

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-IV(NEW) EXAMINATION – WINTER 2022****Subject Code:3140203****Date:13-12-2022****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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Define following vehicle terminologies. 1) Turning radius 2) Tractive effort 3) Draw bar pull	<b>03</b>
	(b) Classify auto vehicles basis on any four aspects. Mention examples of each, based on their classification.	<b>04</b>
	(c) How power is transmitted from engine to wheel in case of front engine rear wheel drive vehicle? Show by net sketch. Mention the function of power transmission line components.	<b>07</b>
<b>Q.2</b>	(a) Compare merits and demerits of vehicle layouts with Front mounted and rear mounted engines..	<b>03</b>
	(b) Which are the resistances acting on a vehicle in motion? How to calculate these resistances?	<b>04</b>
	(c) Explain necessity of gear box with suitable road performance curves.	<b>07</b>
	<b>OR</b>	
	(c) Draw gear arrangement of 4 + 1 constant mesh type of gearbox. Explain power flow for each gear shift.	<b>07</b>
<b>Q.3</b>	(a) Enlist the possible causes and remedies for Gear slipping.	<b>03</b>
	(b) Explain: Gearbox interlocking mechanism for gear shifting.	<b>04</b>
	(c) Explain types of rear axle supporting system with suitable diagram.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Draw gear arrangement for 2 forward speed epicyclic gearbox with proper labeling.	<b>03</b>
	(b) How torque multiplication is taking place in torque converter? Explain with suitable blade diagram.	<b>04</b>
	(c) What is the function of differential in passenger vehicle? Explain the working of open differential with suitable diagram.	<b>07</b>
<b>Q.4</b>	(a) Differentiate Hotchkiss drive and torque tube drive for rear axle drive.	<b>03</b>
	(b) What is the difference between fixed caliper and floating caliper in disc brake?	<b>04</b>
	(c) Draw layout of hydraulic braking system of passenger car. Label all the components and write down the function of each.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Define following vehicle suspension terminologies. 1) Sprung weight 2) Unsprung weight 3) Roll	<b>03</b>
	(b) Enlist different types of suspension springs and compare all based on their springing behavior.	<b>04</b>
	(c) Compare wishbone type suspension and beam type rigid axle suspension system with suitable diagram.	<b>07</b>

**Q.5** (a) What is the function of Unloader valve, Brake valve and Brake chamber in case of air brake system? **03**  
(b) What is the necessity and function of shock absorber in case of vehicle suspension system? **04**  
(c) Which are primary wheel alignment angles? Define each with suitable diagram. Explain their effects on vehicle wheel alignment. **07**

**OR**

**Q.5** (a) Identify each digit of the following tyre specification: **03**  
145/70 R 12 69 S  
(b) Draw steering linkages for independent suspension system. Label all the components. **04**  
(c) Compare radial tyre and bias ply tyre based on any seven aspects. **07**

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