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Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019

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. Define the different types of resistances encountered by moving vehicle? Also brief the factors influences these resistances. (10 Marks)
- b. The coefficient of rolling resistance for a truck weighing 62293.5 N is 0.018 and the coefficient of air resistance is 0.0276 in the formula $R = KW + KaAV^2$, N, where A is in m^2 of frontal area and V the speed in km/h. The transmission efficiency in top gear of 6.2:1 is 90% and that in second gear of 15 : 1 is 80%. The frontal area is 5.574 m^2 . If the truck has to have a maximum speed of 88 km/h in top gear, calculate,
 - (i) The engine BP required.
 - (ii) The engine speed, if the driving wheels have an effective diameter of 0.8125 m.
 - (iii) The maximum grade the truck can negotiate at the above engine speed in second gear. (10 Marks)
- 2 a. What are the main functions of automobile clutch? (02 Marks)
- b. Sketch and explain the construction and working of centrifugal clutch. (10 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 in both the sides. The coefficient of the friction is 0.3 and the maximum axial pressure is 8.29×10^4 Pa, and external radius of the friction surface is 1.25 times the internal radius. Calculate the dimensions of the clutch plate and the total axial pressure that must be exerted by the clutch springs, considering uniform wear. (08 Marks)
- 3 a. Discuss with a neat sketch the constructional features and working of over running clutch. (10 Marks)
- b. Sketch and discuss the working of fluid coupling. Also state its advantages and disadvantages. (10 Marks)
- 4 a. With a neat diagram, explain the operation of single stage torque converter. (08 Marks)
- b. What is multi stage torque converter? Draw a sketch of three phase torque converter and explain its working. (12 Marks)

PART – B

- 5 a. Draw a neat sketch and explain the construction and working of synchromesh unit used in gear box. (12 Marks)
- b. The gear ratios of a 3 speed gear box are 3.5, 2.1 and 1 : 1. This vehicle is with a differential unit of 6 : 1 constant ratio. Calculate the speed of the vehicle in each gear, if the engine rpm is 3000 and the rear wheel diameter is 60 cm. (08 Marks)
- 6 a. With a neat sketch, explain the construction and working of Wilson gear box for various gear ratios. (12 Marks)
- b. Sketch and explain the working principle of overdrive and also mention its advantages. (08 Marks)
- 7 a. With a line diagram, explain the working of various types of hydrostatic system. (12 Marks)
- b. Brief the advantages and limitations of hydrostatic drives. (08 Marks)
- 8 a. What is meant by automatic drive? (02 Marks)
- b. Draw a schematic diagram of Borge-Warner type automatic transmission and explain. (10 Marks)
- c. With a layout, explain the operation of electric transmission system. (08 Marks)

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