D) Operator skill level

6. Which irrigation system is most likely to be affected by wind conditions, potentially leading to uneven water distribution?
 - (A) Drip irrigation
 - (B) Furrow irrigation
 - (C) Sprinkler irrigation
 - (D) Subsurface irrigation

7. The size of the disk harrow is determined by
 - (A) Number of disks
 - (B) Maximum width of cut
 - (C) Maximum depth of cut
 - (D) Number of gangs

8. A tractor-drawn seed cum fertilizer drill is operated at 3 km/h giving 60 kilograms per hectare seed rate. If the operating speed is increased to 6 km/h, the new seed rate will be
 - (A) 120 kg ha⁻¹
 - (B) 80 kg ha⁻¹
 - (C) 60 kg ha⁻¹
 - (D) None of these

9. Which one of the following is a positive drive?
- (A) Friction drive
 - (B) V-belt drive
 - (C) Rope drive
 - (D) Gear drive
10. What is the primary function of a photovoltaic (PV) cell?
- (A) Convert heat into electricity
 - (B) Convert sunlight directly into electricity
 - (C) Store solar energy
 - (D) Concentrate solar radiation for heating
11. The theoretical maximum efficiency (%) of the wind rotor is about
- (A) 60
 - (B) 75
 - (C) 85
 - (D) 90
12. The effective size of particles of soil is denoted by (symbol have their usual meaning)
- (A) D10
 - (B) D20
 - (C) D30
 - (D) D60
13. The critical depth meter is used to measure
- (A) Velocity of flow in an open channel
 - (B) Depth of flow in an open channel
 - (C) Hydraulic jump
 - (D) Depth of channel
14. Useful-soil moisture for plant growth is
- (A) Gravity water
 - (B) Capillary water
 - (C) Hygroscopic water
 - (D) All are correct
15. Which type of nozzle is best suited for achieving fine spray in pesticide application?
- (A) Hollow cone nozzle
 - (B) Flat fan nozzle
 - (C) Full cone nozzle
 - (D) Flooding nozzle
16. threshers can be classified based on
- (A) Type of crop
 - (B) Type of threshing drum
 - (C) Type of power source
 - (D) All are correct

17. The process of converting organic material into biogas is known as
- (A) Photosynthesis
 - (B) Pyrolysis
 - (C) Anaerobic digestion
 - (D) Fermentation
18. The primary advantage of using wind energy over fossil fuels is
- (A) Lower initial cost
 - (B) Higher efficiency
 - (C) Environmentally friendly
 - (D) Consistent power output
19. Anaerobic digestion in biogas plants primarily produces
- (A) Methane
 - (B) Carbon dioxide
 - (C) Nitrogen
 - (D) Oxygen
20. Which of the following renewable energy sources is dependent on the gravitational pull of the moon?
- (A) Solar energy
 - (B) Wind energy
 - (C) Tidal energy
 - (D) Geothermal energy
21. Solar cells are made primarily from
- (A) Silicon
 - (B) Copper
 - (C) Aluminum
 - (D) Iron
22. Which of the following laws is associated with the energy required for size reduction?
- (A) Boyle's Law
 - (B) Kick's Law
 - (C) Newton's Law
 - (D) Charles' Law
23. The term "hygroscopic" refers to materials that
- (A) Absorb moisture from the air
 - (B) Release moisture to the air
 - (C) Neither absorb nor release moisture
 - (D) None of the above
24. The maximum moisture content at which grains can be safely stored is known as
- (A) Critical moisture content
 - (B) Equilibrium moisture content
 - (C) Dry basis moisture content
 - (D) Wet basis moisture content

25. The efficiency of a dryer is typically measured by
- (A) Drying rate
 - (B) Energy consumption per unit of moisture removed
 - (C) Temperature of the drying air
 - (D) Airflow rate
26. The material most widely used for cladding greenhouses is
- (A) Glass
 - (B) Aluminum sheets
 - (C) Polyethylene
 - (D) Wood panels
27. Calculate the draft required to pull a plough with a cutting width of 1.5 meters and a depth of 0.25 meters in soil with a draft coefficient of 800 N/m^2 .
- (A) 3000 N
 - (B) 3600 N
 - (C) 4200 N
 - (D) 4800 N
28. If a tractor moves at a speed of 5 km/h with a plough having an effective width of 1.2 meters, what is the theoretical field capacity (ha/h)?
- (A) 0.5
 - (B) 0.6
 - (C) 0.7
 - (D) 0.8
29. What is the effective field capacity (ha/h) of a seed drill operating at 6 km/h with a row spacing of 30 cm and a field efficiency of 75%?
- (A) 0.135
 - (B) 0.45
 - (C) 0.75
 - (D) 1.35
30. What type of plough is used to prepare the soil for direct seeding of crops without disturbing the soil structure?
- (A) Moldboard plough
 - (B) Disc plough
 - (C) Chisel plough
 - (D) Zero-till drill
31. Calculate the amount of pesticide required if a knapsack sprayer with a tank capacity of 15 litres is used at a rate of 500 litres per hectare over a 0.4-hectare area.
- (A) 150 litres
 - (B) 200 litres
 - (C) 250 litres
 - (D) 300 litres
32. Which nozzle type is commonly used in sprayers for applying herbicides?
- (A) Flat fan nozzle
 - (B) Hollow cone nozzle
 - (C) Full cone nozzle
 - (D) Flooding nozzle

