**TUTORIAL QUESTIONS**

1. Explain the term “Magnification Factor”.
2. State the two (2) factors upon which Magnification Factor depends.
3. State the reason why the magnification factor of a machine cannot reach infinity.
4. Differentiate between the operation of a flywheel and a governor in relation to speed and load variation.
5. State the three (3) classes of governors and briefly explain them.
6. List and explain the three (3) types of gravity controlled centrifugal governors.
7. Discuss the following; Governor Effort, Governor Speed and Governor Power.
8. A machine part having mass of 4.5 kg vibrates in a viscous medium. A harmonic exciting force of 40 N acts on the part and causes resonant amplitude of 17 mm with a period of 0.29 second. Determine the damping coefficient. If the frequency of the exciting force is changed to 5 Hz, determine the increase in the amplitude of the forced vibrations upon the removal of the damper.
9. A single-cylinder vertical diesel engine has a mass of 500 kg and is mounted on a steel chassis frame. The static deflection owing to the weight of the chassis is 3.2 mm. the reciprocating masses of the engine amount to 23 kg and the stroke of the engine is 190 mm. A dashpot with a damping coefficient of 4 N/mm/s was also used to dampen the vibrations. In the steady-state of the vibrations, determine;
10. The amplitude of the vibrations if the driving shaft rotates at 500 rpm
11. The speed of the driving shaft when the resonance occurs.
12. A body having a mass of 19 kg was suspended from a spring which deflects 15 mm under the weight of the mass. Determine the frequency of the free vibrations. What is the viscous damping force needed to make the motion a periodic at a speed of 1.5 mm/s. If, when damped to this extent, a disturbing force having a maximum value of 130 N and vibrating at 7 Hz is made to act on the body, determine the amplitude of the ultimate motion.

**TUTORIAL ANSWERS**

1. Magnification factor is the ratio of the amplitude of the steady-state response to the static deflection under the action of force Fo.
2. Magnification factor depends on;

The ratio of frequencies $\frac{ω}{ωn}$

The damping factor

1. As a result of friction, this tends to dampen the vibration.

**READ THROUGH YOUR NOTE FOR SOLUTIONS TO QUESTIONS 4 TO 7 WHILE SOLUTIONS TO QUESTIONS 8 TO 10 WILL BE SENT TO YOUR WHATSAPP GROUP**