Week 3 Assignment

The due date for submitting this assignment has passed. Due on 2018-02-28, 23:59 IST.
As per our records you have not submitted this assignment.

This assignment contains 15 questions, 5 questions of 1 mark each and 10 questions of 2 marks each. Full marks are 25.

1) The energy dissipated per cycle in viscous damping with damping constant $c$ during the simple harmonic motion $x(t) = X \sin(\omega t)$, is given by

- $\pi c \omega X^2$
- $\pi \omega X^2$
- $\pi c \omega X$
- none

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\pi c \omega X^2$

2) For small value of damping ratio ($\xi$), the dynamic magnification factor at resonance is

- $1/3\xi$
- $1/\xi$
- $1/2\xi$
- $\xi/2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$1/2\xi$

3) Magnification factor will be maximum for the following value of $r$ (frequency ratio) is equal to

- $\sqrt{1 - 2\xi^2}$
- $r = 1/\xi$
- $r = 1/2\xi$
- $r = 1$
4) When the frequency of excitation coincides with the natural frequency of the system, the condition is known as _____.

- transmissibility
- minimum amplitude
- underdamping
- resonance

No, the answer is incorrect.
Score: 0
Accepted Answers:
resonance

5) In force vibration with viscous damping, maximum amplitude occurs when the forced frequency is

- equal to natural frequency
- slightly less than natural frequency
- slightly greater than natural frequency
- zero

No, the answer is incorrect.
Score: 0
Accepted Answers:
slightly less than natural frequency

6) What is the magnification factor, in the case of steady-state response, when frequency ratio is 0.8 (excitation frequency is less than natural frequency) and the level of damping is 0.4.

- 1.36
- 2.36
- 4.63
- 3.63

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.36

7) A vibrating system with mass 3 kg, stiffness 21 N/m and a damper having damping coefficient 10 N-s/m when an exciting force of magnitude 27sin 2t is acting, what would be the time period of oscillation (in second)?

- 5.8
- 1.56
- 3.14
- 3.89

No, the answer is incorrect.
Score: 0
8) A spring-mass system, with a spring stiffness of 5,000 N/m, is subjected to a harmonic force of magnitude 30 N and frequency 20 Hz. The mass is found to vibrate with an amplitude of 0.2 m. Assuming that vibration starts from rest, the mass of the system is……

- 0.2976 kg
- 0.7927 kg
- 0.8679 kg
- 1.5926 kg

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.2976 kg

9) A damped system when excited by a harmonic force has the magnification of 10 at the resonance frequency. The Damping ratio (ξ) will be

- 7 %
- 6 %
- 5 %
- 4 %

No, the answer is incorrect.
Score: 0

Accepted Answers:
5 %

10) A point mass is executing simple harmonic motion with an amplitude of 10 mm and frequency of 4 Hz. The maximum acceleration of the mass is (in m/s²).

- 7.13
- 6.31
- 5.31
- 4.13

No, the answer is incorrect.
Score: 0

Accepted Answers:
6.31

11) What is the effect of damping on phase angle at resonance frequency?

- Phase angle increases as damping increases
- Damping has no effect on phase angle
- Phase angle increases as damping decreases
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Damping has no effect on phase angle

12) A mass of 100 kg is suspended on a spring having speed constant 20 N/cm. The mass is acted upon by a harmonic force of 4 N at 1 Hz. The damping may be considered viscous with a coefficient of 40N-sec /m. The amplitude of vibration of mass is

- 1 mm
- 3 mm
- 5 mm
- 2 mm
13 Consider a single degree of freedom system with viscous damping excited by a harmonic force. At resonance the phase angle (in degree) of the displacement with respect to the exciting force is

- 0
- 45
- 90
- 135

No, the answer is incorrect.
Score: 0
Accepted Answers:
2 mm

14 An industrial machine weighing 445 kg is supported on a spring with a statical deflection of 0.5 cm. If the machine has the rotating imbalance of 25 kg cm and rotating speed is 1200 rpm. The dynamic amplitude machine (in mm) will be

- 6.2
- 2.6
- 5.2
- 4.3

No, the answer is incorrect.
Score: 0
Accepted Answers:
90

15 A mass weighing 1.93 kg is suspended in a box by vertical spring whose constant k=10 kg/cm. The box is placed on the top of a shake table producing vibration

\[ x = 0.09 \sin 8t \]

Assume no damping. The relative displacement (in cm) of mass is

- 2.147x10^{-3}
- 1.147x10^{-3}
- 4.147x10^{-3}
- 3.147x10^{-3}

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.147x10^{-3}