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

A

Time: 1¹ᐟ² Hours   **Maximum Marks: 50**

Answer All Questions

PART - A (5 x 2 = 10 Marks)

		CO	**Blooms**
1	Analyze the importance of Initial Torque in Heavy Vehicles	**CO1**	**Ana**
2	List out the various resistance offered to vehicle motion.	**CO1**	**Rem**
3	Define Gradability.	**CO1**	**Rem**
4	Analyze the various tire forces	**CO2**	**Ana**
5	Identify the modification that can be done in tire design to perform well in cornering	**CO2**	**Ana**

PART – B (40 Marks)

6	(a)	The coefficient of rolling resistance for a truck weighing 62293.5 N is 0.018 and the coefficient of air resistance is 0.0276 in the formula $R = KW + K_aAV^2$. The transmission efficiency in top gear of 6.2:1 is 90% and that in the second gear of 15:1 is 80%. The frontal area is 5.574m². If the truck has to have a maximum speed of 88 km/hr in top gear. Calculate (i)Engine Power Required (ii) The Engine speed if the driving wheel have an effective diameter of 0.8125 m, (iii) The maximum grade the truck can negotiate at the above engine speed in second gear, (iv) The maximum drawbar pull available on level at the above engine speed in second gear.	13	**CO1**	**App**

(or)

	(b)	A car of weight 14224.5 N is fitted with an engine developing 31kW, the top gear ratio is 4.5:1 with an effective wheel diameter of 0.66 m and transmission efficiency of 88% at 2000 rpm. Rolling resistance equal to 14N/1000N and $R_a=0.0775V^2$ Total Inertia of the car including that of engine transmission and road wheel may be assume equal to that of weight of 17805 N. Calculate (i) Forward speed at 2000 rpm, (ii) Power available for hill climbing at this speed, (iii) Maximum Acceleration at this speed.	13	**CO1**	**App**

7	(a)	Analyze the various forces and moments involved in tires with a neat sketch	13	**CO2**	**Ana**

(or)

	(b)	Examine the ride property of a tire in detail.	13	**CO2**	**Ana**

8. (a) Analyze the assumptions that need to be carried out while designing a vehicle. 14 **CO1** **Ana**

(or)

(b) Inspect the performance parameters of tire on wet surfaces in detail. 14 **CO2** **Ana**