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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Automobile Engineering

Semester End Examination; July / Aug. - 2022

Automotive Transmission

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Design and select clutch for different automotive vehicles and discuss working of different types of clutches.

CO2: Discuss different types of fluid flywheel and torque converters

CO3: Determine gear ratios and explain the different types of gear boxes for different vehicles requirements.

CO4: Discuss and determine gear ratios of different epicyclic gear boxes and their working.

CO5: Explain the different automatic transmission systems used in automotive vehicles and their advantages and limitation.

Note: ***I) PART - A*** *is compulsory.* ***Two*** *marks for each question.*

II) PART - B*: Answer any* ***Two*** *sub questions (from a, b, c) for a Maximum of* ***18 marks*** *from each unit.*

Q. No.	Questions	Marks
	I : PART - A	**10**
I a.	Write the torque equation in case of clutch.	2
b.	What is the basic difference between fluid fly wheel and torque converter?	2
c.	Mention the top gear ratio.	2
d.	Name the active members of planetary gear box.	2
e.	Mention the position of a control lever for automatic transmission.	2
	II : PART - B	**90**
	UNIT - I	**18**
1 a.	Explain the construction and working of a multiplate clutch with neat sketch.	9
b.	Derive an expression for effective mean radians and torque transmitted in case of single plate clutch assuming uniform intensity of pressure.	9
c.	A friction clutch is required to transmit 33.12 kW at 2000 rpm. It is to be of single plate disc type with both sides of the plate effective, the pressure being applied axially by means of spring and limited to 6.87×10^4 Pa. If the outer diameter of the plate is to be 0.305 m, find the required inner diameter of the clutch ring and the total force exerted by the springs. Assume the wear to be uniform and coefficient of friction 0.3.	9
	UNIT - II	**18**
2 a.	Sketch and explain the construction and working of torque convertor.	9
b.	With neat sketches, explain the working of sprag and roller one way clutches.	9
c.	Sketch and explain the construction and working of fluid coupling.	9
	UNIT - III	**18**
3 a.	Discuss the types of resistances acting on moving vehicle.	9
b.	Sketch and explain the construction and working of constant mesh gear box.	9

Contd… 2

c.	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 diametrical pitch of each gear is 3.25 mm and smallest pinion is to have at least 15 teeth. Determine the suitable number of teeth different gears. Also, determine the distance between the main and lay shafts.	9

UNIT - IV **18**

4 a.	Sketch and explain the working principle of epicyclic gear box.	9
b.	With a neat sketch, explain the two speed epicyclic gear box.	9
c.	Explain the working of over drive with a neat sketch.	9

UNIT - V **18**

5 a.	With schematic diagram, explain the working of Borge-Warner automatic transmission.	9
b.	Explain the principle of hydraulically controlled gearshift mechanism.	9
c.	Discuss the difference between manual and automatic transmission.	9

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