

**B. Tech 7th Semester Examination**  
**Automobile Engineering (NS)**  
**ME-413**

**Time : 3 Hours**

**Max. Marks : 100**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** This question paper carries five sections. Attempt any five questions selecting at least one question each from section A, B, C & D. Section E is compulsory.

**SECTION - A**

1. (a) Briefly explain the general classification of vehicles. Also list the types of automobile with respect to different purposes. (10)
- (b) Explain the operation of centrifugal type clutch with the help of well labeled diagram. Also explain how centrifugal clutch is different from diaphragm clutch in operation? (10)
2. (a) Explain the operation of clutch assembly with the help of well labeled diagram. Also list the units in the operating mechanism of the clutch assembly. (10)
- (b) Explain the functions of the body and the frame. Also explain vehicle dimensions. (10)

**SECTION - B**

3. How transmission systems in the automobile are classified? Explain the operation of synchromesh type of transmission system with the help of well labeled diagram. Also explain how synchromesh transmission is different from constant mesh transmission in operation? (20)
4. (a) Draw a line sketch of a differential showing the internal parts and explain how it functions. (13)
- (b) Explain the different types of load coming on rear axles. (7)

**SECTION - C**

5. (a) Make a sketch showing the rear wheel suspension with leaf springs and shock absorber. Also explain how it functions. (12)
- (b) Explain the terms: camber, steering axis inclination, castor, toe-in and toe-out. (8)
6. Draw a neat sketch of a steering system, mark all important parts on it and explain how the system works. Mark on the sketch the part called steering linkage. (20)

**SECTION - D**

7. (a) How braking systems in the automobile are classified? With the help of neat sketch explain the hydraulic braking system. Why bleeding is required in a hydraulic braking system? Describe the procedure for bleeding. (12)
- (b) What is the necessity of battery in a car? How is the lead acid battery protected from overcharging in a vehicle? (8)
8. (a) How wheels of the automobile are classified? Explain any one classification in detail with the help of well labeled diagram. Also write the comparison of the radial and bias-ply tyres. List the different tyre materials. (12)
- (b) Explain the starting method of an automobile with a starter motor and over-running clutch. (8)

**SECTION - E (Compulsory Question)**

9. Write short answers of the following:
  - (a) Clutch linkages
  - (b) Sub Frames
  - (c) Requirements of clutch
  - (d) Necessity of transmission
  - (e) Defects in Frames
  - (f) Transfer Box
  - (g) Propeller Shaft
  - (h) Shock Absorber
  - (i) Compare drum and disc brakes
  - (j) Tyre Wear

(2×10=20)