33. If a thresher has a threshing drum with a diameter of 0.6 meters and rotates at 1200 rpm, what is the peripheral speed of the drum?
- (A) 22.6 m/s
(B) 37.7 m/s
(C) 45.2 m/s
(D) 75.4 m/s
34. Find out the depth at which 1 ha of rice field can be irrigated with a flow of 7.51/s in 8 hours.
- (A) 0.0216 cm
(B) 2.16 cm
(C) 21.6 cm
(D) 4.32 cm
35. Which factor primarily influences the power output of a wind turbine?
- (A) Humidity levels
(B) Air temperature
(C) Wind speed
(D) The height of the wind turbine
36. If the moisture content of wheat is reduced from 20% to 12% on a wet basis, how much water is removed from 100 kg of wheat?
- (A) 8.0 kg
(B) 9.1 kg
(C) 10.5 kg
(D) 12.0 kg
37. The primary advantage of using a tray dryer for fruits is
- (A) Fast drying time
(B) High energy efficiency
(C) Better retention of colour and nutrients
(D) Low cost
38. Calculate the equilibrium moisture content (EMC) if the initial moisture content is 20% and the final moisture content after drying is 15%.
- (A) 5%
(B) 10%
(C) 12.5%
(D) 15%
39. If a sprinkler system delivers 5 litres of water per minute and operates for 8 hours, how much water is applied in cubic meters?
- (A) 1.2 m³
(B) 1.8 m³
(C) 2.4 m³
(D) 3.0 m³
40. Why is a chisel plough preferred over a moldboard plough in heavy clay soils?
- (A) It reduces soil compaction by loosening the soil without inversion
(B) It requires less power to operate
(C) It is more effective in cutting through crop residues
(D) It increases soil moisture retention

41. Which of the following is the least efficient method for reducing soil compaction in a tillage system?
- (A) Using wider tyres with lower pressure
 - (B) Using a subsoiler
 - (C) Adding ballast to the tractor
 - (D) Reducing the number of passes over the field
42. If a planter with a row spacing of 50 cm is set to plant 70,000 seeds per hectare, how many seeds are planted per meter of a row?
- (A) 3.5 seeds
 - (B) 5.0 seeds
 - (C) 7.0 seeds
 - (D) 9.0 seeds
43. The most significant factor affecting the shelf life of stored grains is
- (A) Temperature
 - (B) Humidity
 - (C) Grain moisture content
 - (D) Storage time
44. The main disadvantage of using a tray dryer for grain drying is
- (A) High energy consumption
 - (B) Limited capacity
 - (C) Inconsistent drying
 - (D) High maintenance costs
45. The primary purpose of parboiling rice is to
- (A) Increase the grain's nutritional value
 - (B) Improve the grain's taste
 - (C) Increase the grain's size
 - (D) Harden the grain for easier milling
46. The Father of food preservation is
- (A) Lavoisier
 - (B) Nicholas Appert
 - (C) Needham
 - (D) Louis Pasteur
47. At high-temperature T Kelvin, the rate at which a body radiates heat is proportional to
- (A) T
 - (B) T^2
 - (C) T^3
 - (D) T^4
48. A vapour containing liquid particles to the extent of 50% by the volume is known as
- (A) Saturated liquid
 - (B) Supersaturated liquid
 - (C) Wet vapour
 - (D) Saturated vapour

49. The mass of water vapour per kg of the pressure of saturated vapour in the air is known as
- (A) Specific humidity
 - (B) Relative humidity
 - (C) Molar humidity
 - (D) Humidity ratio
50. What type of wouldboard is short but broader with a relatively abrupt curvature?
- (A) Bod or breaker
 - (B) Slat
 - (C) Stubble
 - (D) General purpose
51. Which irrigation method is most suitable for crops that require precise water delivery and minimal evaporation losses?
- (A) Flood irrigation
 - (B) Sprinkler irrigation
 - (C) Drip irrigation
 - (D) Furrow irrigation
52. The ambient temperature, as recorded by an ordinary thermometer, is called.
- (A) Dry bulb temperature
 - (B) Dew point temperature
 - (C) Wet bulb temperature
 - (D) Saturation temperature
53. Carbon dioxide enrichment in greenhouses primarily enhances.
- (A) Temperature control
 - (B) Humidity regulation
 - (C) Plant growth
 - (D) Soil fertility
54. The ratio of the specific humidity of moist air to the specific humidity of the saturated air at the same temperature is known as
- (A) Absolute humidity
 - (B) Degree of saturation
 - (C) Relative humidity
 - (D) None of these
55. Which one is the most abundant greenhouse gas in the Earth's atmosphere?
- (A) Nitrous oxide
 - (B) Carbon dioxide
 - (C) Water vapour
 - (D) Methane
56. The process of heating and immediately cooling the milk to control bacterial growth is known as
- (A) Blending
 - (B) Regeneration
 - (C) Pasteurization
 - (D) Evaporation

