



Name:			
Enrolment No:			
<b>UPES</b> <b>Supplementary Odd Examination, December 2023</b>			
<b>Course: Components of Automotive Chassis</b> <b>Program: B. Tech ADE</b> <b>Course Code: MEAD2004</b>		<b>Semester : III</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions:</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1	What are the different types of sections used in the vehicle frame?	4	CO1
Q 2	List the design requirements of the suspension system.	4	CO2
Q 3	Define the spring rate and spring index of the coil spring.	4	CO1
Q 4	Explain the three different zones for designing a vehicle body for crashes.	4	CO2
Q 5	List out the various components of a clutch. Why is a cone clutch more effective than a plate clutch?	4	CO3
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	State and explain different types of impact occurring in car accidents. What are the necessary features of a safe vehicle body? Explain the desired dummy performance with respect to vehicle crashworthiness.	10	CO2
Q 7	Explain the method of calculation of total resistance to vehicle motion.	10	CO4
Q 8	Derive the expressions for maximum torque transmission capacity and maximum applied for a single plate frictional clutch. Under what conditions the Uniform pressure theory and uniform wear theories are used?	10	CO2
Q 9	Write short notes on the following: (i) Ackermann steering geometry. (ii) Classification of Suspension Systems (iii) Semi-floating axle.	10	CO3
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	Describe in detail various loads acting on the vehicle chassis with neat sketches.	20	CO4

Q 11	<p>Explain the purpose of motor vehicle suspension. What are the advantages of independent suspension over solid axle suspension? Derive the expression for maximum deflection for a semi-elliptical spring acted by a load <math>W</math>. Also, briefly explain the purpose of using shackles in these springs.</p> <p style="text-align: center;">OR</p> <p>Discuss in detail the various types of gearboxes. Also, mention its advantages and limitations.</p>	<b>20</b>	<b>CO3</b>
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