CBCS SCHEME

USN | | | | | | | | | | |

15AU64

Sixth Semester B.E. Degree Examination, June/July 2018
Automotive Transmission

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

1 a. What is the need of a clutch? What are the requirements of a good clutch? **(08 Marks)**

b. With a neat sketch, explain the construction and working principle as a centrifugal clutch. **(08 Marks)**

OR

2 a. What are the various clutch facing materials? **(03 Marks)**

b. List the common clutch troubles. Explain their causes and remedies. **(07 Marks)**

c. The engine of a car employing a single plate clutch develops maximum torque of 150Nm. External diameter of the clutch plate is 1.2 times its internal diameter. Determine the dimensions of the clutch plate and the axial force provided by the springs. The maximum allowable pressure intensity for the clutch facings is 100kPa and coefficient of friction is 0.3. Assume uniform wear. **(06 Marks)**

Module-2

3 a. With a neat sketch, explain the construction and working principle of a fluid flywheel. **(08 Marks)**

b. What is the necessity of over running clutch? With a neat sketch explain the working principle of cam and roller type over running clutch. **(08 Marks)**

OR

4 a. With a neat sketch, explain the construction and working principle of a single stage torque converter. **(10 Marks)**

b. Explain any two methods used to increase the efficiency of a torque converter. **(06 Marks)**

Module-3

5 a. Explain the following terms in detail: i) Acceleration ii) Gradeability iii) Drawbar pull. **(09 Marks)**

b. The coefficient of rolling resistance for a truck weighing 62293.5N is 0.018 and the coefficient of air resistance is 0.0276 in the formula $R = KW + K_a AV^2$, N. The transmission efficiency in top gear of 6.2:1 is 90% and that in the second gear of 15:1 is 80%. The frontal area is $5.574m^2$. If the truck has to have a maximum speed of 88 km/hr in top gear, calculate,

i) The engine BP required.
ii) The engine speeds if the driving wheels have an effective diameter of 0.8125m.
iii) The maximum grade the truck can negotiate at the above engine speed in second gear.
iv) The maximum drawbar pull available on level at the above engine speed in second gear. **(07 Marks)**

OR

6 a. With a neat sketch, explain the construction and working principle of a constant mesh gear box. **(08 Marks)**

b. 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 3.25mm 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 and layout shaft? **(08 Marks)**

Module-4

7 a. Explain the principle of operation of a planetary transmission system with a neat sketch. **(08 Marks)**

b. Explain the working principle of a Wilson planetary transmission system with a neat sketch **(08 Marks)**

OR

8 a. What is overdrive? Explain the construction and working of an overdrive with a neat sketch **(10 Marks)**

b. The input shaft of an epicyclic type of gear box has two sun wheels each with 25 teeth splined to the shaft. Their corresponding annuli have 100 teeth each. The output shaft has a sun running free on that shaft with 40 teeth, while the corresponding annulus has 80 teeth. Calculate the first, second and reverse gear ratios. **(06 Marks)**

Module-5

9 a. With a neat sketch, explain the working principle of variable displacement pump and constant displacement motor type hydrostatic drive. **(08 Marks)**

b. What are the limitations and advantages of hydrostatic drives? **(08 Marks)**

OR

10 a. With a neat sketch, explain the working principle of Borge-Warner automatic transmission system. **(08 Marks)**

b. Describe the working principle of hydromatic transmission system with a neat sketch. **(08 Marks)**

* * * * *