Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2024

MECHANICAL ENGINEERING
Fifth Semester
ME 5071 AUTOMOBILE ENGINEERING
(Regulation 2019)

Time: 3 hrs | Max.Marks: 100

CO 1	Explaining various types of automobiles, their power packs and types of vehicle bodies
CO 2	Analyzing the various types of power train and fuel supply and management systems
CO 3	Analyzing the various types of transmission systems for a vehicle
CO 4	Analyzing the working parameters of various braking and suspension system in a vehicle
CO 5	Analyzing the working parameters of various electrical and electronic devices in a vehicle

BL – Bloom's Taxonomy Levels
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

Q. No	Questions	Marks	CO	BL
1	List out any two safety standards applicable for an automobile.	2	1	L1
2	Mention the necessity for the Motor Vehicles Act.	2	1	L2
3	List out reasons why ethanol is blended with gasoline?	2	2	L2
4	Draw a schematic of a hybrid vehicle setup.	2	2	L2
5	Mention the functions of an axle in an automobile.	2	3	L2
6	How do you specify a radial automotive tyre?	2	3	L1
7	What is the functioning of a proportional valve in braking system?	2	4	L1
8	Why it is necessary to carryout wheel balancing periodically?	2	4	L2
9	Do we really need a HVAC system for an automobile? Justify.	2	5	L2
10	What is OBD? Mention its necessity.	2	5	L1

PART- B (5 x 13 = 65 Marks)

(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks	CO	BL
11 (a) (i)	Explain with suitable illustrations some commonly found types of automobile and their power train.	6+7	1	L3
	OR			
11 (b) (i)	Write about the current emission norms for Chennai considering any Diesel LMV or heavy vehicle.	6	1	L2
(ii)	With a schematic discuss briefly about types of body for different class of automobiles.	7	1	L3

12 (a) (i)	Mention atleast two merits and demerits of the following alternate fuels: a) Methanol b) CNG c) LPG d) Hydrogen	3*3+4	2	L2
	OR			
12 (b) (i)	With a sketch describe the exhaust treatment system for a modern day CI engine.	6+4	2	L3
(ii)	Under what A/F mixture conditions does a catalytic converter achieves maximum effectiveness in cleaning the exhaust. Support your answer with a graph / sketch	3	2	L2
13 (a) (i)	State the need for a clutch in an automobile. With a sketch explain the operation of a clutch in a light motor vehicle.	5+4	3	L2
(ii)	Draw a simple sketch of a fully floating and semi-floating axle	4	3	L3
	OR			
13 (b) (i)	Draw a neat sketch of a differential and discuss about its operation.	4+4	3	L3
(ii)	Draw a sketch of a front suspension system employed in a car.	5	3	L2
14 (a) (i)	Draw a neat sketch of a steering system of a car and label the parts. Also discuss about the working of a E-PAS system.	6+3	4	L3
(ii)	Briefly discuss about the need for Wheel alignment.	4	4	L3
	OR			
14 (b) (i)	List out the different steering geometry parameters and their significance.	7	4	L3
(ii)	Draw a sketch of a hydraulic braking system employed in a car.	6	4	L2
15 (a) (i)	Brief about the safety systems in an automobile	5	5	L3
(ii)	State the necessity of a i) Alternator ii) Starter Motor and how they function?	8	5	L2
	OR			
15 (b) (i)	Discuss briefly about – EBD, ESP, automatic headlamp ON and rain sensing wipers	8	5	L2
(ii)	Draw a schematic of a HVAC system of a car and discuss its working.	5	5	L2

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16. i)	Discuss briefly about electronic engine management system for a Diesel engine. Support your answer with a simple schematic.	4+5	2	L2
ii)	Why periodic servicing of automobiles is necessary? Mention some salient points taken up in periodic servicing of automobiles.	6	4	L3