Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–V. EXAMINATION – SUMMER 2016

Subject Code:X51901 **Date:11/05/2016**

Subject Name:Theory of Machine

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)** Explain the internal expanding shoe brake with neat sketch. **07**

(b) Distinguish between: **07**

1. Brakes and Dynamometers
2. Flywheel and Governor

Q.2 **(a)** Derive an expression for height in case of Watt governor. What are the confines of Watt governor? **07**

(b) Explain gyroscopic effect on ship during steering and pitching with diagram. **07**

OR

(b) Discuss the effect of the gyroscopic couple on a two wheeled vehicle when taking a turn. **07**

Q.3 **(a)** Prove that the sensitiveness of a Proell governor is greater than that of a Porter governor. **07**

(b) Explain the following terms: **07**

1. Stability
2. Sensitiveness
3. Isochronism
4. Hunting.

OR

Q.3 **(a)** Show that, in a band and block brake, the ratio of the maximum and minimum tensions in the brake straps is **07**

$$\frac{T_0}{T_n} = \left(\frac{1 + \mu \tan\theta}{1 - \mu \tan\theta} \right)^n$$

(b) The turning moment diagram for a petrol engine is drawn to the following scales: Turning moment, 1 mm = 5 N-m; crank angle, 1 mm = 1°. The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm^2. The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 rpm. **07**

Q.4 **(a)** Prove that the maximum fluctuation of energy = $2EC_s$ **07**

(b) Discuss the turning moment diagram of a multi cylinder engine. **07**

OR

Q.4 **(a)** Write a short note on 'Prony Brake Dynamometer'. **07**

(b) Derive an expression for the inertia force due to reciprocating mass in reciprocating engine, neglecting the mass of the connecting rod. **07**

Q.5 **(a)** State and explain D-Albert's principle. **07**

	(b)	Explain inertia force analysis of a reciprocating engine using Klen's construction.	**07**

OR

Q.5	**(a)**	Explain - function generation, path generation and motion generation.	**07**
	(b)	Explain synthesis of function generation.	**07**

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