



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

**Sixth Semester, B.E. - Automobile Engineering**

**Semester End Examination; August - 2023**

**Automotive Chassis and Suspension**

Time: 3 hrs

Max. Marks: 100

### Course Outcomes

The Students will be able to:

CO1: Identify different chassis layouts and frames and analyze for performance automobiles and suitability of frames.

CO2: Analyze front axles and steering systems and its auxiliaries and determine major dimensions of the same.

CO3: Analyze propeller shaft, differential and rear axle and its auxiliaries and determine major dimension of the same.

CO4: Analyze braking system and determine major dimension of the same.

CO5: Analyze suspension system and wheel and tires. Also determine major dimension of the suspension system.

**Note: I) PART - A is compulsory. Two marks for each question.**

**II) PART - B: Answer any Two sub questions (from a, b, c) for a Maximum of 18 marks from each unit.**

**III) Draw neat sketches whenever necessary.**

**IV) Use of Design Data Handbook is permitted.**

Q. No.	Questions	Marks	BLs	COs	POs
<b>I : PART - A</b>		<b>10</b>			
1 a.	Write a note on frame defects.	2	L1	CO1	PO2
b.	List the factors influencing wheel alignment.	2	L1	CO5	PO2
c.	What is trans-axle?	2	L1	CO3	PO2
d.	What is bleeding of hydraulic brakes? Indicate its sequence.	2	L1	CO4	PO2
e.	Indicate the need for tyre rotation.	2	L1	CO5	PO2
<b>II : PART - B</b>		<b>90</b>			
<b>UNIT - I</b>		<b>18</b>			
2 a.	Sketch and illustrate the merits and demerits of front engine rear wheel drive.	9	L3	CO1	PO2
b.	List and explain the different types of frames used in automobiles.	9	L3	CO1	PO2
c.	Indicate the materials used in frame and discuss the stresses on frames.	9	L2	CO1	PO2
<b>UNIT - II</b>		<b>18</b>			
3 a.	Sketch and explain the terms oversteer and understeer.	9	L2	CO2	PO2
b.	What is power steering? Illustrate the types of power steering with brief explanation of each.	9	L3	CO2	PO2
c.	Discuss the various troubleshooting aspects of steering systems.	9	L2	CO2	PO2

**UNIT - III****18**

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|--|---|----|-----|-----|
| 4 a. Sketch and illustrate the principle of Differential.                | 9 | L3 | CO3 | PO2 |
| b. Explain the working of hotchkiss drive with a sketch.                 | 9 | L2 | CO3 | PO2 |
| c. Discuss the term torque reaction, driving thrust hand braking torque. | 9 | L2 | CO3 | PO2 |

**UNIT - IV****18**

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|---|---|----|-----|-----|
| 5 a. "Disc brakes are generally used at the front wheels". Justify the statement and indicate the merits of disc brakes over drum brakes. | 9 | L4 | CO4 | PO2 |
| b. Sketch and illustrate the construction and working of hydraulic brakes.  | 9 | L3 | CO4 | PO2 |
| c. Why adjustment of brakes is necessary? Discuss the brakes component with neat sketch.  | 9 | L2 | CO4 | PO2 |

**UNIT - V****18**

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|--|---|----|-----|-----|
| 6 a. Discuss the merits of independent suspension over beam axle suspension system and write a note on stabilizer bar. | 9 | L2 | CO5 | PO2 |
| b. Illustrate the factors affecting tyre life.   | 9 | L3 | CO5 | PO2 |
| c. Explain the different types of tyre construction.   | 9 | L2 | CO5 | PO2 |

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