Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

ME5CA05 Automotive Chassis & Transmission System

Programme: M.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.

Q.1 i. Angle between the vertical axis of the wheels and the vertical axis of the vehicle when viewed from the front or rear is called: **1**

(a) Caster (b) KPI (c) Toe-in (d) Camber

ii. Which member provides the torsional rigidity: **1**

(a) Side member (b) Vertical member

(c) X-member (d) None of these

iii. Un-sprung weight is- **1**

(a) Weigh of vehicle (b) Weigh of chassis frame

(c) Weight of wheels (d) Weight of wheels and axles

iv. The function of master cylinder in hydraulic brakes is to- **1**

(a) Builds up hydraulic pressure to operate the brakes

(b) Maintains constant volume of fluid in the system

(c) Serves as a pump to force air out of the hydraulic system

(d) All of these

v. Which of this differential transmits constant torque to both the wheels? **1**

(a) Conventional (b) Double reduction type

(c) Power lock (d) None of these

vi. By using synchronizing device, the two involved adjacent gears have their speeds **1**

(a) Increased (b) Reduced (c) Equalized (d) Un equalized

vii. A fluid coupling is used as- **1**

(a) Automatic clutch (b) Automatic gearbox

(c) Suspension (d) None of these

P.T.O.

viii. Torque convertor is used in- **1**
(a) Automatic Transmission (b) Automatic clutch
(c) Power booster (d) Suspension

ix. Advantages of CVT are: **1**
(a) Improves fuel efficiency (b) Eliminates shift shocks
(c) Better acceleration (d) All of these

x. Which one is odd about DCT: **1**
(a) It does not have clutch pedal
(b) It improves the fuel economy
(c) It reduces the fuel economy
(d) It uses wet clutches

Q.2 i. Define Automotive chassis. Enlist the components of chassis. **2**

ii. Explain the following with a neat sketch: **3**
(a) Castor (b) Camber (c) King pin inclination

iii. Describe the working of hydraulic steering system with the help of suitable diagrams and explain the function of each component. **5**

OR iv. Discuss the types of front axles and stub axles using neat sketches. **5**

Q.3 i. Define leading and trailing shoes. **2**

ii. Describe the working of hydro-elastic suspension system and details of components using neat sketch of the same. Compare it with traditional suspension system. **8**

OR iii. Describe hydraulic braking system in detail. Use a neat sketch to describe the function of each component. Give a brief explanation of Regenerative braking. **8**

Q.4 i. What is clutch? Mention the different types of clutches. **3**

ii. What is the principle of differential? Explain its constructional details using a neat sketch. Explain in brief about non–slip differential and differential locks. **7**

OR iii. What are the types of automotive transmission system? Describe construction and functioning of synchromesh transmission system using a suitable diagram. Also state its advantages. **7**

Q.5 i. Differentiate between fluid coupling and torque converter. **4**

ii. Describe constructional details and functioning of poly-phase torque converter using a neat sketch. **6**

OR iii. What is Janny hydro-static drive? Explain working principle and construction of typical Janny hydro-static drive. **6**

Q.6 Write short note on any two:

i. Continuously Variable Transmission (CVT) **5**

ii. Hydraulic control systems of automatic transmission **5**

iii. Automated Manual transmission **5**

Scheme of Marking

ME5CA05 Automotive Transmission and Chassis System

Q.1	i)	Angle between the vertical axis of the wheels and the vertical axis of the vehicle when viewed from the front or rear is called: (d) Camber	1
	ii)	Which member provides the torsional rigidity: (c) X-member	1
	iii)	Un-sprung weight is (d) Weight of wheels and axles	1
	iv)	The function of master cylinder in hydraulic brakes is to: (d) All of the above	1
	v)	Which of these differential transmits constant torque to both the wheels: (a) Conventional	1
	vi)	By using synchronizing device, the two involved adjacent gears have their speeds (c) Equalized	1
	vii)	A fluid coupling is used as (a) Automatic clutch	1
	viii)	Torque convertor is used in (a) Automatic Transmission	1
	ix)	~~CVT offers~~: Advantages of CVT are! (d) All of these	1
	x)	Which one is odd about DCT: (c) It reduces the fuel economy	1
Q.2	i.	Define Automotive chassis and name the components of chassis. Definition .....1 mark Name of components.....1 mark	2
	ii.	Explain with neat sketch: (i) Castor (ii) Camber (iii) King pin inclination Definition with diagram each.....1 mark	3
	iii.	Describe the working of hydraulic steering system with the help of suitable diagrams and explain the function of each component. Diagram.....1 mark Working of system.....2 marks Functioning of components.....2 marks	5
OR	iv.	Discuss the types of front axles and stub axles using neat sketches. Types of front axles.....3 marks Types of stub axles.....2 marks	5
Q.3	i.	Define leading and trailing shoes. Definition of leading shoe.....1 mark Definition of Trailing shoes.....1 mark	2
	ii.	Describe the working of hydro-elastic suspension system and details of its components using neat sketch of same. Compare it with traditional suspension system. Neat sketch.....2 marks Description of components.....2 marks Working of system.....2 marks Comparison.....2 marks	8
OR	iii.	Describe hydraulic braking system in detail. Use a neat sketch to describe the function of each component. Give a brief explanation of Regenerative braking. Neat sketch.....2 marks Working of system.....2 marks Description of components..... .....2 marks Regenerative braking..... 2 marks	8
Q.4	i.	What is clutch? Mention the different types of clutches. Defining clutch.....1 mark Types of clutch.....2 marks	3
	ii.	What is the principle of Differential? Explain its constructional details using a neat sketch. Explain in brief about Non–Slip differential and Differential locks. Principle & Diagram.....2 marks Description.....2 marks Working.....1 mark Non slip differential & Differential locks.....2 marks	7
OR	iii.	What are the types of automotive transmission system? Describe construction and functioning of synchromesh transmission system using a neat sketch. Also state its advantages. Types .....1 mark Neat sketch.....1 mark Construction.....2 marks Functioning.....2 marks Advantages.....1 mark	7
Q.5	i.	Differentiate between Fluid coupling and Torque converter. Four Differences.....4 marks	4
	ii.	Describe constructional details and functioning of poly-phase torque converter using a neat sketch.	6

		Neat sketch.....2 marks Description of parts.....2 marks Working.....2 marks	
OR	iii.	Explain Janny hydro-static drive using a neat sketch. Describe working principle and construction of typical Janny hydro-static drive. Neat sketch.....2 marks Working.....2 marks Construction.....2 marks	6
Q.6		Attempt any two: Write short note.	
	i.	Continuously Variable Transmission (CVT) Description.....3 marks Working.....2 marks	5
	ii.	Hydraulic control systems of automatic transmission Description.....3 marks Working.....2 marks	5
	iii.	Automated Manual transmission Description.....3 marks Working.....2 marks	5