UNIVERSITY OF LUCKNOW
FACULTY OF ENGINEERING AND TECHNOLOGY
Department of Mechanical Engineering

DYNAMICS OF MACHINES (ME 602)
FACULTY MARKED ASSIGNMENT (FMA) 02@ 2019-20(Even)

Year: 3rd ***Section: ME 3*** ***Last Date Of Submission: 22/04/2020***

- ***Before starting the assignment first remove all confusion about the concept used in questions of assignment by the respective faculty member.***
- ***Submit Assignment on due date, no Assignment will be marked after due date***
- ***Submit Assignment in Assignment Register only, loose sheets are not permitted***
- ***Each Assignment carry equal marks in the internal marks of the subject***

Short answer questions

1. Define natural, damped and forced vibrations.
2. What is damping coefficient?
3. What do you mean by damping factor?
4. What is logarithmic decrement?
5. Define magnification factor in forced vibration?
6. What is vibration isolation?
7. Define transmissibility?
8. What is under damped and over damped system?
9. What do you mean by critical damping?

Long answer questions

1. Derive the equation of natural frequency of longitudinal vibration by equilibrium and energy method.
2. Derive the equation of natural frequency longitudinal vibration by Rayleigh's method.
3. Derive the equation to show the inertia effect of the mass of the spring on natural frequency of longitudinal vibration.
4. Show that the ratio of two consecutive amplitudes are same in under damped vibrating system.
5. Derive the relation between damping factor and damping coefficient.
6. What is magnification factor and it depend on which factor and how?
7. Transmissibility depends on which factor and how?
8. What do you mean by critical speed of shaft? derive the equation for critical speed.
9. The following data are given for a vibratory system with viscous damping: Mass = 2.5 kg ; spring constant = 3 N/mm and the amplitude decreases to 0.25 of the initial value after five consecutive cycles. Determine the damping coefficient of the damper in the system.
10. The mass of a single degree damped vibrating system is 7.5 kg and makes 24 free oscillations in 14 seconds when disturbed from its equilibrium position. The amplitude of vibration reduces to 0.25 of its initial value after five oscillations. Determine: 1. stiffness of the spring, 2. logarithmic decrement, and 3. damping factor, i.e. the ratio of the system damping to critical damping.
11. A shaft of 100 mm diameter and 1 metre long is fixed at one end and other end carries a flywheel of mass 1 tonne. Taking Young's modulus for the shaft material as 200 GN/m2, find the natural frequency of longitudinal and transverse vibrations.

12. A vibrating system consists of a mass of 8 kg, spring of stiffness 5.6 N/mm and a dashpot of damping coefficient of 40 N/m/s. Find (a) damping factor, (b) logarithmic decrement, and (c) ratio of the two consecutive amplitudes.

*************************END OF FMA 03***********************