

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VI EXAMINATION – WINTER 2025

Subject Code:3161920

Date:25-11-2025

Subject Name:Automobile Engineering

Time:02:30 PM TO 05:00 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 the vehicle layouts showing (1) Front engine front wheel drive and (2) Four wheel drive in Automobile. | 03 |
| | (b) | What are the functions of chassis? List components installed on chassis. | 04 |
| | (c) | Explain different types of vehicle bodies with neat sketch with its constructional features. | 07 |
| Q.2 | (a) | Define road resistance, gradient resistance and tractive force. | 03 |
| | (b) | Derive the equation of maximum speed of vehicle while taking a left turn on road for its stability. | 04 |
| | (c) | Explain with figure construction and working of multi plate clutch. | 07 |
| | | OR | |
| | (c) | Explain semi centrifugal clutch with neat sketch. Also compare it with centrifugal clutch. | 07 |
| Q.3 | (a) | What are the functions of suspension system? | 03 |
| | (b) | Explain briefly 1. Castor angle and 2. King pin inclination. | 04 |
| | (c) | Explain Wishbone type suspension system. | 07 |
| | | OR | |
| Q.3 | (a) | What do you mean by understeer and oversteer? | 03 |
| | (b) | What is toe in and toe out? When they are used in vehicle design? | 04 |
| | (c) | Write a short note on electric power steering. | 07 |
| Q.4 | (a) | Why differential gear box is used in vehicles? | 03 |
| | (b) | Explain the necessity of transmission in a vehicle. | 04 |
| | (c) | Explain working and construction of sliding mesh gear box. | 07 |
| | | OR | |
| Q.4 | (a) | What is the function of brake? Give its classification. | 03 |
| | (b) | Give the comparison between hydraulic brake and mechanical brake | 04 |
| | (c) | What is the meaning of ABS in vehicle? Explain about it in detail. | 07 |

- Q.5** (a) Differentiate active and passive safety system. **03**
- (b) Explain the relation between tire pressure and tire wear pattern with neat sketch. **04**
- (c) Enlist types of hybrid vehicle. Explain any one in details. **07**

OR

- Q.5** (a) What is the advantage of Air - bags in car? How does Air - bag work? **03**
- (b) Compare Hotchkiss drive with Torque tube drive. **04**
- (c) What troubles are commonly experienced in the electric system of a car? **07**
Suggest suitable remedies to rectify those faults.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3161920

Date:05-12-2024

Subject Name:Automobile Engineering

Time:02:30 PM TO 05:00 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) Classify the automobile vehicles based on three criteria.	03
	(b) Write four functional requirements of vehicle body.	04
	(c) List various types of automobile layouts and its arrangement. For any one, write two advantages and two disadvantages with neat sketch.	07
Q.2	(a) Discuss various types of materials used in automobile body construction.	03
	(b) Write two advantages and two disadvantages of frameless construction of automobile vehicles.	04
	(c) Discuss different types of resistances acting on vehicles in motion.	07
	OR	
	(c) Explain the stability of a vehicle in motion around the curve.	07
Q.3	(a) State three faults and its diagnosis for hydraulic brake system.	03
	(b) Explain the working of multi plate clutch.	04
	(c) Describe construction and explain working of differential gear box.	07
	OR	
Q.3	(a) How automatic transmission works?	03
	(b) Define following terms related to braking of automobile: (i) braking distance (ii) braking efficiency (iii) weight transfer (iv) wheel skidding	04
	(c) Write types of manual gear boxes used in automobile vehicles and explain working of any one in detail.	07
Q.4	(a) List types of front and rear axles.	03
	(b) Draw four automobile tyre tread patterns.	04
	(c) Explain multi-leaf suspension system in details with neat sketch.	07
	OR	
Q.4	(a) Explain construction of tubeless tyre in brief.	03
	(b) Write four functional requirements of suspension systems in automobile vehicles.	04
	(c) Identity faults and its diagnosis of suspension and steering system.	07
Q.5	(a) How does hybrid vehicle start?	03
	(b) List four electronics components of modern automobile vehicle and state its use.	04

(c) Draw lighting circuit of automobile car with nomenclature. 07

OR

Q.5 (a) Explain active safety measures in brief. 03

(b) State the function of (i) fuel gauge (ii) wiper (iii) speedometer (iv) odometer. 04

(c) Draw layout of electric vehicle, mention name of components and write use of every component. 07

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2023****Subject Code:3161920****Date:13-12-2023****Subject Name:Automobile Engineering****Time:02:30 PM TO 05:00 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.

