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ME-703

B. TECH.

SEVENTH SEMESTER EXAMINATION, 2003-2004

AUTOMOBILE ENGINEERING

Time : 3 Hours *Total Marks : 100*

Note : (1) Attempt **All** questions.
(2) All questions carry equal marks. Each question is of 20 marks.

1. Attempt any *TWO* parts :— **(10×2)**

(a) Explain, what do you mean by "Valve and Valve Gear Mechanism" ? Explain the four valve location per cylinder for an I.C. Engine, on valve layout. Also draw the actual valve timing diagram.

(b) What is the necessity of Gear Box ? Explain the working of constant Mesh Gear Box. What are its advantages and limitations ?

(c) What types of resistances are offered by a vehicle ?

The coefficient of rolling resistance for a truck weighing 6350 kg is 0·018 and air resistance is 0·00281. The transmission efficiency in top gear of 6·2 : 1 is 90%, that in second gear of 18 : 1 is 80%. The frontal area is 6 m^2. If truck has to have maximum speed of 85 km/hour in top gear, calculate :

(i) Engine B.H.P. required,

(ii) The engine speed when driving wheel dia. is 80 cm,

(iii) The maximum grade the truck can negotiate in IInd gear.

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2. Attempt any *FOUR* parts :— (5×4)

(a) What are the basic requirements of an Automobile Clutch ? How are these fullfilled in a Diaphragm Clutch ?

(b) Explain the working of Torque Converter. How may it become a fluid coupling ?

(c) What is the need of differential gear in an Automobile ? Explain its working.

(d) What do you know about Automatic Transmission System ?

(e) Explain the Ackerman principle of Steering. How is it applied with tractor two-axle trolley ?

(f) Explain, how the slip angle affects Under-steer and Over-steer ?

3. Attempt any *TWO* parts :— (10×2)

(a) What are different types of Brake System used in Automobiles ? Explain the working of one of them with the help of neat sketch.

(b) Explain the working of Disc Brakes. Also explain the working of master cylinder with neat sketch.

(c) What is the need of Independent Suspension System ? How is it achieved in front and rear wheel suspension ?

4. Attempt any *TWO* parts :— (10×2)

(a) What is an Ignition Advance ? Explain clearly different methods of adjusting ignition advance.

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(b) Describe, with the help of a neat sketch, the working of a three-unit regulator used in an Automobile.

(c) Draw the line diagram of fuel supply system in case of M.P.F.I. system of an Automobile. Explain, how it differs from Carburettor system ?

5. Attempt any *TWO* parts : (10×2)

(a) Why is lubrication necessary in a car ? Describe, with neat sketch, the force feed lubricating system of a four-cylinder engine.

(b) Write the names of various types of Maintenance. Explain about break down maintenance.

(c) (i) Why is Water cooling preferred to Air cooling in Automobile engine ?

(ii) What is the need of overhauling for an engine ? Name the various components which require overhauling in an engine, also underline the components which maintain compression ratio of engine.

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