Total No. of Questions: 21

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

AU3EL13 Tractor & Farm Equipment`s

Programme	:	B.Tech.	**Branch/Specialisation**	:	AU
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

		Marks	CO	BL
Q1.	What is the primary purpose of an aftercooler in earth-moving equipment? ○ To cool the exhaust gases ○ To increase engine torque ◉ To cool compressed air before it enters the engine ○ To regulate fuel injection	1	1	2
Q2.	Which type of transmission is most commonly used for automatic shifting in heavy machinery? ○ Manual Transmission ◉ Hydro shift Automatic Transmission ○ Dual-clutch Transmission ○ Continuously Variable Transmission (CVT)	1	1	3
Q3.	Which type of hydraulic pump is commonly used for high-pressure applications? ○ Gear pump ○ Vane pump ◉ Piston pump ○ Screw pump	1	2	1
Q4.	In a hydraulic circuit, which component would be most affected if there is a blockage in the control valve? ○ Pump ○ Relief Valve ◉ Actuator (Cylinder or Motor) ○ Reservoir	1	2	3
Q5.	Which type of gear reduction is commonly used in final drives for heavy machinery? ○ Planetary reduction ○ Helical gear reduction ◉ Bevel gear reduction ○ Spur gear reduction	1	3	1
Q6.	What is the primary purpose of hydraulic suspension in vehicles? ○ To increase tire pressure ◉ To enhance ride comfort by absorbing shocks ○ To reduce fuel consumption ○ To increase braking power	1	3	2
Q7.	Why is it important to consider soil type when selecting earth-moving equipment? ○ To reduce fuel consumption ◉ To ensure equipment efficiency and durability ○ To minimize maintenance costs ○ To increase haul distance	1	4	2
Q8.	Which factor is most critical when selecting equipment for operations involving long haul distances? ○ Engine capacity ◉ Equipment speed and fuel efficiency ○ Operator's skill ○ Tire size	1	4	3
Q9.	Which safety equipment is essential for protecting the operator of a tractor from rollovers? ○ Seatbelt ◉ Rollover Protective Structure (ROPS) ○ Fire extinguisher ○ First aid kit	1	5	1

Q10. Why is it important to regularly check tire pressure in farm equipment? **1 5 2**

- (•) To ensure smoother operation and prevent tire bursts
- ( ) To reduce fuel consumption
- ( ) To improve the aesthetic appearance of the equipment
- ( ) To increase engine life

Section 2 (Answer all question(s))

Marks CO BL

Q11. Explain how a torque converter enhances the performance of earth-moving machinery during operation. **3 1 2**

Rubric	Marks
Explanation in short	3

Q12. (a) Evaluate the importance of turbochargers and aftercoolers in improving the efficiency and performance of an earth-moving equipment engine. **7 1 5**

Rubric	Marks
importance of turbochargers in improving the efficiency and performance of an earth-moving equipment engine	3.5
importance of aftercoolers in improving the efficiency and performance of an earth-moving equipment engine.	3.5

(OR)

(b) Explain the construction and working of hydro shift automatic trans torque converters with sketch.

Rubric	Marks
Construction	2
Working	3
Sketch	2

Section 3 (Answer all question(s))

Marks CO BL

Q13. Explain how a hydraulic control valve operates to direct the flow of fluid within a hydraulic circuit. **4 2 2**

Rubric	Marks
Explanation	4

Q14. (a) Explain open loop and closed loop hydraulic circuit with sketch. **6 2 6**

Rubric	Marks
Open loop hydraulic circuit with sketch.	3
Closed loop hydraulic circuit with sketch	3

(OR)

(b) Evaluate the role of relief valves in ensuring the safety and efficiency of hydraulic systems. What could happen if the relief valve fails?

Rubric	Marks
Evaluate the role of relief valves in ensuring the safety and efficiency of hydraulic systems.	3
What could happen if the relief valve fails?	3

Section 4 (Answer all question(s))

Marks CO BL

Q15. What is the function of the final drive in an automobile? What are the main components of a final drive? **3 3 1**

Rubric	Marks
function of the final drive in an automobile.	2
main components of a final drive.	1

Q16. (a) Evaluate the advantages and disadvantages of planetary reduction systems in final drives compared to other reduction types. **7 3 5**

Rubric	Marks
advantages	3.5
disadvantages	3.5

(OR)

(b) Explain a basic hydraulic brake circuit for a tractor, labeling each component and explaining its function within the system.

Rubric	Marks
Diagram with labeling	2
explaining its function	5

Section 5 (Answer all question(s))

Marks CO BL

Q17. Describe the key factors to consider when matching different types of earth-moving machines for a large-scale construction project. **4 4 3**

Rubric	Marks
Key factors to consider	4

Q18. (a) Evaluate the effectiveness of different types of maintenance schedules (like preventive, predictive and corrective) for managing heavy equipment in harsh environments. **6 4 5**

Rubric	Marks
effectiveness of different types of maintenance schedules	6

(OR)

(b) Explain a basic maintenance schedule for a fleet of earth-moving equipment, considering factors like equipment type, usage hours and environmental conditions.

Rubric	Marks
Explanation	6

Section 6 (Answer any 2 question(s))

Marks CO BL

Q19. Analyze the common causes of accidents involving farm equipment and suggest effective safety precautions to prevent them. **5 5 4**

Rubric	Marks
Common causes of accidents involving farm equipment	2.5
Effective safety precautions to prevent them.	2.5

Q20. Evaluate the importance of personal protective equipment (PPE) like gloves, goggles and hearing protection when operating heavy machinery. **5 5 5**

Rubric	Marks
Importance of personal protective equipment	5

Q21. Design a safety checklist for daily inspection of tractors and farm equipment to ensure safe operation and minimize accident risks. **5 5 6**

Rubric	Marks
Design a safety checklist	5

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