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ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)**B.E / B. Tech/ B. Arch (Full Time) END SEMESTER ARREAR EXAMINATIONS – APRIL / MAY 2024****MECHANICAL ENGINEERING****V Semester****ME5071 Automobile Engineering****(Regulation 2019)**

Time: 3 Hours

Max. Marks 100

PART- A (10 x 2 = 20 Marks)**(Answer ALL Questions)**

Q.No	Questions	Marks
1.	Differentiate between a spark plug and a fuel injector.	2
2.	What are the major ride comfort problems in an automobile?	2
3.	What is a hybrid electric vehicle?	2
4.	Mention the types of gasoline injection system(s) present.	2
5.	Gist the types of suspension systems available.	2
6.	What is the function of a gear box?	2
7.	Why regular servicing of automobiles is mandatory in European countries?	2
8.	List any four types of brakes used in automobiles.	2
9.	What is the function of an electronic control unit in automobile?	2
10.	Why hydrogen powered automobiles are not in commercial use in India?	2

PART- B (5 x 13 = 65 Marks)

Q.No	Questions	Marks
11.	(a) Enumerate the functions of an automobile frame. Discuss on the types of chassis frames with merits and demerits. Also brief upon Bharath Stage VI emission norms for automobiles.	13
	OR	
	(b) Deliberate the factors that depend upon the fuel economy. Also, brief upon the following new trends in automobile, (a) Additive manufacturing and (b) Artificial Intelligence.	13
12.	a) With a simple schematic sketch, explain the principle, working and functioning of a catalytic converter.	13
	OR	
	b) What is a hybrid vehicle? Explain the various key elements in a hybrid vehicle with a simple diagram and discuss the term; (a) Parallel hybrid and (b) Series hybrid.	13
13.	a) Explain in detail about the necessity of suspension system in an automobile? Also list its limitations.	13
	OR	
	b) Explain the working principle of a friction clutch with a neat sketch with the merits and demerits.	13
14.	a) What is the necessity of a braking system in an automobile? Write notes on Mechanical brake, Hydraulic brake and Pneumatic brake with simple sketc's.	13
	OR	

	b) Explain in detail about the need for steering system and brief upon the key steering geometry parameters.	13
15.	a) Explain the following automobile safety systems; (i) Seat belt, (ii) Air bags, (iii) Anti-lock braking system & (iv) Collision warning system.	13
	OR	
	b) Explain the working principle of an alternator with a neat sketch? Gist the symptoms of a bad alternator.	13

PART- C (1 x 15 = 15 Marks)

(Q.No. 16 is Compulsory)

Q. No	Questions	Marks
16 (i)	Explain the need and various components of a HVAC system in an automobile?	10
(ii)	Write short notes on the integration of Hydrogen as primary fuel in two wheelers in India.	5

