CBCS SCHEME

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15AU64

Sixth Semester B.E. Degree Examination, July/August 2022
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 clutch in the transmission system? What are the requirements of a good clutch? **(08 Marks)**

b. Explain the construction and working of an electromagnetic clutch with a neat sketch. **(08 Marks)**

OR

2 a. Discuss the working principle of centrifugal clutch with a sketch. **(06 Marks)**

b. In a cone clutch, the semi-angle of cone is 15°, $\mu = 0.35$ and the contact surfaces have an effective mean diameter of 80 mm. If the axial force applied is 196.2 N. Find the torque required to produce the slipping of the clutch under uniform wear. Calculate the time required to attain the full speed and also the energy lost in the slipping of the clutch, if the clutch is employed to connect an electric motor, running uniformly at 1200 rpm with a flywheel which is stationary and has a moment of inertia of 3.4 N-m^2. **(10 Marks)**

Module-2

3 a. Explain the basic working principle of a fluid coupling with a sketch. **(10 Marks)**

b. What is over running clutch? Explain its necessity in automobiles. **(06 Marks)**

OR

4 a. Distinguish fluid couplings over torque converters. **(04 Marks)**

b. Explain the typical hydrodynamic transmission with a figure. **(12 Marks)**

Module-3

5 a. Explain the following terms:
(i) Power for propulsion
(ii) Tractive effort
(iii) Acceleration
(iv) Gradiability **(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. Sketch and explain the working of 3-speed 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 differential pitch of each gear is 3.25 mm and the smallest pinion is to have atleast 15 teeth. Determine the suitable number of teeth of the different gears. What is then the distance between the main and lay shaft? **(08 Marks)**

Module-4

7 a. Describe the principle of 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 sunwheels 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)**

OR

8 a. Explain the working principle of an over drive with a neat sketch. **(08 Marks)**

b. An epicyclic gear consists of three wheels, A, B and C shown in Fig.Q8(b). Wheel A has 12 teeth C has 32 external teeth. The wheel B gear with both A and C is carried on an arm which rotates about the centre of A at 18 rpm. If wheel A is fixed, determine the speeds of B and C.

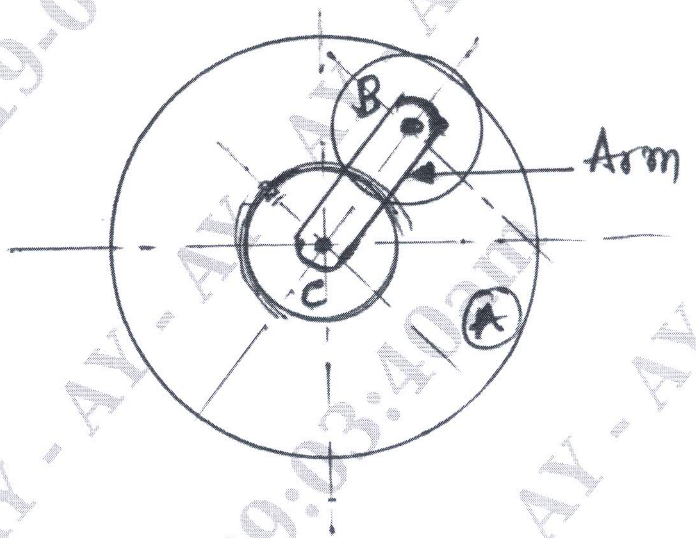

Fig.Q8(b) **(08 Marks)**

Module-5

9 a. Discuss the working principle of hydrostatic drive system with a sketch. **(10 Marks)**

b. Write a short note on variable displacement pump and constant displacement motor. **(06 Marks)**

OR

10 a. What is automatic transmission? Mention its advantages and limitations. **(08 Marks)**

b. Explain the working of Borg-Warner type-automatic gearbox with a sketch. **(08 Marks)**

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