Enrollment No: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Mid Semester Exam

Semester:8th **Date: (31/01/2024)**
Subject Code: (203102481) **Time: (1hr: 30min)**
Subject Name: (Automobile System Design) **Total Marks: 40**

Sr. No.		Marks
Q.1	(A) One-line questions. 1) What is the primary function of a vehicle's steering system? 2) What is the purpose of a steering gearbox? 3) Define stopping distance. 4) What do you mean by standardization? 5) Write principle on which braking system work?	05
	(B) It is required to standardize eleven shafts from 100 to 1000 mm diameter. Specify their diameters.	05
Q.2	Attempt any four (Short Questions) (1) Explain the concept of camber and Caster angle in steering systems. (2) What role does friction material play in clutch design? (3) Explain following: (1) Brake efficiency (2) Braking ratio (3) Weight transfer (4) A 1600 Kg car is travelling at a speed of 90 Km/h. What Braking force must be applied for the car to come to a complete stop in 50 m? (5) In a conical clutch, the mean radius of the bearing surface is 300 mm whereas the breadth is 20 mm. Find the inner and outer radii. The semi cone angle is 30°.	12
Q.3	Attempt any two questions (1) The car is moving up on the 12o inclined road with horizontal at 36 km/h which is having wheelbase 1.4 m. The C.G. of the car is 0.9 m above the road. The coefficient of friction is 0.7. What is the retardation of the car if the brakes are applied to all the four wheels? (2) State the requirements of good friction clutch. (3) Derive the fundamental equation for correct steering.	08
Q.4	(A) Explain the step-by-step design procedure for Single plate clutch using uniform wear theory.	05
	(B) A vehicle with wheel base=2.14m and front wheel track=1m is provided with Ackermann steering system. The distance from the center plane of each front wheel to the nearest king pin axis is 0.11m. while taking a turn, the inner front wheel is deflected through a maximum angle of 42°. Calculate the corresponding deflection of the outer front wheel, assuming that all wheels are in true rolling motion. Also find turning radius of the outer front wheel and inner rear wheel.	05
	OR	
	(B) A centrifugal clutch is to be designed to transmit 15kW at 900 rpm. The shoes are four numbers. The speed at which the engagement begins is 3/4th of the running speed. The inside radius of the pulley rim is 150mm. the shoes are lined with ferrodo for which the coefficient of friction may be taken as 0.25 determine mass of the shoes. Assume suitable data if require.	05