Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 170202 **Date: 04/05/2017**

Subject Name: Automobile System Design

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Differentiate between drum brake and disc brake.	**07**
	(b)	Write short note on power steering.	**07**
Q.2	**(a)**	State the names of different steering gear boxes. Explain any one with neat sketch stating its merit and limitations.	**07**
	(b)	A track has pivot pins 1.37 m apart, the length of each track arm is 0.17 m and the track rod is behind front axle and 1.17 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 60º to the centre line of the car.	**07**
		OR	
	(b)	A motor car has a wheel base of 2.743 m and pivot centre of 1.065 m. the front and rear wheel track is 1.217 m. Calculate the correct angle of outside lock and turning circle radius of the outer front and inner rear wheels when the angle of inside lock is 40˚.	**07**
Q.3	**(a)**	list of various types of universal joint and explain any one of them.	**07**
	(b)	An automobile engine develops 28 kW at 1500 rpm and its bottom gear ratio is 3.06. If a propeller shaft of 40 mm outside diameter is to be used, determine the inside diameter of mild steel tube to be used, assuming a safe shear stress of 55 x 10^3 kPa for the mild steel.	**07**
		OR	
Q.3	**(a)**	Explain air brake system with line diagram.	**07**
	(b)	Explain in brief with neat sketch the working of torque tube drive.	**07**
Q.4	**(a)**	Explain telescopic type shock absorber.	**07**
	(b)	Design a spring for a balance to measure 0 to 1000 N over a scale of length 80 mm. The diameter of spring wire spring is 4 mm. The approximate number of turns is 30. The modulus of rigidity is 85 kN/mm^2. Also calculate the maximum shear stress induced.	**07**
		OR	
Q.4	**(a)**	State the requirements of good friction lining material for clutch. Describe the different material used for same with its properties.	**07**
	(b)	A single plate clutch, effective on both sides, is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner diameters of frictional surface if the coefficient of friction is 0.255, ratio of diameters is 1.25 and the maximum pressure is not to exceed 0.1 N/mm^2. Also, determine the axial thrust to be provided by springs. Assume the theory of uniform wear.	**07**
Q.5	**(a)**	Explain Johnson's method of optimum design with suitable example.	**07**
	(b)	Explain construction and working of differential unit.	**07**
		OR	
Q.5	**(a)**	Write short note on chassis dynamometer.	**07**
	(b)	Write short note on anti-lock braking system.	**07**

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