Exam.Code:0942
Sub. Code: 7060

1019

B.E. (Mechanical Engineering)
Sixth Semester
MEC-603: Mechanical Vibrations

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

(a) Write the name of the different parts of a vibrating system. (b) Define the term magnification factor. (c) What do you understand by transient vibrations? (d) What is influence coefficient? (e) What is the difference between discrete system and continuous system?	10 (2×5)
Section A(Attempt any two questions)	
(a) A body is subjected to two harmonic motions as given below : $X_1 = 15 \cos(\omega t + \Pi/6)$, $X_2 = 8 \cos(\omega t + \Pi/6)$ What extra harmonic motion should be given to the body to bring it to static equilibrium?	5
(b) 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.	5
(a) Explain Coulomb damping.	2
(b) The disc of a torsional pendulum has a moment of inertia of 600 kg-cm^2 and is immersed in a viscous fluid. The brass shaft attached to it is of 10 cm diameter and 40 cm long. When the pendulum is vibrating, the observed amplitudes on the same side of the rest position for successive cycles are 9°, 6° and 4°. Determine (i) Logarithmic decrement (ii) damping torque at unit velocity (iii) the periodic time of vibration. Assume for the brass shaft, G=4.4 ×10^{10} N/m^2. What would the frequency be if the disc is removed from the viscous fluid?	8
(a) A machine 100 kg mass has a 20 kg rotor with 0.5 mm eccentricity. The mounting spring have K= 85 × 10^3 N/m, ε= 0.02.The operating speed of the machine is 600 rpm and the unit is constrained to move vertically. Find (i) the dynamic amplitude of the machine. (ii) the force transmitted to the supports.	7
(b) Write a short note on Vibration Isolation.	3

P.T.O.

Section B(Attempt any two questions)

(a) Explain semi-definite system. Derive the equation of motion and also find the natural frequency of the system. 7

(b) Explain Vibrometer with the help of diagram. 3

Q6) Determine the natural frequencies of the spring mass system shown in the figure-1.Take $K_1=k_2=k_3=k$ and $m_1=m_2=m_3=m$. Use Stodola's method. 10

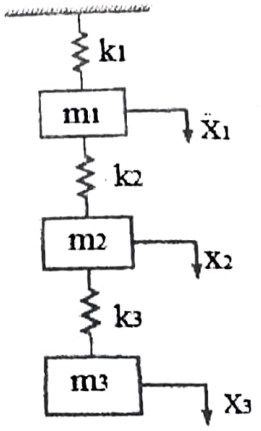

Figure-1

7 Derive frequency equation for a beam with both ends free and having transverse vibration. 10

x-x-x