Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – SUMMER 2025

Subject Code:3140203 Date:08-05-2025

Subject Name: Basics of Automobile Systems

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Draw drive system for front engine front wheel drive passenger car. Label all the parts and show power transmission line in the diagram.	**03**
	(b)	Enlist the types of automobile frame. Explain advantages, disadvantages and application of any one type of frame.	**04**
	(c)	Define the road resistances acting on the vehicle when moving with high speed and grade. Explain the relation between traction forces and road resistances, using road performance curve.	**07**
Q.2	**(a)**	Mention the importance of interlocking mechanism in automobile gear box and explain its operation.	**03**
	(b)	Explain working of continuous variable transmission in vehicle with suitable diagram.	**04**
	(c)	Draw gear arrangement of 4 + 1 type of constant mesh gear box. How to achieve different gear ratios? Explain with suitable power flow line.	**07**
		OR	
	(c)	With the help of neat diagram, describe the construction, working and application of torque convertor in transmission.	**07**
Q.3	**(a)**	Explain the types of arrangement of front axle for front wheel drive vehicles.	**03**
	(b)	Explain types and function of universal joints used in vehicle. Name the places where they are used in passenger car.	**04**
	(c)	With aid of suitable diagram explain the function and working of master cylinder with power booster in hydraulic braking system of passenger car.	**07**
		OR	
Q.3	**(a)**	Enlist types of rear axle supporting system and explain any one with suitable diagram.	**03**
	(b)	What is the function of differential in four wheeler? Differentiate open differential and limited slip differential.	**04**
	(c)	Differentiate drum brake and disc brake with respect to any three aspects and also explain the types of disc brake with suitable diagram.	**07**
Q.4	**(a)**	What is the role of suspension system in the vehicle?	**03**
	(b)	What is the full form of ABS with respect to vehicle? What is pressure modulation with reference to ABS? List major parts of an ABS.	**04**
	(c)	Compare leaf, coil, torsion bar and rubber suspension springs based on any seven aspects.	**07**

OR

Q.4	**(a)**	Differentiate sprung and unsprung weight of the vehicle.	**03**
	(b)	Illustrate the necessary steps of brake bleeding operation for four wheel hydraulic braking system.	**04**
	(c)	Enlist types of suspension system. Draw arrangement of each types of suspension system and label all the major parts.	**07**
Q.5	**(a)**	Explain the Ackerman steering mechanism with suitable diagram.	**03**
	(b)	What is the function of steering gear? Explain the types of steer gears with suitable diagram.	**04**
	(c)	Draw ply arrangement of radial and bias tyre. Compare radial and bias tyre based on any five aspects.	**07**

OR

Q.5	**(a)**	Differentiate understeer and oversteer condition of vehicle.	**03**
	(b)	Draw steering linkages arrangement for rigid axle suspension system and independent suspension system and label all the major components.	**04**
	(c)	Decrypt the tyre specification P165/65 R14 79T and explain types of tyre wear patterns and their causes.	**07**

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