Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2180206 **Date:17/05/2019**

Subject Name:Automobile system Design

Time:10:30 AM TO 01:00 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)**	Give your comments and justify on the given statement. "Braking action when traveling in 'reverse' is not as effective as when travelling 'forward'."	**03**
	(b)	Explain the uniform wear theory while designing the single plate clutch.	**04**
	(c)	A centrifugal clutch transmitting 20kW at 750 rpm consist of four shoes. The clutch is to be engaged at 500 rpm the inner radius of the drum is 165mm the radius of the center of gravity of the shoes is 140mm, when the clutch is engaged. The coefficient of friction is 0.3 , while the permissible pressure on friction lining is 0.1 N/mm^2 calculate a) The mass of each shoe; and b) The dimensions of friction lining.	**07**
Q.2	**(a)**	Justify a given statement "It is more logical and safer to use uniform wear theory in the design of clutch".	**03**
	(b)	Explain the advantages and disadvantages of disk brake in automotive vehicle.	**04**
	(c)	Define the spring length terminology with the design parameters with the sketch diagram.	**07**
		OR	
	(c)	The following data is given for a caliper disk brake with annular pad for the front wheels of sports car. Torque capacity = 1500 Nm Outer radius of pad = 150 mm Inner radius of pad = 100 mm Coefficient of friction = 0.35 Average pressure on pad = 2 N/mm^2 Number of pads = 2 Determine the angular dimension of the pad.	**07**
Q.3	**(a)**	How does weight transfer occurs during braking?	**03**
	(b)	What is the significance of spring index in spring design?	**04**
	(c)	A truck spring has 12 numbers of leaves, two of which are full length leaves the spring supports are 1.05 m apart and the central band is 85mm wide. The central load is to be 5.4kN with a permissible stress of 280MPa. Determine the thickness and width of the steel spring leaves. The ratio of the total depth to the width of the spring is 3. Also determine the deflection of the spring	**07**

OR

Q.3	**(a)**	Inscribe the term bake fade.	**03**
	(b)	Explain the telescopic type suspension system.	**04**
	(c)	Design a spring for a balance to measure 0 to 1000 N over a scale length 80mm. the spring is to be enclosed in a casing of 25mm diameter. The approximate number of turns is 30. G= 85kN/mm^2.also calculate the maximum shear stress induced. Diameter of wire should be considered between 3 to 6 mm. $K = \frac{4c-1}{4c-4} + \frac{0.615}{c}$. Assuming necessary data if require.	**07**
Q.4	**(a)**	Discuss the design consideration for a friction clutch.	**03**
	(b)	Write a short note on semi floating axle hub.	**04**
	(c)	Write a short note on following terms 1) Air resistance 2) Rolling resistance	**07**

OR

Q.4	**(a)**	Write a short note on stopping distance.	**03**
	(b)	Give explanation any one type of gear box used in steering system.	**04**
	(c)	A propeller shaft is required to transmit 45kW power at 500 rpm. It is a hollow shaft having an inside diameter 0.6 times of the outside diameter. It is made of plain carbon steel and the permissible shear stress is 84 N/mm^2.calculate the inside and outside diameter of the propeller shaft.	**07**
Q.5	**(a)**	Explain the steering gear ratio for steering system design.	**03**
	(b)	Give explanation the cross section design for vehicle axle.	**04**
	(c)	Explain Johnson's method of optimum design.	**07**

OR

Q.5	**(a)**	Explain a brief note on leaf spring with suitable sketch.	**03**
	(b)	With the sketch diagram of internal expanding brake and indicate the all require parameters.	**04**
	(c)	Explain the Ackermann-linkage geometry for the steering system design.	**07**

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