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NPTEL

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Courses » Introduction to Mechanical Vibration Announcements Course Ask a Question Progress



Unit 4 - Week 3

Course outline

How to access the portal

Week 1

Week 2

Week 3

- Lesson 1 - Harmonic excitations
- Lesson 2 - Magnification factor and frequency response curve
- Lesson 3 - Rotating unbalance
- Lesson 4 - Excitation of the support
- Lesson 5 - Energy input and dissipation by viscous damping
- Quiz : Week 3 Assignment
- Feedback Form For Week 3
- New Lesson
- Introduction to mechanical vibration: week-3 solution

Week 4

Week 5

Week 6

Week 7

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 **1 point**

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\pi c \omega X^2$

2) For small value of damping ratio (ξ), the dynamic magnification factor at resonance is **1 point**

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

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 **1 point**

- $\sqrt{1 - 2\xi^2}$

Week 8

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$\sqrt{(1 - \xi^2)}$

$\xi\sqrt{(1 - \xi^2)}$

2ξ

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\sqrt{(1 - 2\xi^2)}$

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 forced frequency is 1 point

- 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. 2 points

- 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 $27\sin 2t$ is acting, what would be the time period of oscillation (in second)? 2 points

- 5.8
- 1.56
- 3.14
- 3.89

No, the answer is incorrect.

Score: 0



Accepted Answers:*3.14*

8) A spring-mass system, with a spring stiffness of 5,000 N/m, is subjected to a **2 points** 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
- 1.5926kg

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 **2 points** 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 **2 points** and frequency of 4 Hz. The maximum acceleration of the mass is (in m/s^2).

- 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?. **2 points**

- 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 **2 points** 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



No, the answer is incorrect.

Score: 0

Accepted Answers:

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 **2 points**

- 0
- 45
- 90
- 135

No, the answer is incorrect.

Score: 0

Accepted Answers:

90

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 **2 points**

- 6.2
- 2.6
- 5.2
- 4.3

No, the answer is incorrect.

Score: 0

Accepted Answers:

6.2

15 A mass weighing 1.93 kg is suspended in a box by vertical spring whose constant $k=10 \text{ kg/cm}$. 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 points**

- 2.147×10^{-3}
- 1.147×10^{-3}
- 4.147×10^{-3}
- 3.147×10^{-3}

No, the answer is incorrect.

Score: 0

Accepted Answers:

1.147×10^{-3}

Previous Page

End

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