

Enrollment No.....



Faculty of Engineering
End Sem Examination May-2024

AU3CO48 Automotive Chassis & Transmission System
Programme: B.Tech. Branch/Specialisation: AU

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. Which statement best describes the purpose of a clutch release bearing (also known as a throw out bearing)? **1**
- (a) It transfers power from the engine to the transmission.
(b) It helps to engage and disengage the clutch.
(c) It controls the speed of the vehicle.
(d) It regulates the fuel-air mixture in the engine.
- ii. Which type of gearbox is known for providing seamless gear shifts without the need for manual intervention? **1**
- (a) Manual gearbox
(b) Automatic gearbox
(c) Continuously Variable Transmission (CVT)
(d) Dual-clutch gearbox
- iii. In a hydrostatic drive system, which component is responsible for converting hydraulic energy into mechanical energy? **1**
- (a) Hydraulic pump (b) Hydraulic cylinder
(c) Hydraulic accumulator (d) Hydraulic reservoir
- iv. What is a primary advantage of electric drive systems in vehicles compared to traditional internal combustion engines? **1**
- (a) Lower initial cost (b) Higher fuel efficiency
(c) Reduced emissions (d) Longer maintenance intervals
- v. Which property of fluid allows a fluid coupling to smoothly transmit power between the input and output shafts? **1**
- (a) Viscosity (b) Density
(c) Surface tension (d) Conductivity

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| vi. | What is the primary function of a wheel rim on a vehicle? | 1 |
| | (a) To provide structural support to the tire | |
| | (b) To absorb shock from the road surface | |
| | (c) To regulate tire pressure | |
| | (d) To control the vehicle's steering | |
| vii. | Which part of the chassis is responsible for connecting the front and rear axles and supporting the vehicle's body? | 1 |
| | (a) Subframe (b) Suspension system | |
| | (c) Frame rails (d) Crossmembers | |
| viii. | Which component of the steering system is responsible for converting the rotational motion of the steering wheel into lateral movement to turn the wheels? | 1 |
| | (a) Tie rods (b) Steering column | |
| | (c) Steering rack (d) Pitman arm | |
| ix. | Which component of the suspension system is responsible for connecting the wheels to the vehicle's frame and absorbing shocks? | 1 |
| | (a) Control arms (b) Coil springs | |
| | (c) Shock absorbers (d) Sway bars | |
| x. | Which type of brake system relies on a drum and brake shoes to generate friction for stopping the vehicle? | 1 |
| | (a) Disc brakes (b) Anti-lock braking system (ABS) | |
| | (c) Hydraulic brakes (d) Drum brakes | |
| Q.2 | i. Explain the function of a clutch in a manual transmission vehicle. | 2 |
| | ii. Discuss the differences between manual and automatic gearboxes, including their respective advantages and disadvantages in terms of driving experience, fuel efficiency, and maintenance. | 3 |
| | iii. Describe the potential consequences of improper clutch usage, such as "riding the clutch" or "clutch slipping," on the vehicle's performance and longevity. | 5 |
| OR | iv. Explain the working principles of a continuously variable transmission (CVT) and discuss its benefits and drawbacks compared to traditional automatic or manual gearboxes. | 5 |
| Q.3 | i. What is the principle of early Ward Leonard Control system? | 2 |
| | ii. Explain the construction and working of typical Janny hydrostatic | 8 |

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| | | drive with neat sketch. | |
| OR | iii. | Explain the principle, construction and working of fluid coupling with neat sketch. | 8 |
| Q.4 | i. | What is propeller shaft? Give the names of different types of propeller shaft. | 3 |
| | ii. | Explain the principle and working of power glide transmission Toyota "ECT-i" automatic transmission with intelligent electronic controls system with neat sketch. | 7 |
| OR | iii. | Explain working of full - floating, three-quarter floating and semi-floating axles with neat sketch. | 7 |
| Q.5 | i. | Write the any four differences between chassis and frame. | 4 |
| | ii. | What are the key processes involved in testing the structural integrity and performance of frames, particularly in automotive or mechanical engineering applications? | 6 |
| OR | iii. | Explain the operational principles and structural features of various steering gear mechanisms commonly found in automotive systems with neat sketches? | 6 |
| Q.6 | | Attempt any two: | |
| | i. | Discuss the factors that engineers consider when designing a suspension system for a specific type of vehicle, such as a sports car, SUV, or truck, and how these factors influence the suspension's characteristics and performance. | 5 |
| | ii. | Explain the different types of braking systems commonly used in vehicles, such as disc brakes, drum brakes, and regenerative braking. Compare and contrast their working principles, advantages, and limitations. | 5 |
| | iii. | Describe the role of anti-lock braking systems (ABS) in modern vehicles. Explain how ABS works to prevent wheel lock-up during braking and discuss the benefits of ABS in terms of vehicle stability and control in emergency braking situations. | 5 |

Marking Scheme

Automotive Chassis & Transmission System (T) - AU3CO48 (T)

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	ii)	Which type of gearbox is known for providing seamless gear shifts without the need for manual intervention?	1
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	iii)	In a hydrostatic drive system, which component is responsible for converting hydraulic energy into mechanical energy?	1
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	v)	Which property of fluid allows a fluid coupling to smoothly transmit power between the input and output shafts?	1
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	vi)	What is the primary function of a wheel rim on a vehicle?	1
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	vii)	Which part of the chassis is responsible for connecting the front and rear axles and supporting the vehicle's body?	1
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		ii. Explain the Construction and working of typical Janny hydrostatic drive with neat sketch.	3
			3
			2

OR	iii.	Explain the principle, construction and working of fluid coupling with neat sketch.	1 2 3 2
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