B.Tech. SEM -VII Mechanical 2014 Course (CBCS) : WINTER - 2018

SUBJECT: MECHANICAL VIBRATION

Day: Friday
Date: 23/11/2018

W-2018-2569

Time: 02.30 PM TO 05.30 PM
Max Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data if necessary.
4) Use of nonprogrammable of **CALCULATOR** is allowed.

Q.1 **a)** Define vibration & explain its causes. **(06)**

b) Describe method for reducing effects of vibrations. **(04)**

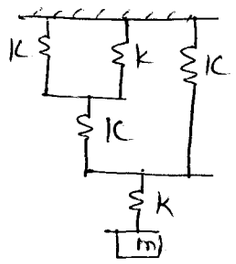
OR

a) Explain type of vibration according to motion of system with respective to axis **(06)**

b) Explain terms: simple harmonic motion, time period. **(04)**

Q2 **a)** Explain Rayleigh method for finding natural frequency. **(06)**

b) Find natural frequency of following system: K= 2 x 10^5 N/m, m= 20 Kg. **(04)**

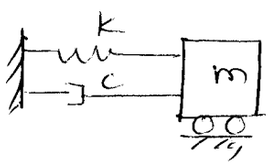


OR

a) Explain Newton's method for forming differential equation. **(06)**

b) Explain longitudinal vibration with figure. **(04)**

Q 3 A spring mass damped system m= 10 Kg, K= 16KN/m and C = 1600 Ns/m. mass is displace 0.1 m & release with velocity in direction of return motion. Find: Circular frequency, Damping factor, Displacement after 1/100 sec. **(10)**



OR

a) In Damped free vibration, m= 2Kg, K= 100 N/m, initial amplitude of 100 mm is reduced to 1 mm in 10 oscillation. Find: Damping constant and Natural frequency. **(06)**

b) Explain coulomb's Damping in details. **(04)**

P.T.O.

Q.4 **a)** The vibration system, total mass is 30Kg. At speed of 900 rpm, eccentric mass have phase difference 90^0 and corresponding amplitude 18mm. Eccentric unbalance mass is 1.2Kg, has radius of rotation 45mm. Find: **(08)**

i) Natural Frequency
ii) Amplitude At 1550 rpm
iii) Damping factor
iv) Phase angle at 1550 rpm

b) Define motion transmissibility. **(02)**

OR

Q.4 Electric motor is supported on spring and damper. Spring stiffness 5000N/m and damper resistance 300N at 2.5m/s. unbalance mass 1.5Kg rotate at 50mm radius and total electric motor mass 50Kg. If motor runs at 340rpm. Find: **(10)**

i) Damming factor
ii) Phase angle
iii) Amplitude of resonance
iv) Amplitude of Steady state vibration
v) Resonance speed

Q.5 Determine natural frequency and position of node of torsion vibration system having 2 rotors A and B at end of shaft 1500 mm long. Moment of Inertia of rotor A is 650Kg m^2 and rotor B is 215 Kgm^2 shaft is 95mm diameter for first 600mm, 60mm diameter next 500mm length and 50mm diameter for reaming Length. G = 0.8×10^{-5} MPa. **(10)**

OR

Q.5 **a)** Write short notes on: Torsion vibration of geared system. Neglecting inertia of gears **(06)**

b) Explain principle mode of vibration with respect to 2 Degree of freedom translational system. **(04)**

Q.6 Write short notes on: **(10)**

i) Frequency measuring instruments
ii) Time domain and frequency domain analysis of signals

OR

Q.6 **a)** What is of microphone and explain working and anyone microphone. **(06)**

b) What do you mean by vibration absorber and explain principle of operation of it. **(04)**

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