Printed Pages : 4

EAU603

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

PAPER ID : 147602

Roll No.

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15

DESIGN OF AUTOMOTIVE COMPONENTS

Time : **3** Hours] [Total Marks : **100**

Note : (1) Attempt All Questions.

(2) Assume any missing data suitably.

1 Attempt Any Four Questions : **5×4=20**

(a) Explain the need of gear box in an automobile?

(b) Explain the Design Procedure of Four speed Gear Box.

(c) What is Sprag Clutch, explain with diagram?

(d) Explain Camber and Castor in Steering System?

(e) What is Final drive? Explain with neat Sketch.

2 Attempt any Two questions: **10×2=20**

(a) Derive an expression for Design of Centrifugal clutch with neat Sketch.

(b) The contact surface in a cone Clutch have an effective diameter of 80 mm, the semi angle of cone is 15 degree and the coefficient of friction is 0.3. Find the torque required to produce slipping of clutch, if the axial force applied is 200 N. The clutch is employed to convert an electric motor, running uniformly at 900rpm with a flywheel, which has a mass of 14 kg and radius of gyration is 160 mm. Calculate the time required for the flywheel to attain full speed and also the energy lost in slipping of clutch.

(c) A Vehicle weighing 1500kg has a coefficient of rolling resistance of 0.015. The transmission has a final Drive Ratio of 4.07:1 and overall mechanical efficiency is 85 percent. If the engine develops a max. torque of 100N-m and the effective road wheel radius is 0.27m. Determine the Bottom gear ratio. Assume the steepest gradient to be encountered is 1 in 4.

3 Attempt any two questions : **10×2=20**

(a) How Synchromesh Gear Box Works, explain with neat diagram?

(b) Write Short Notes on :

(i) Steering Ratio

(ii) Turning Radius

(iii) Rear Axle Ratio

(iv) Overall Gear Ratio.

(c) Describe the different types of resistance which face when a vehicle is travelling on the road?

4 Attempt any two questions : **10×2=20**

(a) Derive an expression of Davis steering gear Mechanism and Explain the Steering Behavior?

(b) A multiple disc clutch Steel on Bronze is to transmit 4.5 kW at 750rpm. The inner radius of the contact is 40mm and outer radius of the contact is 70 mm. The clutch operates in oil with an expected coefficient of friction is 0.1, average allowable pressure is 0.35 N/mm^2. Find,

(1) Total no. of steel and bronze disc

(2) Actual axial force required

(3) Actual average pressure.

(c) What is the Difference between Live and Dead Axle? And derive an expression for Full floating Rear Axle for the stresses acting on the axle with diagram.

5 Attempt any two questions : **10×2=20**

(a) Write the Fundamental Equation for Correct Steering. Derive the Expression for it with neat sketch. A motor car has a wheel base of 2.743m and pivot centre of 1.065m. The front and rear wheel tracks is 1.217m , calculate the correct angle of outside lock and turning circle radius of the outer front wheel and inner rear wheel when the angle of inside lock is 40 degree.

(b) Explain the Different types of Load and Stresses which are acted on the Front axle?

(c) Explain the Computer Aided design of Helical Spring with the help of diagram.

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