



CBGS SCHEME

15AU64

Sixth Semester B.E. Degree Examination, June/July 2019 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. Explain design details of cone clutch based on uniform rate of wear. (06 Marks)
b. A cone clutch with a semi-cone angle of 12° is to transmit 11.19W at 750rpm. The width of the face is $1/4^{\text{th}}$ of the mean diameter and normal pressure between the contact faces is not to exceed 8.27×10^4 Pa. The coefficient of friction is 0.2. Determine the main dimensions of the clutch and the axial force required. (10 Marks)

OR

- 2 With a neat sketch, explain the followings:
i) Semi-centrifugal clutch
ii) Vacuum operated clutch. (16 Marks)

Module-2

- 3 a. Sketch and explain the construction and working principle of fluid flywheel. (08 Marks)
b. With the help of graph, discuss the performance characteristics of a torque converter. (08 Marks)

OR

- 4 a. What is uni-directional clutch? Explain any two. (08 Marks)
b. With a neat sketch, explain the construction and working principle of torque converter. (08 Marks)

Module-3

- 5 a. Briefly discuss the various resistance to motion of the automobile. (08 Marks)
b. Describe the variation of tractive effort and total resistance with the speed of the vehicle with the help of graph. (08 Marks)

OR

- 6 a. A motor vehicle weighs 7975.5N and its engine develops 14.7 kW at 2500 rpm. At this engine speed the road speed of the car on the top gear is 64.37km/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 0.762m and the projected front area of the vehicle is 1.116m^2 . The coefficient of air resistance is 0.0314 and road resistance is 0.023W. Calculate:
i) Speed of car on bottom gear
ii) Tractive effort available at the wheels on top and bottom gear.
iii) Gradient which car can climb on bottom gear. (10 Marks)
b. Sketch and explain the working principle of 3-speed synchromesh gearbox. (06 Marks)

Module-4

- 7 a. Briefly explain the principle of simple epicyclic gear train with sketch. Show that more number of gear ratios are possible from it. (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 annular 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 first, second and reverse gear ratios. (06 Marks)

OR

- 8 a. What is overdrive? Explain its use in automobile. (08 Marks)
- b. An epicyclic train of wheels is arranged as shown in Fig.Q.8(b). How many revolutions does the arm make to which the pinions B and C are attached?
- i) When pinion-A makes one revolution clock-wise and pinion-D makes half a revolution anti-clockwise.
- ii) When pinion-A makes one revolution clockwise and pinion-D is stationary. Number of teeth on the pinion-A and D are 40 and 90 respectively. (08 Marks)

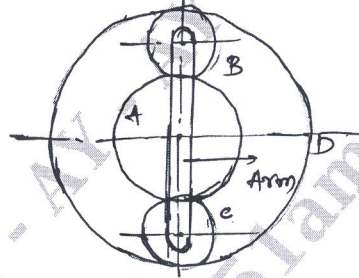


Fig.Q.8(b)

Module-5

- 9 a. Write a short notes on:
- i) Constant displacement pump and constant displacement motor. (08 Marks)
- ii) Variable displacement pump and variable displacement motor. (08 Marks)
- b. With a neat diagram, explain the working of Borge-Warner automatic transmission system. (08 Marks)
- OR**
- 10 a. Explain the basic working principle of hydrostatic drives. (08 Marks)
- b. Discuss the functioning of the hydraulic control in an epicyclic planetary gear system. (08 Marks)
