Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VIII (NEW) EXAMINATION – WINTER 2020

Subject Code:2180206 **Date:28/01/2021**

Subject Name:Automobile system Design

Time:02:00 PM TO 04:00 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Why is a cone clutch more effective then plate clutch?	**03**
	(b)	Explain design procedure of centrifugal clutch.	**04**
	(c)	A single plate clutch both side effective is to transmit 30 KW at 200 rpm. The pressure is being applied axially by means of springs, and is limited to 0.15 N/mm^2. If the outer diameter of plate is 250 mm, find the required inner diameter of the plate and axial force necessary to engage the clutch. Assume the theory of uniform wear and $\mu = 0.3$.	**07**
Q.2	**(a)**	Explain principal of braking system.	**03**
	(b)	Explain and derive fundamental equation for correct steering.	**04**
	(c)	A track has pivot pins 1.37 m apart, the length of each track arm is 0.18 m and the track rod is behind front axle and 1.27 m long. Determine the wheel base which will give true rolling for all wheels when the car is turning so that the inner wheel stub axle is 60° to the centre line of the car. A geometrical construction may be used.6	**07**
Q.3	**(a)**	Explain stopping distance.	**03**
	(b)	Give function of steering system and draw a layout of steering linkage.	**04**
	(c)	Give advantages and disadvantages of hydraulic system.	**07**
Q.4	**(a)**	Explain bleeding of hydraulic brakes.	**03**
	(b)	State types of steering gear box and explain one of them with neat sketch.	**04**
	(c)	Compare Disc type brake and Drum type brake.	**07**
Q.5	**(a)**	What should be the characteristics of propeller shaft?	**03**
	(b)	Explain twin tube telescopic damper with neat sketch.	**04**
	(c)	Explain with a neat diagram the construction of a fully floating rear axle.	**07**
Q.6	**(a)**	Explain various components and their functions in a hydraulic braking system.	**03**
	(b)	Explain working of Disc brake with neat sketch.	**04**
	(c)	Design a suitable I-section for the front axle assuming the following data: Total weight of car = 1400 Kg Load taken by front axle = 650 Kg Wheel track = 140 cm Distance between the center of spring pads = 70 cm Flange width and thickness are 0.6 and 0.2 of the overall depth of the section. Working stress = 900 Kg/cm^2 Thickness of the web = 0.25 width of flange.	**07**

Q.7	**(a)**	Explain wheel alignment.	**03**
	(b)	Give detail classification of universal joint and explain any one of them with neat sketch.	**04**
	(c)	Design a cylindrical helical spring of circular cross- section wire to carry safely an axial compressive load of 6000 N at a maximum stress of 800 MN/m^2. The spring stiffness should be 25 KN/m. Take spring index 7 and ratio of length to mean diameter of coil = 1.7 to 2.3 Determine 1) Mean diameter of coil 2) Diameter of wire 3) Total deflection	**07**
Q.8	**(a)**	Explain torsion bar.	**03**
	(b)	Explain design procedure of propeller shaft.	**04**
	(c)	Explain Johnson's method of optimum design with suitable example.	**07**

****