

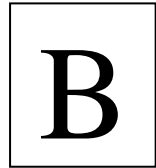


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SNS College of Technology, Coimbatore-35.
(Autonomous)

B.E/B.Tech- Internal Assessment -I
Academic Year 2023 – 2024 (Odd)



Fifth Semester

Automobile Engineering

19AUT302 – VEHICLE DYNAMICS AND STRUCTURES

Time: 1^{1/2} Hours

Maximum Marks: 50

Answer All Questions

PART - A (5 x 2 = 10 Marks)

	CO	Blooms
1 Analyze the value for air resistance for a vehicle at Stationary condition.	CO1	Ana
2 Mention the various resistance offered to a vehicle motion.	CO1	Rem
3 Define Tractive Effort	CO1	Rem
4 Analyze the various tire moments	CO2	Ana
5 Identify the modification that can be done in tire design to perform well in wet surface	CO2	Ana

PART – B (40 Marks)

6 (a) An engine is required to power weight of a vehicle 40937 N. Engine speed is 2400 rpm, maximum grade the vehicle to negotiate at 32 km/ hr in second gear to be 15%. Rolling Resistance coefficient is 0.017. Air resistant coefficient is 0.0324. Frontal area is 5.2 m ² . Efficiency of transmission is 80%. Wheel radius is 0.419 m. Final drive ratio is 3.92:1. Find the Gearbox ratio and Power required.	13	CO1	App
(or)			
(b) For a typical motor car, the road resistance is given by 23N per 1000N, the air resistance is given by expression $0.0827V^2$. Transmission efficiency is 88% in top speed, car weights 19934 N when fully loaded. Calculate (a) Power Required for a top speed of 144 km/hr, (b) Acceleration at 48 km/hr, assuming the torque at 48 km/hr in the top gear is 25% more than at 144 km/hr, (c) The power required to drive the car up a gradient of 1 in 5 at 48km/hr, the transmission efficiency is 80% in bottom gear. The resistance being in N and V the speed in km/hr and $g = \text{acceleration due to gravity} = 9.8\text{m/s}^2$	13	CO1	App
7 (a) Examine the cornering property of tire in detail.	13	CO2	Ana
(or)			
(b) Analyze the performance parameters of tire on wet surfaces in detail.	13	CO2	Ana

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|----|-----|--|----|------------|------------|
| 8. | (a) | Inspect the assumptions that need to be carried out while designing a vehicle. | 14 | CO1 | Ana |
| | | (or) | | | |
| | (b) | Analyze the various forces and moments of Tire with a neat sketch | 14 | CO2 | Ana |