



**EN32201 Applied Agricultural Engineering and Environmental Technology
(Compulsory)**

Paper info.	Theory MCQ Total number of Questions: 25 Number of Pages: ④	INSTRUCTIONS Answer all questions. Only non-programmable calculators are permitted. Mobile phones are NOT permitted.
Duration	30 Minutes	
Index No.		Date: July 10, 2026

- Which of the following statements regarding the infrared moisture meter used in the Department of Agricultural Engineering laboratory are correct?
 - The instrument determines moisture content by drying the sample using infrared radiation emitted from an infrared lamp.
 - The moisture content is displayed as a percentage on a wet basis.
 - The instrument requires a conversion table or calibration curve to determine the moisture content.
 - Only A and C are correct.
 - Only B and C are correct.
 - Only A and B are correct.
 - All statements are correct.
 - None of the above statements are correct.
- The results of a soil moisture determination test are as follows. Mass of empty moisture can = 33.76g, Mass of moisture can + wet soil = 70.25 g, Mass of moisture can + dry soil = 64.25 g, If bulk density of soil is 1.55 g/cm³, determine the gravimetric and volumetric soil moisture contents, respectively.
 - 23.24 and 19.68 %, respectively
 - 28.24 and 30.50 %, respectively
 - 19.68 and 30.50 %, respectively
 - 25.24 and 30.50 %, respectively
 - 30.50 and 19.68 %, respectively
- The soil moisture sensor used in the practical estimates soil moisture by measuring changes in:
 - Soil bulk density
 - Soil electrical properties
 - Soil particle density
 - Soil organic matter content
 - Soil temperature only
- Match the joining method with its correct characteristic:

1. Gas Welding	a. Uses an electric arc, can reach ~5500 °C
2. Arc Welding	b. Uses filler metal below 400 °C, base metals are not melted
3. Soldering	c. Uses the combustion of a fuel gas (e.g., oxy-acetylene), temperature ~3100 °C

 - 1-a, 2-b, 3-c
 - 1-b, 2-a, 3-c
 - 1-c, 2-a, 3-b
 - 1-a, 2-c, 3-b
 - 1-c, 2-b, 3-a
- A technician needs to check the gap between two machine components during machine assembly. Which tool is most suitable for this purpose?
 - Screw pitch gauge
 - Vernier caliper
 - Feeler gauge
 - Try square
 - Steel ruler

6. Which of the following statements regarding workshop tools is/are correct?
 - A. A feeler gauge is used to measure the diameter of a hole.
 - B. A torque wrench is used to tighten fasteners to a specified torque.
 - C. A bench vice is used to securely hold a workpiece during machining or repair.
 - a) A and B only
 - b) B and C only
 - c) A and C only
 - d) A, B and C
 - e) C only

7. The primary purpose of adding support structures during 3D printing is to:
 - a) Reduce deformation of the printed component during printing.
 - b) Improve dimensional accuracy of the printed component.
 - c) Prevent sagging of overhanging features during printing.
 - d) Enhance the surface appearance of the printed component.
 - e) Minimize material wastage during the printing process.

8. Which of the following factors primarily determines the appropriate cutting speed during a turning operation on a lathe machine?
 - a) Feed rate and depth of cut
 - b) Material of the workpiece and cutting tool
 - c) Diameter of the workpiece and spindle speed setting
 - d) Length of the carriage travel and tailstock position
 - e) Type of coolant used during machining

9. Which of the following statements regarding plant protection equipment are correct?
 - A. In a compression sprayer, the lower end of the pressure vessel functions as the piston.
 - B. In a lever-operated knapsack sprayer (piston pump), the upward stroke draws the spray liquid into the cylinder through the inlet ball valve.
 - C. In a lever-operated knapsack sprayer, the entire tank acts as the pressure vessel, whereas a compression sprayer has a separate pressure vessel.
 - a) Only A
 - b) Only B
 - c) Only C
 - d) Only A and B
 - e) Only B and C

10. Which of the following statements regarding field capacity is/are correct?
 - A. Field capacity is reached after excess gravitational water has drained from a saturated soil.
 - B. Sandy soil generally reaches field capacity earlier than clay soils.
 - C. Field capacity represents the lower limit of available soil moisture.
 - a) A and B only
 - b) B and C only
 - c) A and C only
 - d) A, B and C
 - e) C only

11. Select the correct statement.
 - a) Low pressure results in smaller drops sprinkled away from the sprinkler.
 - b) High pressure results in larger drops sprinkled away from the sprinkler.
 - c) Low pressure results in larger drops sprinkled very near to the sprinkler.
 - d) High pressure results in smaller drops sprinkled away from the sprinkler.
 - e) High pressure results in smaller drops sprinkled very near to the sprinkler.