57. Pulses are a major source of
- (A) Protein
 - (B) Carbohydrates
 - (C) Fat
 - (D) Vitamins
58. The instrument used for recording the humidity of air is
- (A) Hygrometer
 - (B) Thermometer
 - (C) Anemometer
 - (D) Lux meter
59. The spoilage of food is due to
- (A) Micro-organisms
 - (B) Desiccation
 - (C) Enzymes
 - (D) All are correct
60. A pyrometer is used to measure
- (A) Temperature
 - (B) Pressure
 - (C) Humidity
 - (D) Displacement
61. The SI unit of thermal diffusivity is
- (A) m^2/s
 - (B) m/s
 - (C) J/s
 - (D) W
62. The product of the Reynold number and Prandtl number is known as
- (A) Stanton number
 - (B) Peclet number
 - (C) Mach number
 - (D) Biot number
63. Which of the following is a rapid pre-cooling method commonly used for fresh produce?
- (A) Forced air cooling
 - (B) Hydro cooling
 - (C) Vacuum cooling
 - (D) Evaporative cooling
64. When dealing with the efficiency of screens in grain processing, which factor is least likely to influence the efficiency directly?
- (A) Aperture size of the screen
 - (B) Shape of the grains
 - (C) Grain moisture content
 - (D) Length of the screen

65. Which drying method would be most appropriate for preserving the quality of heat-sensitive grains?
- (A) Sun Drying
 - (B) Fluidized Bed Drying
 - (C) Vacuum Drying
 - (D) Hot Air Drying
66. Which of the following size reduction equipment is commonly used for primary size reduction of large lumps of solid materials?
- (A) Hammer Mill
 - (B) Attrition Mill
 - (C) Ball Mill
 - (D) Jaw Crusher
67. Which type of separator would be most effective for removing ferrous contaminants from a batch of grains?
- (A) Specific Gravity Separator
 - (B) Magnetic Separator
 - (C) Spiral Separator
 - (D) Cyclone Separator
68. The humidity ratio is also known as
- (A) Specific humidity
 - (B) Relative humidity
 - (C) Percentage humidity
 - (D) Absolute humidity
69. The light materials such as chaff straw, and small seeds are separated from wheat grain by ascending air current because of their differences in
- (A) Mass of the grains
 - (B) Bulk volume
 - (C) Terminal velocity
 - (D) Size of the grains
70. Cyclone separator design is based on
- (A) High tangential velocity, low radial velocity
 - (B) Low tangential velocity, high radial velocity
 - (C) Both tangential and radial velocities are high
 - (D) Both tangential and radial velocities are low
71. The degree of grinding is defined as
- (A) The ratio of the surface area of feed to the surface area of the ground product
 - (B) The ratio of the surface area of the ground product to the surface area of the feed
 - (C) The ratio of bran removed in polishing of rice and the wholeness of kernel
 - (D) The ratio of hulled grain obtained to the total amount of feed grain

72. What is the primary mechanism for reducing the size of food grains in an attrition mill?
- (A) Cutting action between sharp blades
(B) Impact force from high-speed hammers
(C) Rubbing action between rotating grooved surfaces
(D) Compression between heavy rollers
73. A burr mill works on the principle of
- (A) Centrifugal
(B) Impact
(C) Abrasive
(D) Gravitational
74. In a ball mill, the speed of the mill should be _____ than critical speed.
- (A) Less than
(B) More than
(C) Equal to
(D) None of these
75. The centre of resistance lies at a distance equal to _____ from the share wing.
- (A) $\frac{3}{4}$ th size of tractor
(B) $\frac{3}{4}$ th size of the plow
(C) $\frac{3}{4}$ th size of share
(D) $\frac{3}{4}$ th size of frog
76. A pyr heliometer is an instrument that measures
- (A) Beam radiation
(B) Global radiation
(C) Total radiation
(D) Diffused radiation
77. Which milling process is most likely to require the use of a velvet roll separator for effective cleaning and sorting?
- (A) Rice Milling
(B) Wheat Milling
(C) Pulse Milling
(D) Oilseed Milling
78. Which of the following equipment is primarily used for plant protection?
- (A) Reapers
(B) Sprayers
(C) Binders
(D) Mowers
79. Which of the following is a vector quantity?
- (A) Mass
(B) Energy
(C) Momentum
(D) Angle

