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

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

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

B.E Manufacturing Engineering

Semester V

PR5072 PRODUCTION OF AUTOMOTIVE COMPONENTS

(Regulations 2019)

Time: 3 hrs | Max.Marks: 100

CO1	Acquire knowledge on the manufacturing of piston assembly, cylinder and cylinder head components
CO2	Acquire knowledge on the manufacturing of various engine components.
CO3	Understand the manufacturing of fuel and transmission system.
CO4	Acquire knowledge on the production of chassis and suspension system
CO5	Acquaint with the recent development in automobile manufacturing

BL – Bloom's Taxonomy Levels

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

PART- A (10 x2 =20 Marks)

(Answer all Questions)

Q.No	Questions	Marks	CO	BL
1	Define compression ratio.	2	1	L1
2	State true or false. Aluminium cylinder block with enclosed cast iron liners re used to increase cooling performance. Justify your answer.	2	1	L3
3	How do the Venturi effect and choke mechanism in a carburetor contribute to the atomization of fuel and help to start a cold engine?	2	2	L2
4	What is the primary function of a push rod and rocker arm in an internal combustion engine?	2	2	L2
5	Differentiate between an open differential and a limited-slip differential system.	2	3	L2
6	Why disc brakes are used in front wheel and drum brakes are used in rear wheel in most passenger car?	2	3	L3
7	Contrast between Twin-tube and Mono-tube shock absorbers.	2	4	L3
8	Mention any four non-metallic materials used for chassis components with example.	2	4	L2
9	State the working principle of tire pressure monitoring system.	2	5	L2
10	In what ways do MMC liners and thermal barrier coatings improve the efficiency of internal combustion engines?	2	5	L3

PART- B (5 x 13 = 65 Marks)

Q.No	Questions	Marks	CO	BL
11 (a)	Identify and analyze the different production process to manufacture piston and testing involved in piston assembly.	13	1	L3
	OR			

11 (b)	Compile and relate various operations involved in the manufacturing of engine block.	13	1	L3
12 (a)	Discuss in detail the working principle and production process involved in crankshaft and connecting rod manufacturing.	13	2	L3
	OR			
12 (b)	Enumerate various valve operating mechanisms and with neat schematic relate the different steps in inlet and exhaust valve manufacturing process.	13	2	L3
13 (a) i)	Describe the working principle of fuel injection pumps for diesel engines with neat diagram.	7	3	L2
ii)	Explain the working principles, types and manufacturing operations involved in gear box.	6	3	L2
	OR			
13 (b) (i)	With neat schematic explain the working and components in clutch system.	7	3	L2
(ii)	Describe the functions, types of joints and mention the process steps in propeller shaft production.	6	3	L2
14 (a)	Classify the various types and components of suspension system.	13	4	L3
	OR			
14 (b)	Analyze the step-by-step production process involved in wheel assembly.	13	4	L3
15 (a)	Illustrate the working principles, chemical reactions and advancements of three way catalytic converter and analyze the manufacturing process of ceramic monolith and metallic monolithic honey comb substrate in catalytic converter.	13	5	L4
	OR			
15 (b) (i)	Outline the hydroforming process and its types with a case study.	7	5	L4
(ii)	Identify and explain the application and working of appropriate sensors and actuators in air bag deployment system.	6	5	L4

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q.No	Questions	Marks	CO	BL
16. (i)	Create an innovative energy-absorbing steering column for autonomous vehicles that integrates energy absorption features while minimizing weight and maximizing energy efficiency. Assess the impact of your design on the vehicle's overall performance and handling.	7	3	L6
(ii)	Design a conceptual automobile with advanced aerodynamic features to reduce drag and improve fuel efficiency. Explain how these features would impact stability at high speeds and in crosswinds. Propose a testing methodology to evaluate the crashworthiness of the vehicle in real-world accident scenarios.	8	4	L6

ADDITIONAL CONTROLLER OF EXAMINATIONS
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