B.Tech. SEM -VII Mechanical 2014 Course (CBCS) : SUMMER - 2019

SUBJECT: MECHANICAL VIBRATION

Day: Thursday
Date: 09/05/2019

Time: 02.30 PM TO 05.30 PM
Max. Marks: 60

S-2019-2834

N.B:

1) All questions are **COMUPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data if necessary.
4) Use of non programmable of **CALCULTOR** is allowed.

Q.1 **a)** Explain causes and effects of vibration. **(06)**

b) Define degree of freedom and natural frequency. **(04)**

OR

Q.1 **a)** Explain classification of vibration in detail. **(06)**

b) Write short notes: steps involve in vibration analysis. **(04)**

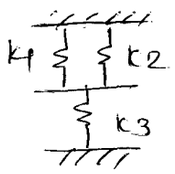
Q.2 **a)** Write short notes: Energy method for determination of natural frequency. **(06)**

b) A truck weighing 150KN and travelling at 2m/s impact with buffer spring witch compress 1.25cm per 10KN. Find maximum compression of spring. **(04)**

OR

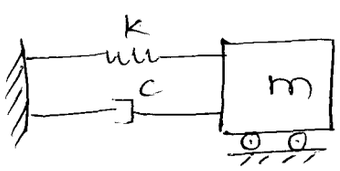
Q.2 **a)** Explain longitudinal and torsion vibration system. **(06)**

b) Find Natural Frequency of following system: K_1 = 1100N/m , K_2 = 1110N/m K_3 = 2200N/m m = 10Kg. **(04)**



Q.3 A spring mass damper has stiffness 10KN/m, viscous damping coefficient 1500Ns/m and mass 7Kg is displace by 0.01m and release with velocity 10m/s in direction of return motion find. **(10)**

i) Expression far displacement x of mass in terms of time t.
ii) Displacement of mass after 0.02 sec.



P.T.O.

OR

Q.3 **a)** In single degree damped vibrating system, a suspended mass 8Kg makes 30 oscillations in 18sec. The amplitude decrease 0.25 of initial value after 5 oscillations. Find **(06)**

i) Stiffness of spring
ii) Logarithmic decrement
iii) Damping coefficient

b) Explain displacement Vs time plot far various types of damping. **(04)**

Q.4 **a)** Compare has mass 500Kg mounted on spring having stiffness 1.96×10^5N/m and damping factor 0.2, rotating parts are balanced and equivalent reciprocating weigh 2Kg. stroke of compressor is 0.2m. Find dynamic amplitude and phase difference. **(05)**

b) Write short notes on: critical speed and shaft. **(05)**

OR

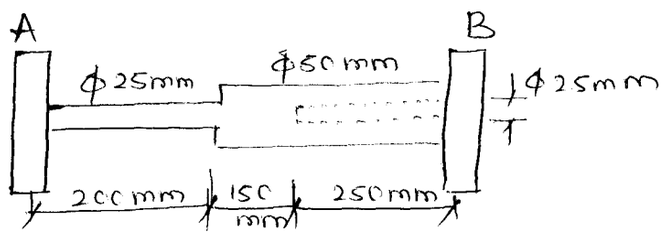
Q.4 A rotor having mass 6 Kg mounted on simply supported shaft and diameter 10mm and length 400 mm. C.G of rotor is 0.02mm away from geometric centre of rotor if rotor rotates at 2500rpm. Find amplitude of steady state vibration and dynamic force transmitted to bearing. Assume E = 200 GPa. **(10)**

Q.5 **a)** Explain torsionally equivalent shaft. **(06)**

b) Define: i) Mode shape ii) Eigen value **(04)**

OR

Calculate natural frequency and torsion vibration of 2-rotor system, mass moment of inertia of rotor A and B are 0.20 Kgm^2 0.8Kgm^2 G = 80GN/m^2. **(10)**



Q.6 Explain terms: i) Vibration isolation ii) FFT spectrum analysis. **(10)**

OR

a) What do you mean of condition monitoring of machine and what are various techniques used for it. **(06)**

b) Explain principles of working of **(04)**

i) Vibrometer ii) Microphone

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