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

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. (Full Time) - END SEMESTER EXAMINATIONS, NOV/DEC 2023

COMMON TO MECHANICAL, MANUFACTURING & AUTOMOBILE ENGINEERING BRANCHES

V Semester

ME5071 Automobile Engineering

(Regulation 2019)

Time: 3 hrs. Max. Marks: 100

CO 1	Distinguishing the different types of automobiles and chassis.
CO 2	Interpreting the various types of engines and their emission control.
CO 3	Selecting the appropriate transmission systems.
CO 4	Comparing the braking and steering systems.
CO 5	Inferring the functions of different electrical and electronic components

BL – Bloom's Taxonomy Levels

(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)

Q. No	Questions	Marks	CO	BL
1.	Classify automobiles based on their applications.	2	1	L4
2.	Write short note on MV Act, 1988.	2	1	L1
3.	Choose an emerging engine technology that caused the introduction of particulate matter (PM) emission limit for the first time in BS VI emission norms for light duty petrol vehicles from the following options: a) Ethanol addition b) Direct injection c) Hybrid powertrain d) EGR.	2	2	L5
4.	Defend the statement – "Hydrogen's use as an alternative fuel for automobiles benefits our environment".	2	2	L5
5.	Show the path of actuating force during disengaging operation of a single plate clutch through its various components starting from the clutch pedal to its final component by using a block diagram.	2	3	L3
6.	Compare tubeless tyres and tube tyres.	2	3	L5
7.	Draw a schematic diagram of air braking system with its components.	2	4	L3
8.	Mention the importance of periodic servicing of vehicles.	2	4	L1
9.	State the function of alternator in automobiles.	2	5	L2
10.	Discuss briefly on the benefits of employing OBD system in automobiles.	2	5	L2

PART- B (5 x 13 = 65 Marks)

Q. No	Questions	Marks	CO	BL
11 (a).	Discuss on the features of different automobile safety standards and regulations that are applicable for passenger cars in India	13	1	L2
	OR			
(b).	Describe the construction, advantages and disadvantages of different chassis layouts of automobiles based on engine and drive axle positons with neat sketches	13	1	L2
12 (a).	Draw a block diagram of Common Rail Direct Injection system of CI engines and tabulate its components with their functions	13	2	L1
	OR			
(b).	Sketch the constructional diagram of a three-way catalytic converter employed in SI engines, and list the function of each material, as well as the various conversion reactions involved in it.	13	2	L1
13 (a).	Compare the construction, operating principle and characteristics of the three different gearbox types used in manual transmission systems with supporting figures.	13	3	L4
	OR			
(b).	Explain the construction and working principle of automobile differentials with neat sketch.	13	3	L4
14 (a).	Briefly explain the construction, working principle, advantages and limitations of rack and pinion steering system with neat sketch.	13	4	L4
	OR			
(b).	Distinguish among the wheel alignment parameters - Camber, Caster, and Toe - based on their definitions, purposes, benefits and the issues that arise when their recommended limits are exceeded.	13	4	L4
15 (a).	Examine the effectiveness of seat belt and airbag safety systems in their individual and collaborative roles on enhancing occupant safety with each of their working principles.	13	5	L3
	OR			
(b).	Illustrate the benefits and working principle of Anti-lock Braking System (ABS) with neat sketch.	13	5	L3

PART- C (1 x 15 = 15 Marks)

16 i.	Evaluate the operational concepts and significance of any three different sensors employed in various electronic safety systems of automobiles.	6	5	L5
ii.	Conceptualize a future automobile or mobility system designed to operate on sustainable energy sources with minimal environmental impact. Present your vision in the form of a schematic diagram by including its components, energy sources and subsystems. Also list down important features of the concept.	9	1	L6