80. How does a Tipping Bucket Rain Gauge measure rainfall?
- (A) Weighing the collected water
 - (B) Counting bucket tips
 - (C) Detecting raindrops optically
 - (D) Using a siphon mechanism
81. Which of the following is a major environmental concern associated with large-scale wind farms?
- (A) Greenhouse gas emissions
 - (B) Impact on local wildlife, particularly birds and bats
 - (C) Depletion of natural resources
 - (D) Generation of thermal pollution
82. Anaerobic digestion in biogas production primarily involves the decomposition of organic material in the absence of
- (A) Nitrogen
 - (B) Carbon dioxide
 - (C) Oxygen
 - (D) Hydrogen
83. Which of the following solar energy conversion methods involves both direct and diffuse solar radiation to generate thermal energy?
- (A) Flat plate collectors
 - (B) Photovoltaic systems
 - (C) Concentrating solar power systems
 - (D) Solar ponds
84. In a trickle irrigation system, what is the primary reason for placing emitters close to the plant roots?
- (A) To prevent soil erosion
 - (B) To avoid clogging emitters
 - (C) To distribute water evenly across the entire field
 - (D) To reduce water evaporation
85. Which renewable energy source is most likely to be classified as a "baseload" energy source, capable of providing continuous power?
- (A) Solar energy
 - (B) Wind energy
 - (C) Tidal energy
 - (D) Geothermal energy
86. If the length, breadth, and thickness of a rice grain are 7 mm, 3 mm, and 2 mm respectively, the sphericity of the grain is
- (A) 0.286
 - (B) 0.365
 - (C) 0.495
 - (D) 0.612

87. The bacterial population in milk increases 200 times in 18 hours of storage at 20°C . The increase in population in 3 hours of storage at the same temperature is
- (A) 1.34 times
(B) 2.42 times
(C) 7.02 times
(D) 14.14 times
88. What power is necessary for pulling a harrow 50 times, each giving a resistance of 1.0 kg when the speed of the harrow is 5 km/h?
- (A) 0.069 kW
(B) 0.69 kW
(C) 6.9 kW
(D) None of these
89. Capillary water is held in the soil due to
- (A) Absorption force
(B) Osmotic force
(C) Gravitational force
(D) Surface tension force
90. A soil 0.8 meters deep has a volumetric water content of 0.12. What is the quantity of water (in meters of water) needed to bring the volumetric water content to 0.30?
- (A) 0.064 meters
(B) 0.144 meters
(C) 0.216 meters
(D) 0.240 meters
91. Operator 'X' states that a plough is used to break up and turn over the soil. Operator 'Y' claims that a harrow is used to break up large clods and bury crop residues. The correct statement is made by
- (A) X only
(B) Y only
(C) Neither X nor Y
(D) Both X and Y
92. In drip irrigation systems, which problem is most likely to arise due to inadequate filter maintenance?
- (A) Increased water pressure
(B) Clogging of emitters
(C) Uneven wetting patterns
(D) Excessive chemical buildup

93. Paddy with a moisture content of 22% is dried to 14% (Wb) for milling. How much moisture is removed during the drying process?
- (A) 34.28 kg
(B) 78.21 kg
(C) 46.51 kg
(D) 69.27 kg
94. How much dry sugar must be added to 100 kg of sugar solution to increase its concentration from 20% to 50%?
- (A) 40 kg
(B) 50 kg
(C) 60 kg
(D) 70 kg
95. The most important form of soil water for plant growth is
- (A) Groundwater
(B) Held water
(C) Hygroscopic water
(D) Capillary water
96. Which type of pump is best suited for applications where the pump must be placed underwater and is used to lift water from deep wells?
- (A) Submersible pump
(B) Horizontal centrifugal pump
(C) Axial flow pump
(D) Reciprocating pump
97. Which component in a sprinkler irrigation system is primarily responsible for controlling the water pressure within the system?
- (A) Main pipeline
(B) Sprinkler head
(C) Pressure regulator
(D) Sub-main pipeline
98. Which material handling equipment is most effective for vertically lifting grains with minimal breakage?
- (A) Screw Conveyor
(B) Belt Conveyor
(C) Bucket Elevator
(D) Pneumatic Conveyor
99. Which irrigation system is particularly beneficial for crops grown under greenhouse conditions?
- (A) Flood irrigation
(B) Furrow irrigation
(C) Sprinkler irrigation
(D) Drip irrigation
100. Which of the following is a common method of greenhouse cooling?
- (A) Solar heating
(B) Pad and fan cooling
(C) Radiant cooling
(D) Windmill cooling

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