- Q.1** (a) Describe the development stages of automobile **03**
(b) Explain in brief the specifications of automobile bodies. **04**
(c) Explain rolling resistance, gradient resistance and wind resistance. **07**

- Q.2** (a) Explain the importance of aerodynamic shape of car body. **03**
(b) Write the various types of loads acting on vehicle body. Explain any one with neat sketch. **04**
(c) Explain the single plate clutch with neat sketch. **07**

OR

- (c) Explain automatic transmission in detail. **07**
Q.3 (a) What is the purpose of providing universal joint and slip joint with the propeller shaft? **03**
(b) Explain torque converter with neat sketch. **04**
(c) With the help of road performance curve explain the necessity of gear box in an Automobile. **07**

OR

- Q.3** (a) Distinguish between the cross type and ball trunnion type universal joint. **03**
(b) Explain the working of conventional differential gear box with neat sketch. **04**
(c) What is synchromesh device? Describe the working of synchromesh gear box. **07**
Q.4 (a) Enlist the types of front axle independent suspension system. **03**
(b) Explain re-circulating ball type steering gear with sketch. **04**
(c) Explain with sketch telescopic shock absorber. **07**

OR

- Q.4** (a) Define: caster, camber and king pin inclination. **03**
(b) Sketch schematic arrangement of vacuum operated brake and explain its working. **04**
(c) Explain with neat sketch wishbone type suspension system. **07**
Q.5 (a) "Battery is the heart of the electrical system of an automobile." **03**
Comment on the validity of this statement.
(b) State the functions and requirements of automobile wheel tyre. **04**
(c) Describe, with neat sketch the construction and working of lead-acid battery which is normally used in automobile. **07**

OR

- Q.5** (a) State the principle of starting motor. **03**
(b) What troubles are commonly experienced in the lighting system of a car? Suggest suitable remedies to rectify those faults. **04**
(c) Explain modern technology used in automobile. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI(NEW) EXAMINATION – WINTER 2022****Subject Code:3161920****Date:17-12-2022****Subject Name:Automobile Engineering****Time:02:30 PM TO 05:00 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.

- Q.1** (a) Compare Front wheel drive layout and rear wheel drive layout for passenger car. **03**
- (b) Describe various forces acting on vehicle body with neat sketch. **04**
- (c) Describe the change in reaction force on tyres of car for following conditions **07**
- (1) Starting with acceleration if car has front wheel drive
 - (2) Starting with acceleration if car has rear wheel drive
 - (3) While taking a right curve with uniform velocity
 - (4) While applying a short break.

- Q.2** (a) Why bike has a lever to engage and disengage clutch but in active it is missing? **03**
- (b) Differentiate between single plate and multi plate clutch. **04**
- (c) Explain Rolling resistance, Grade resistance and Tractive force (with uniform speed and with acceleration) for a vehicle in motion, with neat sketch **07**

OR

- (c) Derive the equation of maximum speed of vehicle while taking a left turn on road for its stability. **07**

- Q.3** (a) Why differential gear box is used in vehicles? **03**
- (b) Differentiate between manual transmission and continuously variable transmission. **04**
- (c) Explain the construction and working of sliding mesh gear box using neat sketch. **07**

OR

- Q.3** (a) Give classification of axle used in vehicles. **03**
- (b) What is toe in and toe out? When they are used in vehicle design? **04**
- (c) How centrifugal clutch is different from normal clutch? Explain its construction and working with neat sketch. **07**

- Q.4** (a) Explain different forces acting of front axle of truck with neat sketch. **03**
- (b) Define King pin inclination and explain its importance in vehicle. **04**
- (c) Which are the functional requirements of suspension system? Explain working of air suspension system. **07**

OR

- Q.4** (a) What are the functional requirements of braking system? **03**
- (b) Explain the relation between tyre pressure and tyre wear pattern with neat sketch. **04**
- (c) What is the meaning of ABS in vehicle? Explain about it in detail. **07**

- Q.5** (a) Differentiate between Active and Passive Safety systems in automobiles. **03**
- (b) Explain the working of Hydraulic brake with neat sketch. **04**

- (c) What is regenerative breaking? How it is achieved? Describe different methods used for the same. **07**

OR

- Q.5** (a) What is Adaptive Cruise Control? How it is useful. **03**
(b) What is the advantage of Air bags in car? How it is working? **04**
(c) Write a note on Hybrid Vehicles and various technology used for the same. **07**
