

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2767

Roll No.

**B.Tech.**

(SEM. VII) ODD SEMESTER THEORY EXAMINATION 2012-13

**AUTOMOBILE ENGINEERING**

Time : 3 Hours

Total Marks : 100

Note :— (1) Attempt **all** questions.

(2) Assume missing data suitably (if any).

(3) Be precise in your answer.

1. Attempt any **TWO** parts of the following :— ( $2 \times 10 = 20$ )

(a) (i) What consideration are made in the design of a vehicle ?

(ii) What are the main components of an internal combustion engine ? Give their material of construction and their functions.

(b) Design a sliding type of gear box to obtain following speed ratios :

Top gear ratios = 1 : 1

Third gear ratio = 1.4 : 1

Second gear ratio = 2.24 : 1

Reverse and first gear ratio = 3.8 : 1

Assume countershaft speed = half that of engine speed.

Assume smallest gear to have not less than 15 teeth.

(c) Draw the layout of a 4-wheeler vehicle. Explain how front wheel drive differs from rear wheel drive.

2. Attempt any **TWO** parts of the following :— **(2×10=20)**

(a) With the help of suitable sketches, describe the working of :

(i) Free wheel, and

(ii) Universal joint.

(b) State principle and derive equation for correct steering of a vehicle. Draw Ackerman's steering mechanism and explain wheel lock and steering lock angles.

(c) Explain briefly the following :

(i) Camber angle

(ii) Castor angle

(iii) Toe-in

(iv) King pin inclination

(v) Slip angle.

3. Attempt any **TWO** parts of the following :— **(2×10=20)**

(a) What are the essential requirements of a good brake ? Explain phenomenon of transfer of weight during braking on all the four wheels. How can the weight transfer be reduced ?

(b) (i) Classify different types of brakes.

(ii) Explain working of a vacuum servo brake.

(c) (i) What are the loads coming on a chassis frame ?  
Explain various types of chassis frame sections  
and their suitability for chassis frame.

(ii) Sketch and label an independent front suspension  
system.

4. Attempt any **TWO** parts of the following :— (**2×10=20**)

(a) What is the function of a starting drive ? Describe the  
construction and working of any one type of Bendix  
drive.

(b) Describe the working of a jerk type diesel fuel injection  
pump with the help of a suitable sketch.

(c) (i) Explain the working of an A.C. Generator.

(ii) Discuss the working of Fuel injection system in  
petrol engines.

5. Attempt any **TWO** parts of the following :— (**2×10=20**)

(a) Explain the working of Car Air conditioning system  
with help of a neat sketch.

(b) Differentiate between preventive and breakdown  
maintenance. Discuss maintenance schedule of a  
vehicle.

(c) Describe :

(i) Semi-pressurised lubrication system, and

(ii) Dry sump lubrication system.