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**Question Paper Code: R2A06**

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

First Semester

Agricultural Engineering

**R21UAG206 FARM TRACTOR**

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The prime purpose of a tractor is \_\_\_\_\_ CO1- U  
(a) Soil inversion (b) Driving (c) Ploughing (d) Creating higher tractive force
2. Useful life of power tiller is \_\_\_\_\_ CO1- U  
(a) 10 years (b) 15 years (c) 5 years (d) 2 years
3. In tractor engine the complete path of power from the engine to the wheel is called as \_\_\_\_\_ CO1- U  
(a) Power train (b) Power wheel (c) Both 1 and 2 (d) none of these
4. The correct sequence of strokes in four stroke cycle engines? CO1- U  
(a) Compression, Suction, Exhaust, Power (b) Power, Suction, Exhaust, Compression  
(c) Suction, Compression, Power, Exhaust (d) Suction, Power, Compression, Exhaust
5. The angle between the steering axis and the vertical in the plane of the wheel CO1- U  
(a) Castor (b) Camber (c) Steering axis inclination (d) Kingpin inclination
6. The purpose of using differential in tractor is \_\_\_\_\_ CO1- U  
(a) Control speed (b) Help in turning (c) Avoid jerks (d) None of these
7. The type of system uses oil under pressure means of power transmission is \_\_\_\_ CO1- U  
(a) pneumatic system (b) hydraulic system (c) fluid power system (d) stepper motor
8. The force required in the direction of travel to overcome the resistance of motion is \_\_\_\_\_ CO1- U  
(a) Tractive efficiency (b) Rolling resistance (c) Traction (d) none of these

9. \_\_\_\_\_ are the testing enters that have published standards on machine/components for different agricultural machines CO1- U
- (a) ISO (b) BIS (c) NCAM (d) All the above.
10. In power tiller, the tilling attachment receives the power from \_\_\_\_\_ CO1- U
- (a) Main clutch (b) Tilling clutch (c) PTO (d) Transmission gear

PART – B (5 x 2= 10 Marks)

11. Classify the tractor based on the type of drive. CO1- U
12. State the main function of piston rings. CO1- U
13. Outline the pathway of gear transmission in a sliding mesh gearbox. CO1- U
14. List out the components of the hydraulic system. CO1- U
15. How does a bulldozer work? List down its parts. CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) Describe in detail about power tiller and its components, highlighting their roles and functionality in agricultural operations. CO1- U (16)
- OR
- (b) Briefly explain about Tractor, Development of tractor and Classification of tractor. CO1- U (16)
17. (a) Two tractors are operating continuously in the field under high-temperature conditions—one uses an air cooling system while the other uses a liquid cooling system. Apply your knowledge of tractor engine cooling mechanisms to compare and contrast the working, efficiency, and maintenance aspects of both systems. Based on your analysis, suggest which system would be more suitable for long-duration agricultural operations and justify your recommendation. CO4-App (16)
- OR
- (b) During maintenance of two different tractor engines, you observe that one uses a wet sump lubrication system while another employs a dry sump system. Apply your understanding of lubrication principles to explain how each system operates, illustrating the working with neat sketches. Compare their suitability for different operating conditions and recommend which lubrication system would be more effective for heavy-duty agricultural tractors, justifying your answer. CO4-App (16)

18. (a) You are tasked with selecting a suitable transmission system for a light-duty agricultural tractor. Apply your understanding of the advantages and limitations of the sliding mesh gearbox to evaluate its performance in terms of gear shifting efficiency, power transmission, and durability. Compare it with constant mesh and synchromesh gearboxes, and recommend the most appropriate type for the given application, justifying your choice with technical reasons. CO3-App (16)

OR

- (b) You are designing a transmission system for a medium-duty tractor intended for both field and road operations. Apply your knowledge of gearbox mechanisms to analyze the advantages and limitations of a constant mesh gearbox in terms of gear shifting efficiency, power transmission, and durability. Compare its performance with sliding mesh and synchromesh gearboxes, and recommend the most appropriate gearbox type for the given application with suitable justification. CO3-App (16)

19. (a) Discuss the function of the three-point linkage in tractors, and how these features impact the tractor's performance. CO1- U (16)

OR

- (b) Explain the advantages of the three-point linkage system over the one-point and two-point hinge support systems in agricultural machinery. CO1- U (16)

20. (a) Describe the test procedures used for testing tractors, focusing on key aspects such as performance, efficiency, and safety. CO1- U (16)

OR

- (b) Explain how tractor field efficiency can be optimized to save energy and fuel during agricultural operations. CO1- U (16)

