K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:VI
Class:TY	Program:B.Tech
Branch Code:ROB	Pattern:2022
Name of Course:Automobile Engineering	Course Code:ROB223015(D)
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	Differentiate between conventional chassis frame construction and unitised frame body construction. List four materials commonly used for chassis components.	(6)	CO1
Question No. 2			
2a)	Explain the working principle of a Synchromesh gearbox. What is the function of a universal joint in a propeller shaft?	(6)	CO2
Question No. 3			
3a)	Explain the working principle of a hydraulic power steering system. What are its main advantages?	(8)	CO3
	OR		
3b)	Define Cornering Force, Slip Angle, and Scrub Radius. Explain the working of a four-wheel steering system.	(8)	CO3
3c)	Compare and contrast full floating, three-quarter floating, and semi-floating rear axles, highlighting the loads supported by each.	(8)	CO3
	OR		
3d)	Explain the necessity of wheel alignment and wheel balancing. Describe the constructional differences between a radial-ply tyre and a cross-ply (bias-ply) tyre.	(8)	CO3
Question No. 4			
4a)	Explain the construction and working of a disc brake assembly. What is meant by 'servo braking' (power brakes)?	(8)	CO4
	OR		
4b)	Describe the complete layout of an air brake system as used in heavy vehicles, explaining the function of each major component.	(8)	CO4
4c)	Explain the construction and working of a telescopic shock absorber. Why is damping necessary in a suspension system?	(8)	CO4
	OR		

4d)	Describe the construction and advantages of air springs (air suspension). What is an interconnected suspension system?	(8)	CO4

Question No. 5

5a)	Define tractive effort. Explain the factors affecting vehicle stability during cornering. What are active safety systems?	(8)	CO4

OR

5b)	Explain the terms 'road resistance' and 'tractive effort'. Describe how road performance curves are used to understand vehicle performance.	(8)	CO4
5c)	List the key items to be checked in a schedule maintenance chart for a passenger car. Explain the purpose of this chart.	(8)	CO4

OR

5d)	Explain the basic layout and working of a battery electric vehicle (BEV). Briefly discuss the key principles of vehicle interior ergonomics.	(8)	CO4

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