

Third Semester B.E./B.Tech. Degree Examination, June/July 2025

Automotive Transmission

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	With mathematical expressions describe power required to propel a vehicle.	05	L1	CO1
	b.	Infer on selection of the top and bottom gear ratios.	05	L1	CO1
	c.	How it is made use in a gear box that at no time two gears are engaged simultaneously. Illustrate your answer by means of a neat sketch of an interlocking device.	10	L3	CO2
OR					
Q.2	a.	Sketch and explain the construction and working of a synchromesh gear box. What are its merits?	10	L2	CO1
	b.	An automobile gear box gives 3 forward speeds and one reverse with a top gear of unity and bottom and reverse gear ratio of approximately 3.3 : 1. The centre distance between the shafts is to be 110 mm approximately. Gear teeth of module 3.25 mm are to be employed. Sketch the layout of a typical constant mesh gear box for these conditions giving the number of teeth for the various gear wheels and showing closely how the different ratios are obtained.	10	L4	CO2
Module – 2					
Q.3	a.	Analyze various factors affecting torque transmission in a clutch and write a comprehensive note on classification of clutches.	10	L3	CO1
	b.	Describe the working principle of a fluid flywheel with the help of suitable diagram and discuss the characteristics, merits and demerits.	10	L3	CO1
OR					
Q.4	a.	The engine of a car employing a single plate friction clutch develops maximum torque of 150 Nm. External diameter of the clutch plate is 1.2 times its internal diameter. Determine the dimensions of the clutch plate and the axial force provided by the springs. The maximum allowable pressure intensity for the clutch facings is 100 KPa and coefficient of friction is 0.30. Assume uniform wear.	10	L4	CO1
	b.	Explain the construction, working and uses of roller type overrunning clutch.	10	L3	CO2
Module – 3					
Q.5	a.	Describe the principle of epicyclic gear train with sketch. Show that more number of gear ratios is possible.	10	L2	CO3
	b.	Explain with neat sketch Wilson planetary gear box.	10	L2	CO3

OR

Q.6	a.	What are the advantages of an over drive? Explain its working principle with a neat sketch.	10	L1	CO3
	b.	Explain with neat sketch Ford-T model gear box.	10	L2	CO3

Module – 4

Q.7	a.	Evaluate the advantages and disadvantages of automatic transmission in comparison to manual transmission within the context of efficiency and societal preferences.	10	L1	CO3
	b.	Compare the performance of a constant displacement pump versus a variable displacement pump in terms of energy efficiency, control precision and application.	10	L4	CO3

OR

Q.8	a.	Evaluate the limitations of hydrostatic drives in high-speed applications. How could these limitations be mitigated through engineering design or the use of hybrid systems?	10	L2	CO3
	b.	Explain the working of Borg-Warner type automatic gearbox with a sketch.	10	L3	CO3

Module – 5

Q.9	a.	Draw different configuration of drive trains in electric vehicles. Briefly explain each configuration.	10	L3	CO4
	b.	Explain the role of a DC-DC power converter in an electric drive system. How does it influence the overall efficiency and control of the electric motor?	10	L2	CO4

OR

Q.10	a.	How do vehicle mass, desired acceleration and rated vehicle velocity impact the choice of motor size for an EV?	10	L4	CO4
	b.	How do the torque-speed characteristics of an electric motor impact the driving experience of an EV, and how do they differ from internal combustion engines in terms of transmission design.	10	L1	CO4
