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**Question Paper Code: U5A02**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Fifth Semester

Agricultural Engineering

21UAG502-FARM MACHINERY AND EQUIPMENT

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. The methods of ploughing on which the plough works round the strip of ploughed land is \_\_\_\_\_ CO1-U  
(a) Gathering (b) Headland (c) Casting (d) None of these
2. The weight of the disc harrow ranges from CO1 -U  
(a) 80 to 100 kg (b) 30 to 50 kg (c) 10 to 40 kg (d) 23 to 56 kg
3. In which process of seeding, the seeds are placed in the holes made in seed bed and covering them with soil CO1 -U  
(a) Broadcasting (b) Transplanting (c) Dibbling (d) Drilling
4. The furrow opener has toe and 'T' shaped scrapers is \_\_\_\_\_ CO1 -U  
(a) Reversible shovel (b) Double disc type  
(c) Spear point shovel (d) Single disc type
5. Hand atomizer is used for spraying in \_\_\_\_\_ CO1 -U  
(a) orchard (b) field crop (c) nursery (d) forests
6. Most of the hydraulic sprayers are equipped with \_\_\_\_\_ CO1 -U  
(a) Positive displacement pump (b) Reciprocating pump  
(c) Centrifugal pump (d) Rotary pump
7. In flail type mower, cutting section has CO1 -U  
(a) Fixed knives (b) Swinging knives (c) Reciprocating knives (d) Rotating knives

8. Effective width of the rotary mower cutter is \_\_\_\_\_ CO1 -U  
 (a) 2-3 m (b) 1-2.1 m (c) 3-4 m (d) 1.5-2 m
9. \_\_\_\_\_ are the testing enters that have published standards on CO1 -U  
 machine/components for different agricultural machines.  
 (a) ISO (b) BIS (c) NCAM (d) All the above.
10. Which one of the following company is India's biggest manufacturer CO1 -U  
 and seller of tractor  
 (a) HMT (b) John Deere (c) Mahindra (d) Sonalika

PART – B (5 x 2= 10Marks)

11. Line of pull of a MB is  $15^{\circ}$  with the horizontal and is in a vertical plane which CO2-App  
 is at an angle of  $12^{\circ}$  with the direction of travel. Calculate:  
 a) required pull if draft of plough is 1000 kg and b) side draft (Given  $\cos 15^{\circ}=0.9659$ ,  $\cos 12^{\circ}=0.9780$  and  $\sin 12^{\circ}=0.2079$ )
12. Calculate the seed rate/hectare of a 7 x 17 cm seed drill whose main drive CO2-App  
 wheel is 124 cm diameter and total weight of grain collected in 20 revolutions  
 is 0.423 kg.
13. Calculate the water power which is required to discharge liquid at 30 litres/min CO2-App  
 at 30 kg/cm<sup>2</sup>.
14. Name the crops that can be threshed using multicrop thresher. CO1-U
15. How does ISO contribute to tractor testing? CO1-U

PART – C (5 x 16= 80Marks)

16. (a) Your field needs smoothening and pulverizing the soil the field is CO2-App (16)  
 in two different soil conditions one of our field consists of sandy  
 loam soil and other one is of hard and stony ground in your point  
 of view which harrowing equipment would be best suited for the  
 operation.

Or

- (b) The initial cost of 35 hp Massy Ferguson Tractor owned by a CO2-App (16)  
 farmer is Rs. 4,00,000/-. The tractor is expected to work for 10  
 years. In a year the farmer uses the tractor for 1000 hours. The  
 farmer also owns a 11 tined cultivator. The tynes are spaced at 20  
 cm apart. The cost of the cultivator is Rs.15,000/-. The tractor  
 consumes 3 liters of diesel while ploughing with the cultivator.  
 The life of the cultivator is 10 years. The farmer uses the  
 cultivator for 400 hours in a year. The cultivator is operated at a  
 speed of 4 km/h. Calculate the cost of ploughing 1 ha of land with  
 the cultivator. Assume all other necessary data.

17. (a) How does the seed dispensing unit work and seed trench openers in a seeding machine, and what factors affect its efficiency in ensuring uniform seed distribution? CO1-U (16)
- Or
- (b) Given a one-hectare field, how would you implement potato and sugarcane planting to maximize efficiency, minimize seed loss, and control costs effectively? CO1-U (16)
18. (a) Given a variety of agricultural scenarios, how would you select and utilize different types of sprayers to effectively manage tasks like pesticide application, fertilization? Include sketches to illustrate the appropriate sprayer type for each scenario. CO2-App (16)
- Or
- (b) Imagine you are a farm manager tasked with optimizing the application of fertilizers and pesticides across different crops. How would you use various types of dusters to ensure efficient and effective coverage in the field? CO2-App (16)
19. (a) If you were managing a large-scale farming operation, how would you strategically select different types of reaper binders based on their make, features, and applications to optimize harvesting efficiency? CO2-App (16)
- Or
- (b) For efficient processing of crop residue on your farm how would you apply your knowledge of chaff cutters to select and use the most suitable model? CO2-App (16)
20. (a) You are asked to design an agricultural machinery, to improve comfort and reduce strain of the operator while operating the equipment by applying the physiological factors. CO2-App (16)
- Or
- (b) How would you apply standard testing codes during this process, and what specific tests would you prioritize? CO2-App (16)

