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**Reg. No. :**

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**Question Paper Code: R3A06**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Third Semester

Agricultural Engineering

R21UAG306 – FARM MACHINERY AND EQUIPMENT

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Area covered per day of 8 hours by 4 bottoms, 35 cm MB plough if the speed of ploughing is 6km/hr is \_\_\_\_\_ CO2- App  
(a) 672 m<sup>3</sup>                      (b) 6.72 ha                      (c) 67.2 m<sup>3</sup>                      (d) 67.2 ha
2. What would be the depreciation cost of a tractor purchased by the farmer having 25 KW power at a total cost of Rs 300000/-? CO2-App  
(a) Rs 25                      (b) Rs 24                      (c) Rs 27                      (d) Rs 29
3. Which seed metering device mechanism in a planter brushes out excess seeds from the cells of the feed mechanism? CO1- U  
(a) Edge drop                      (b) Cut off                      (c) Knock out                      (d) Flat drop
4. The accuracy of the planter does not depend on \_\_\_\_\_ CO1- U  
(a) Speed of seed plate                      (b) Shape of hopper bottom  
(c) Uniformity of seed size                      (d) Weather
5. Hand atomizer is used for spraying in \_\_\_\_\_ CO1- U  
(a) orchard                      (b) field crop                      (c) nursery                      (d) forests
6. Which sprayers are operated usually with Internal Combustion engines? CO1- U  
(a) Power sprayer                      (b) Hydraulic sprayer  
(c) Commercial sprayer                      (d) Foot sprayer

7. In flail type mower, cutting section has CO1- U
- (a) Fixed knives (b) Swinging knives  
(c) Reciprocating knives (d) Rotating knives
8. How many hectares of grass per day of 15 hours can be cut by a mower being CO3-App  
operated at the speed of 4.5 km/h and with 4 m cutter bar.
- (a) 20 (b) 22 (c) 27 (d) 16
9. The upper limit of heart rate allowed during an activity of field by a CO1- U  
farmer should not be more than
- (a)  $HR_{max} = 220 - \text{age}$  (b)  $HR_{max} = 250 - \text{age}$   
(c)  $HR_{max} = 230 - \text{age}$  (d)  $HR_{max} = 200 - \text{age}$
10. What is the principal aim of tractor testing? CO1- U
- (a) To make available the data on power output and performance of the tractor  
(b) To sell the tractor  
(c) To move the tractor  
(d) To open the tractor

PART – B (5 x 2= 10 Marks)

11. Distinguish between disc angle and tilt angle with neat sketch CO1 U
12. Calculate the seed rate/hectare of a 7\*17 cm seed drill, whose main drive CO2-App  
wheel is 124 cm diameter and total weight of grain collected in 20  
revolutions in 0.423 kg.
13. What are the functions of sprayers? CO1 U
14. Name the crops that can be threshed using multicrop thresher. CO1 U
15. List out the factors to be considered for the selection of tractor. CO1 U

PART – C (5 x 16= 80Marks)

16. (a) A farmer purchased a tractor of 25kW power at a total cost of Rs. CO2-App (16)  
3,00,000/- and a three-bottom plough of 30 cm bottom width at  
Rs. 12000/- only. The fuel consumption of the tractor was 6  
liters/hr. at the ploughing speed of 5 km/hr. i) calculate the area  
ploughed per hour ii) determine the cost of ploughing per hectare.  
Make necessary assumptions if any.

Or

- (b) A farmer wants to prepare land for wheat. Apply the design of a mould board plough to identify, label, and explain its parts with a neat sketch. CO2-App (16)
17. (a) A farmer in sandy soil faces problems of seed placement, while another farmer in clayey soil struggles with penetration and clogging. Apply the types of furrow openers and justify their selection for different soil conditions with suitable reasons. CO2-App (16)
- Or
- (b) A farmer reports poor germination in paddy fields due to uneven seed placement, while another growing maize faces low yield because of irregular spacing. Apply the key factors that influence effective sowing and justify the selection of suitable sowing methods for different crops and field conditions. CO2-App (16)
18. (a) During pest attack in cotton, a farmer uses a knapsack motorized mist blower-cum-duster and a power sprayer for different operations. Apply their construction and working principles with neat sketches, and explain how each tool can be effectively used for pest control and fertilization in different parts of the farm. CO3-App (16)
- Or
- (b) A farmer uses a hydraulic sprayer for large-scale pesticide application. Apply the design and operating mechanism of a hydraulic sprayer with a neat sketch, and explain its effective application in crop protection practices. CO3-App (16)
19. (a) A farmer wants to harvest fodder crops efficiently. Apply the purpose of a mower and discuss the classification of mowers based on crop requirements and field conditions. CO4-App (16)
- Or
- (b) A farmer operating in sandy and clay soils uses a groundnut digger. Apply the working of a groundnut digger with a neat sketch, and suggest suitable design modifications or operational adjustments to improve efficiency under varying soil conditions. CO4-App (16)

20. (a) Analyze the different categories of tractor tests conducted under OECD standards and evaluate how each test contributes to the assessment of tractor performance and safety compliance. CO5-Ana (16)

Or

(b) Analyze the procedure and standard codes used for testing tractor performance, and illustrate how these are implemented in real testing conditions. CO5-Ana (16)