

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2024**

**Subject Code:3140203**

**Date:19-11-2024**

**Subject Name: Basics of Automobile Systems**

**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) Classify the automobiles with respect to, (a) Application, (b) Drive, (c) Load carrying capacity. **03**
- (b) What are the advantages of a front wheel drive over the rear-wheel-drive system? **04**
- (c) Explain with the help of suitable diagram a chassis frame. **07**

- Q.2** (a) What are the general requirements of a transmission? **03**
- (b) What is an over drive? What are its advantages? **04**
- (c) Describe the working of a torque converter with the help of a neat sketch and discuss its advantages and disadvantages? **07**

**OR**

- (c) Describe with the help of a neat sketch the various gear positions in a sliding mesh gear box. **07**

- Q.3** (a) Differentiate between an 'Elliot' and a 'Reverse Elliot' type stub axle. **03**
- (b) Explain with neat sketch the construction of a propeller shaft. **04**
- (c) Explain various types of axle housing and material used. **07**

**OR**

- Q.3** (a) What is the difference between a 'dead front axle' and a 'live front axle'? **03**
- (b) Explain rear axle drives with suitable figure. **04**
- (c) Explain the necessity of a differential in an automobile. Discuss in detail the construction and operation of the differential. **07**

- Q.4** (a) What are the different methods of actuating the brakes? **03**
- (b) How does an external contracting brake differ from an internal expanding one? **04**
- (c) Explain with neat sketch the independent rear suspension system. **07**

**OR**

- Q.4** (a) What are the objectives of a suspension? **03**
- (b) Compare disc brakes with drum type in regard to construction and operation. **04**
- (c) With suitable sketches explain the principle and working of hydraulic brakes. **07**

- Q.5** (a) With suitable diagram explain camber, caster and toe-in. **03**
- (b) Distinguish between normal and cross ply tyres. **04**
- (c) Explain the various wheel and tyre troubles, with their causes and remedies. **07**

**OR**

- Q.5** (a) What are the factors influencing tyre life? **03**
- (b) Explain why the lower the overall steering ratio, the faster the steering becomes. **04**
- (c) Write a short note on Ackermann steering gear. **07**

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