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10AU62

Sixth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Automotive Transmission

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Discuss various resistances for propulsion of vehicle. (07 Marks)
 b. Define: (03 Marks)
 - i) Traction,
 - ii) Traction effort and
 - iii) Draw bar pull.
- c. A motor car with wheel base 2.75 m with a center of gravity 0.85 m above the ground and 1.15 m behind the front axle has a coefficient of adhesion 0.6 between the tyre and ground. Calculate the maximum possible acceleration when the vehicle is
 - i) Driven on four wheels.
 - ii) Driven on the front wheels only
 - iii) Driven on the rear wheels only (10 Marks)
- 2 a. Single plate friction clutch is to be designed for a TATA truck developing a power of 80.85 KW at 2600 rpm. The maximum torque developed however is 400 Nm at 1750 rpm. A maximum wear of clutch facing of 3 mm is to be allowed, when the clutch is to transmit at least 30%. A pressure intensity of 200 kPa can be safely allowed and ratio of inside diameter to outside diameter is 0.7 is considered reasonable.
 - i) Calculate clutch plate dimensions.
 - ii) If 10 springs are used and initial spring force is to be 1.3 times. The spring force after allowable wear of 4 mm, find out the spring stiffness. Assume uniform wear and $\mu = 0.35$. (10 Marks)
- b. With neat sketch, explain the construction and working of centrifugal clutch. (10 Marks)
- 3 a. Explain with neat sketch the working of fluid coupling. (10 Marks)
 b. Discuss the term over running clutch. Explain different types of over running clutch with relevant sketches. (10 Marks)
- 4 a. Give a comparison between torque converters and fluid coupling. (06 Marks)
 b. Explain the typical hydrodynamic transmission system with suitable sketch. Also state the advantages and disadvantages of hydrodynamic transmission. (14 Marks)

PART – B

- 5 a. A four speed gear box is to be constructed for providing the ratios of 1.0, 1.46, 2.28 and 3.93 to 1 as nearly as possible. The diametral pitch of each gear is 3.25 mm and the smallest pinion is to have at least 15 teeth. Determine the suitable number of teeth of the different gears. What is the distance between the main shaft and lay shaft? (10 Marks)
 b. Explain with neat sketch the construction and working of constant mesh gear box. (10 Marks)

Important Note : 1 On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.

- 6 a. Explain the working of over drive with neat sketch. (10 Marks)
- b. An epicyclic gear consists of three wheels, A, B and C shown in Fig.Q6(b). Wheel A has 72 internal teeth, wheel C has 32 external teeth. The wheel B gears with both A and C and 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.

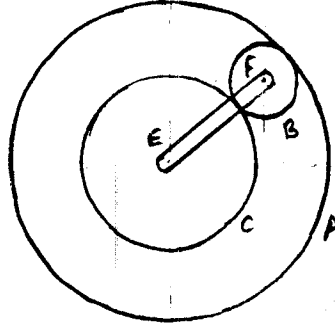


Fig.Q6(b)

(10 Marks)

- 7 a. With neat sketch explain the working principle of hydrostatic drive system. (08 Marks)
- b. Give the comparison between constant displacement pump and variable displacement pump. (06 Marks)
- c. Discuss about the applications and limitations of hydrostatic drives. (06 Marks)
- 8 a. With a neat sketch, explain the working of Borg-Warner automatic transmission. (10 Marks)
- b. Explain the layout of electric transmission. Also list out the limitations. (10 Marks)

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