GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VIII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2180206   **Date: 29/11/2018**

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)**	Define brake fade	**03**
	(b)	Explain function of suspension	**04**
	(c)	Explain design of propeller shaft for bending, torsion, rigidity and critical speed criteria	**07**
Q.2	**(a)**	What parameter required to design centrifugal clutch	**03**
	(b)	What is the requirement of Automotive clutch?	**04**
	(c)	A centrifugal clutch transmitting 15 kW at 900 rpm have 4 shoes which engage from ¾ of running speed. Centre of gravity of the shoes are at 12 cm from the centre of the spider. Inside radius of the drum ring is 150 mm and coefficient of friction for the shoes is 0.3. Find the torque transmitted and the mass of a shoe	**07**

OR

	(c)	A single plate clutch, effective on both sides, is required to transmit 25 kW at 3000 rpm. Determine the outer and inner radii of frictional surface, if the co-efficient of friction is 0.255 the ratio of radii 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.3	**(a)**	What is function of steering knuckle	**03**
	(b)	Write design parameter for Final drive	**04**
	(c)	Explain design of fully floating, half floating axle and dead axle	**07**

OR

Q.3	**(a)**	Explain properties of clutch fluid	**03**
	(b)	Define following terms in steering system. 1) Turning circle radius 2) Steering box torque	**04**
	(c)	Explain in detail Ackermann linkage theory for steering system	**07**
Q.4	**(a)**	Compare Disc type brake with Drum type of brake	**03**
	(b)	Define following terms in braking system. 1) Brake balance 2) Braking efficiency	**04**
	(c)	A motor car has a wheel base of 2.64 m, the height of its C. G. above the ground is 0.61 m and it is 1.12 m in front of the rear axle. If the car is travelling at 40 kmlhr on a level track, determine the minimum distance in which the car may be stopped, when (a) the rear wheels are braked, (b) the front wheels are braked, (c) all wheels are braked. The coefficient of friction between tyre and road may be taken as 0.6. Prove any formula if assumed.	**07**

OR

Q.4	(a)	Write short note on tandem master cylinder.	**03**
	(b)	What is nipping in leaf spring? Write a note on air spring ?	**04**
	(c)	A cantilever leaf spring is designed to meet the following specifications:	**07**

    Load on the spring = 2 kN

    Total number of leaves = 8

    Number of extra full-length leaves master = 2

    Width of each leaf = 50 mm

    Length of spring = 500 mm

    Design stress in tension=350 MPa

    What is the thickness of leaf required to meet above requirement.

Q.5	(a)	What is tractive effort and gradeability	**03**
	(b)	Discuss general design considerations of suspension system	**04**
	(c)	Explain johnson's method of optimum design with suitable example	**07**

OR

Q.5	(a)	Different Forces act on suspension	**03**
	(b)	Write a Short note on single tube telescopic damper	**04**
	(c)	Explain design of hand brake with figure	**07**

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