

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

PAPER ID : 2767

Roll No.

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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 :— (2×10=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 :— ($2 \times 10 = 20$)
- (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 :— ($2 \times 10 = 20$)
- (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 :— ($2 \times 10 = 20$)
- (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 :— ($2 \times 10 = 20$)
- (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.