

ICAR AIEEA PG 2025 Agricultural Engineering and Technology

Question Paper With Solutions

Time Allowed :120 Minutes

Maximum Marks :480

Total questions :120

General Instructions

Read the following general instructions carefully and adhere to them strictly:

1. **Duration of the Exam:** The total duration of the examination is 2 hours and 30 minutes.
2. **Total Marks:** The question paper carries a total of 480 marks.
3. **Number of Questions:** The paper contains 120 multiple-choice questions (MCQs)
4. **Question Paper Format:**
 - All questions are compulsory unless otherwise instructed.
 - Each question has four options, out of which only one is correct.
5. **Mode of Examination:** The examination is conducted in online mode (Computer-Based Test).
6. **Marking Scheme:**
 - Each correct answer carries 4 marks.
 - 1 mark will be deducted for each incorrect answer.
 - No marks will be awarded or deducted for unattempted questions.
7. **Medium of Paper:** The question paper will be bilingual (English and Hindi), except for the language section (if applicable).
8. **Electronic Devices:** Use of calculators, mobile phones, smartwatches or any electronic gadgets is strictly prohibited.

1. Which of the following is a primary function of a moldboard plow in soil tillage?

- (A) Breaking soil compaction layers
- (B) Cutting and inverting the soil slice
- (C) Pulverizing soil clods
- (D) Leveling the soil surface

Correct Answer: (B) Cutting and inverting the soil slice

Solution:

The moldboard plow is designed to cut through the soil and invert it, burying weeds and crop residues. This action helps in aerating the soil and preparing a clean seedbed. The curved moldboard lifts and turns the soil slice, effectively inverting it.

Quick Tip

Moldboard plows are primarily used for turning over the upper layer of the soil, bringing fresh nutrients to the surface.

2. In drip irrigation systems, the emission uniformity is most affected by:

- (A) Pump pressure fluctuations
- (B) Soil texture variations
- (C) Crop root depth
- (D) Ambient temperature

Correct Answer: (A) Pump pressure fluctuations

Solution:

Emission uniformity in drip irrigation refers to the evenness of water distribution to plants. Fluctuations in pump pressure can lead to inconsistent emitter discharge rates, affecting uniformity. Maintaining consistent pressure ensures each plant receives the intended amount of water.

Quick Tip

Consistent pump pressure is crucial for uniform water distribution in drip systems.

3. The specific speed of a pump is defined as the speed at which a geometrically similar pump would operate to deliver:

- (A) Unit discharge at unit head
- (B) Maximum efficiency
- (C) Zero discharge at maximum head
- (D) Infinite discharge at zero head

Correct Answer: (A) Unit discharge at unit head

Solution:

Specific speed (N_s) is a dimensionless parameter that helps in the selection and comparison of pumps. It is defined as the speed at which a geometrically similar pump would operate to deliver a unit discharge (1 m³/s) against a unit head (1 m). It is given by:

$$N_s = N \sqrt{Q} / H^{3/4}$$

where N is the rotational speed, Q is the discharge, and H is the head.

Quick Tip

Specific speed aids in classifying pumps and predicting their performance.

4. In food processing, the primary purpose of blanching vegetables before freezing is to:

- (A) Enhance flavor
- (B) Reduce microbial load
- (C) Inactivate enzymes
- (D) Increase moisture content

Correct Answer: (C) Inactivate enzymes

Solution:

Blanching involves briefly boiling or steaming vegetables to inactivate enzymes that can cause spoilage during storage. This process helps in preserving color, texture, and nutritional value during freezing and storage.

Quick Tip

Blanching is essential to halt enzymatic actions that degrade quality during storage.

5. The thermal conductivity of dry soil is primarily influenced by:

- (A) Soil color
- (B) Organic matter content
- (C) Soil texture
- (D) Soil moisture content

Correct Answer: (D) Soil moisture content

Solution:

Thermal conductivity of soil increases with moisture content because water has higher thermal conductivity than air. Moist soils conduct heat more effectively than dry soils, impacting temperature regulation in the root zone.

Quick Tip

Moisture enhances soil's ability to conduct heat due to water's higher thermal conductivity.

6. In renewable energy systems, the primary function of an inverter is to:

- (A) Store electrical energy
- (B) Convert DC to AC
- (C) Increase voltage levels
- (D) Regulate current flow

Correct Answer: (B) Convert DC to AC

Solution:

Inverters are electronic devices that convert direct current (DC) from sources like solar panels or batteries into alternating current (AC), which is the standard form of electricity for household and industrial use.

Quick Tip

Inverters are key components in solar power systems, enabling compatibility with AC appliances.

7. The main advantage of using a chisel plow over a moldboard plow is:

- (A) Complete soil inversion
- (B) Reduced soil erosion
- (C) Enhanced weed control
- (D) Increased fuel consumption

Correct Answer: (B) Reduced soil erosion

Solution:

Chisel plows loosen the soil without turning it over completely, preserving crop residues on the surface. This practice reduces soil erosion and maintains soil structure, making it suitable for conservation tillage systems.

Quick Tip

Chisel plowing is a conservation tillage method that minimizes erosion by leaving residues on the surface.

8. In post-harvest technology, the primary purpose of controlled atmosphere storage is to:

- (A) Increase humidity levels
- (B) Enhance color development
- (C) Slow down respiration rate

(D) Promote ripening

Correct Answer: (C) Slow down respiration rate

Solution:

Controlled atmosphere storage involves adjusting oxygen, carbon dioxide, and nitrogen levels to slow down the respiration rate of stored produce. This technique extends shelf life and maintains quality by delaying ripening and senescence.

Quick Tip

Controlled atmosphere storage prolongs freshness by reducing metabolic activity in produce.

9. The primary function of a surge tank in an irrigation pipeline system is to:

- (A) Store excess irrigation water
- (B) Remove air from the pipeline
- (C) Absorb pressure fluctuations
- (D) Increase water velocity

Correct Answer: (C) Absorb pressure fluctuations

Solution:

A surge tank acts as a buffer to absorb sudden pressure changes (water hammer) in pipeline systems. It helps in maintaining steady pressure, protecting the pipeline from potential damage due to rapid changes in flow velocity.

Quick Tip

Surge tanks safeguard irrigation pipelines by mitigating pressure surges.