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10AU62

Sixth Semester B.E. Degree Examination, June/July 2015
Automotive Transmission

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1
 - a. Explain the various resistances offered by a vehicle, with neat sketch. (06 Marks)
 - b. A motor vehicle weighs 812.99 kg and its engine develops 14.7 kW at 2500 rpm. At this engine speed, the speed of the car on the top gear is 17.88 m/sec. Bottom gear reduction is 3.5:1 and efficiency of transmission is 88% on top and 80% on bottom gear. The diameter of the wheel is 0.762 m and Frontal area is 1.116 m². Where coefficient of rolling resistance and air resistance is 0.023 and 0.0314 calculate :
 - i) Speed of the car on bottom gear
 - ii) Tractive effort on top and bottom gear
 - iii) Grade which car climb on bottom gear
 - iv) Acceleration and tractive force at the wheels required to start – up the car on the level and attain a speed 13.41 m/sec in 10 sec. (Average air resistance may be taken as half the maximum). (14 Marks)

- 2
 - a. Differentiate between single plate clutch and multi plate clutch. Explain with sketch any one of the above. (08 Marks)
 - b. Derive an expression for effective mean radius and torque transmitted in a single plate clutch assuming different conditions. (08 Marks)
 - c. An automobile power unit gives a maximum torque of 13.56 Nm. The clutch is a single plate dry disc type, having effective clutch lining of both sides of the plate disc. The coefficient of friction is 0.3 and maximum axial pressure is 0.829 bar and outer dia is 1.25 times the inner diameter. Calculate the dimensions of the clutch plate in mm. (04 Marks)

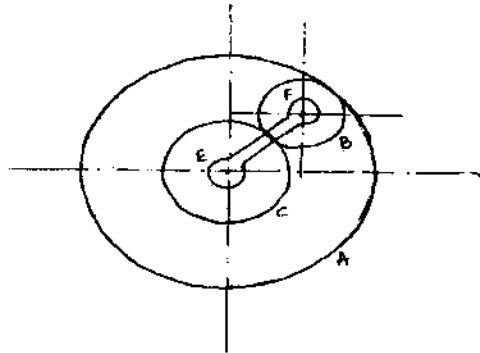
- 3
 - a. Explain with neat sketch, the working of Sprag and Roller type overrunning clutch. (10 Marks)
 - b. With neat sketch, explain the working principle of fluid coupling with their advantages. (10 Marks)

- 4
 - a. What is Torque converter? Explain its working with a neat sketch and state the advantages. Also discuss the performance characteristics, with graph. (14 Marks)
 - b. Differentiate between torque converter and fluid couplings. (06 Marks)

PART - B

- 5
 - a. Explain with a neat sketch, construction and working of sliding mesh gear box giving four forward speed and one reverse speed. (10 Marks)
 - b. Design and sketch a sliding type gear box with four forward speed and one reverse speeds. Find the different speed ratios and gear teeth.
 Gear ratio in top gear = 1:1 ; Gear ratio in third gear = 1.35 : 1 ;
 Gear ratio in second gear = 2.25 : 1 ; Gear ratio in first gear = 3.8 : 1 ;
 Gear ratio in reverse gear = 3.8 : 1.
 Assume countershaft speed is half that of the engine speed and the smallest gear having 29 teeth and idler gear having 15 teeth. (10 Marks)

- 6 a. Draw a neat sketch of epicyclic gear train and discuss the working principle with advantages. (10 Marks)
- b. An epicyclic gear consists of three wheels A, B and C as shown in figure. Wheel A has 72 internal teeth and C has 32 external teeth. The wheel B gears with both A and C is carried on an arm which rotates about the center of A at 18 rpm. If the wheel A is fixed, determine the speed of wheels B and C. (10 Marks)



- 7 a. List the different systems of a hydrostatic drives. Explain the principles of the same. (10 Marks)
- b. What are the advantages of an overdrive? Explain its working with neat sketch. (10 Marks)
- 8 a. Explain the electric transmission system with layout. What are its limitations? (10 Marks)
- b. With the help of line diagram, explain the working of Automatic transmission. (10 Marks)
