AJEENKYA
D Y PATIL UNIVERSITY

End Term Examination (December 2019)

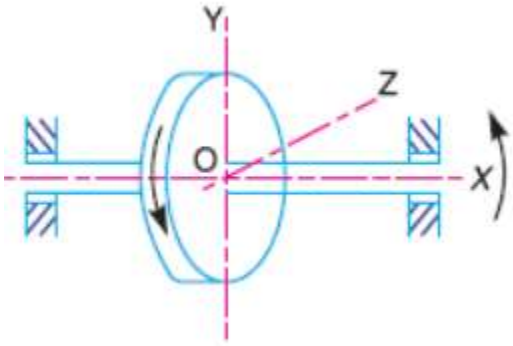
School: School of Engineering **Program: B-Tech Mechatronics**

Course: Dynamics of Machinery **Course Code: MTE401**

Semester: VII **Max Marks: 40** **Duration (mins): 90**

A. Attempt any THREE questions from the following: (30)
(Each question carries 10 marks)

1. A uniform disc of 150 mm diameter has a mass of 5 kg. It is mounted centrally in bearings which maintain its axle in a horizontal plane. The disc spins about it axle with a constant speed of 1000 r.p.m. while the axle precesses uniformly about the vertical at 60 r.p.m. The directions of rotation are as shown in the figure below. If the distance between the bearings is 100 mm, find the resultant reaction at each bearing due to the mass and gyroscopic effects.



2. The damped vibration record of a spring-mass-dashpot system shows the following data:
Amplitude on second cycle = 0.012 m; Amplitude on third cycle = 0.0105 m;
Spring constant k = 7840 N/m; Mass m = 2 kg.
Determine the damping constant, assuming it to be viscous.

3. A cylinder of mass M and radius r rolls without slipping on a cylindrical surface of radius R. Find the natural frequency for small oscillations about the lowest point.

4. Write a detailed note on Coulomb Damping.

B. Attempt any TWO questions from the following: (10)

(Each question carries 5 marks)

5. Principle and working of Vibrometer and accelerometer
6. Principle of seismic instruments
7. a. Spectrum analyzer vs Oscilloscope
   b. Operating principle of a digital frequency analyzer.
8. Define:
   a. Degree of Freedom
   b. What is Damping ratio (or) Damping factor
   c. Damped natural frequency
   d. Transmissibility ratio
   e. Resonance

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