

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.

MARKS

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

- 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**