12. Which property of nanomaterials is primarily responsible for their unique behavior compared to bulk materials?
- High density with closely packed atomic structures
 - Low electrical conductivity under standard conditions
 - High melting point due to atomic bonding forces
 - Low strength-to-weight ratio in structural applications
 - High surface area-to-volume ratio at the nanoscale.
13. Which of the following best describes the effect of moisture content on dry density during the Standard Proctor Compaction Test?
- Dry density decreases continuously with increasing moisture content.
 - Dry density increases continuously with increasing moisture content.
 - Dry density increases to a maximum value and then decreases.
 - Dry density remains constant with increasing moisture content.
 - Dry density changes independently of moisture content.
14. Which of the following statements regarding food drying is/are correct?
- A. Drying preserves food by reducing its moisture content.
B. A drying curve shows the relationship between moisture content and drying time.
C. Drying curves are useful for optimizing drying processes.
- A and B only
 - B and C only
 - A and C only
 - A, B and C
 - None of the above
15. The drying rate of an agricultural product is usually highest during the:
- Final stage of the drying process.
 - Middle stage of drying.
 - Initial stage of drying.
 - Cooling stage after drying.
 - Storage period after drying.
16. In a double-ring infiltrometer test, why is the water level in the outer ring maintained at the same level or a slightly higher level than in the inner ring?
- To establish uniform soil moisture conditions before infiltration measurement
 - To increase hydraulic pressure and enhance the infiltration rate uniformly
 - To determine evaporation losses from the soil surface during testing
 - To minimize lateral water movement and ensure vertical infiltration flow
 - To reduce soil surface compaction and improve measurement consistency
17. Which of the following statements regarding the Mean Weight Diameter (MWD) is correct?
- A lower MWD indicates more stable soil aggregates.
 - A higher MWD indicates more stable soil aggregates.
 - MWD is used to determine soil pH.
 - MWD depends only on soil moisture content.
 - MWD is calculated using only the largest aggregate fraction.
18. A soil sample had a wet weight of 600 g and a dry weight of 540 g. If the wet weight retained on the sieve was 80 g, calculate the oven-dry weight retained on the sieve.
- 68 g
 - 70 g
 - 72 g
 - 75 g
 - 80 g

19. The Normalized Difference Vegetation Index (NDVI) is calculated using the reflectance values of which two spectral bands?
- Blue and Green
 - Green and Red
 - Blue and Near Infrared (NIR)
 - Red and Near Infrared (NIR)
 - Green and Shortwave Infrared (SWIR)
20. Which of the following is the primary function of the D-RTK 2 Mobile Station in the drone system?
- To increase the drone flight speed.
 - To improve the positional accuracy of UAV data.
 - To extend the drone battery life.
 - To capture multispectral images.
 - To control the drone camera angle.
21. Select the correct answer based on the following statements regarding the Atterberg limits.
- The liquid limit and plastic limit are two of the Atterberg limits used to classify fine-grained soils.
 - The Atterberg limits are determined in the laboratory to evaluate the consistency and plasticity characteristics of fine-grained soils.
 - The Atterberg limits depend on the type and amount of clay minerals present in the soil.
- Statements A and B are correct.
 - Only statement C is correct.
 - Only statement B is correct.
 - Statements A and C are correct.
 - All statements are correct.
22. During an infiltration test, the water level in the inner ring decreased from 120 mm to 95 mm in 10 minutes. The infiltration rate is:
- 60 mm h⁻¹
 - 120 mm h⁻¹
 - 150 mm h⁻¹
 - 180 mm h⁻¹
 - 240 mm h⁻¹
23. The volute casing in a centrifugal pump is designed to:
- House the motor bearings
 - Convert velocity energy to pressure energy
 - Preventing air from entering the system
 - Filter impurities from the fluid
 - Control the pump's rotational speed
24. In a typical drip irrigation system layout, what is the correct hierarchical order of the distribution network from largest to smallest diameter?
- Lateral → Sub-main → Main line → Emitter
 - Main line → Lateral → Sub-main → Emitter
 - Main line → Sub-main → Lateral → Emitter
 - Sub-main → Main line → Lateral → Emitter
 - Emitter → Lateral → Main line → Sub-main
25. Which of the following pumping units is commonly used to increase the discharge at approximately the same head?
- Normal pumping unit
 - Deep well pumping unit
 - Series connected pumping unit
 - Parallel connected pumping unit
 - Submersible pumping unit