CBCS SCHEME

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18AU55

Fifth Semester B.E. Degree Examination, Jan./Feb. 2023
Automotive Transmission

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain design details of cone clutch based on uniform rate of wear. **(10 Marks)**

b. A multiplate clutch is to be designed for a motor cycle whose engine develops maximum torque of 3 Nm at 3500 rpm. The external diameter of the clutch racing is limited to 100 mm and the inner diameter may be assumed to be 0.6 times the external diameter. The maximum intensity of pressure may be takes as 80 kPa and $\mu = 0.3$. Calculate the number of plate. **(10 Marks)**

OR

2 a. Sketch and explain the construction and working principle of centrifugal clutch. **(10 Marks)**

b. Sketch and explain the construction and working principle of vacuum operated clutch. **(10 Marks)**

Module-2

3 a. Sketch and explain the construction and working principle of fluid flywheel. **(10 Marks)**

b. With the help of graph, discuss the performance characteristics of a torque converter. **(10 Marks)**

OR

4 a. What is unidirectional clutch? Explain any two. **(10 Marks)**

b. Explain 3 and 4 phase torque converter with sketch and write the advantages. **(10 Marks)**

Module-3

5 a. Briefly discuss the various resistance to motion of the automobile. How can there resistance be minimized? **(10 Marks)**

b. Explain the following :
(i) Traction and tractive effort
(ii) Acceleration grade ability
(iii) Draw bar pull **(10 Marks)**

OR

6 a. A motor vehicle weigh 7975.5 N and its engine develops 14.7 KW at 2500 rpm, at this engine the road speed of the car on the top gear is 64.37 km/h. Bottom gear reduction is 3.5:1 and the efficiency of transmission is 88% on top and 80% on bottom gear. The diameter of tyres is 0.762 m and the projected front area of the vehicle is 1.116 m^2. The coefficient of air resistance is 0.0314 and road resistance is 0.023 N. **(10 Marks)**

b. Sketch and explain the construction and working principle of 3-speed synchromesh gear box. **(10 Marks)**

Module-4

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

b. Explain the basic principle of epicyclic transmission. **(04 Marks)**

c. Briefly explain the principle of simple epicycle gear train with sketch. Show that more number of gear ratios are possible from it. **(10 Marks)**

OR

8 a. What is overdrive? Explain its use in automobile. **(10 Marks)**

b. Explain the construction and working of the Wilson planetary transmission. **(10 Marks)**

Module-5

9 a. Explain the functioning of the hydraulic control in an epicyclic planetary gear system. **(10 Marks)**

b. Write short notes on:
(i) Constant displacement pump and constant displacement motor
(ii) Variable displacement pump and variable displacement motor. **(10 Marks)**

OR

10 a. With a neat diagram, explain the working of Borge Warner automatic transmission system. **(10 Marks)**

b. Explain the basic working principle of hydrostatic drives. **(10 Marks)**

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