Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech., Summer 2018 - 19 Examination

Semester: 4 **Date: 29/04/2019**
Subject Code: 03113252 **Time: 2:00pm to 4:30pm**
Subject Name: Theory of Machines for Mechatronics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions **(5)**

A 1. Which one of these governor is spring controlled-
a) Porter governor b) Proell governor
c) Hartnell governor d) Watt governor

2. Brake is used to-
a) Retard the vehicle b) Stop the vehicle
c) a and b both d) None of these.

3. Magnitude of gyroscopic couple is-
a) $I\omega\omega_P$ b) $2I\omega\omega_P$
c) $0.5I\omega\omega_P$ d) None of these

4. On increasing number of cylinders the fluctuation in energy-
a) Increases b) Decreases
c) can't say d) None of these

5. For old clutches which theory is used-
a) uniform pressure theory b) uniform wear theory
c) None of these d) any of these.

B Fill in the blanks- **(5)**
1. Governor is used to control the fluctuation of _____
2. Flywheel is used to control the fluctuation of _____
3. Ratio of tension in band brake is_____
4. Dynamometer is used to calculate_____
5. In Gyroscopic Couple, direction of angular momentum is similar to_____

C True or false- **(5)**
1. Jaw clutch is friction clutch_____
2. Flywheel reduces speed fluctuations during a cycle for a constant load, but flywheel does not control the mean speed of the engine if the load changes_____
3. The height of a simple Watt governor running at a speed 'N' is proportional to N^2 _____
4. In active gyroscopic couple spin vector and precession vector are parallel to each other_____
5. Brake and Clutch are used for same purpose_____

Q.2 Answer the following questions. (Attempt any three) **(15)**
1. Distinguish between brakes and dynamometer
2. Explain the terms sensitiveness, hunting and stability relating to governors.

3. What is the gyroscopic couple acting on the disc which has mass moment of inertia equal to 0.02135 kg-m^2, if it has a speed of 500 rpm and is made to rotate at 100 rpm.

4. Explain in brief the working of flywheel in punching Press.

Q.3 1. What is a brake? Enlist the various types of brakes and explain the working of any one of them with neat sketch. **(07)**

2. Explain uniform Pressure theory in clutches. Also derive the formula for torque carrying capacity using uniform pressure theory. **(08)**

OR

2. Derive formula for the height of Porter governor. **(08)**

Q.4 1. Explain the turning moment diagram for 4 cylinder four stroke cycle internal combustion engine. **(07)**

OR

1. Explain Prony brake dynamometer with neat sketch. **(07)**

2. Explain the effect of the gyroscopic couple on the reaction of the four wheels of a vehicle negotiating a curve. **(08)**