

CBCS SCHEME

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Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024 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 the following terms:
- i) Gradability
 - ii) Tractive effort
 - iii) Draw bar pull
 - iv) Traction. (10 Marks)
- b. Explain with graphs the various resistances offered by a vehicle in moving condition. (10 Marks)

OR

- 2 a. Explain the construction and working of constant mesh gear box with a line diagram. (10 Marks)
- b. A sliding mesh type of gear box with forward speeds only is to be designed. The gear box should have the following gear ratios available approximately : 1.0, 1.5, 2.5 and 3.9. The centre distance between the layshaft and the mainshaft is 78mm and the smallest gear is to have at least 16 teeth with a diametral pitch of 3.25mm. Calculate the number of teeth of the various gears and the exact gear ratios thus available. (10 Marks)

Module-2

- 3 a. Describe working of a single plate clutch with the help of a diagram. (10 Marks)
- b. Discuss operation of following with sketch :
- i) Electromagnetic clutch
 - ii) Vacuum operated clutch. (10 Marks)

OR

- 4 a. Write short notes on following:
- i) Percentage slip
 - ii) Sprag clutch
 - iii) Ball and roller one-way clutches. (10 Marks)
- b. A multiplate clutch is to be designed for a motor cycle whose engine develops maximum torque of 13Nm at 3500rpm. The external diameter of the clutch facings is limited to 100mm and the inner diameter may be assumed to be 0.2 times the external diameter. The maximum intensity of pressure may be taken as 80kPa and $\mu = 0.3$. Calculate the number of plates. (10 Marks)

Module-3

- 5 a. Describe the working of Wilson Planetary transmission with suitable figure. (10 Marks)
- b. Discuss the pre-selective mechanism with suitable figure. (10 Marks)

OR

- 6 a. Explain the Ford-T gear box with suitable sketch. (10 Marks)
b. With suitable figure explain the working of over drives. (10 Marks)

Module-4

- 7 a. Explain the basic working principle of hydrostatic drives. (10 Marks)
b. With a neat sketch, explain the working of variable displacement pump and constant displacement pump. (10 Marks)

OR

- 8 a. With a neat diagram, describe the working of Borg Warner automatic transmission. (10 Marks)
b. Discuss the basic four-speed hydraulic control system, with neat sketch. (10 Marks)

Module-5

- 9 a. Discuss the construction and working of automobile differential with neat sketch. (10 Marks)
b. Write short notes on the following:
i) Torque-speed characteristics
ii) EV motor sizing. (10 Marks)

OR

- 10 a. Analyze the construction and working of permanent magnet DC machine with neat diagram. (10 Marks)
b. Explain the construction and operation of wound field DC machine with neat sketch. (10 Marks)
