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NPTEL

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

Unit 6 - Week 5

Course outline

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Week 5 Assignment

The due date for submitting this assignment has passed. **Due on 2018-03-14, 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) When a transducer is used in conjunction with another device to measure vibration, it is called a **1 point**
- vibration sensor
 - vibration pickup
 - vibration actuator
 - none

No, the answer is incorrect.

Score: 0

Accepted Answers:
vibration pickup

- 2) The Design criteria for the vibrometer will be effective when **1 point**
- $\omega/\omega_n \geq 3$
 - $\omega/\omega_n \leq 3$
 - $\omega/\omega_n = \sqrt{3}$
 - $\omega/\omega_n \geq 2$

No, the answer is incorrect.

Score: 0

Accepted Answers:
 $\omega/\omega_n \geq 3$

- 3) Tachometer is a device that used to measure **1 point**
- acceleration
 - displacement
 - velocity
 - frequency

No, the answer is incorrect.

Score: 0

Accepted Answers:
frequency

4) A device that transforms values of physical variables into equivalent electrical signals is called a _____ **1 point**

- Transducer
- velometer
- tachometer
- stroboscope

No, the answer is incorrect.

Score: 0

Accepted Answers:

Transducer

5) Which of the following instruments measure amplitude of a vibrating body? **1 point**

- Vibrometer
- Seismometer
- Both (a) and (b)
- none

No, the answer is incorrect.

Score: 0

Accepted Answers:

Both (a) and (b)

6) A vibrometer having the amplitude of vibration of the machine part as 4 mm and $\xi=0.2$. performs harmonic motion. If the difference between the maximum and minimum recorded value is 10 mm, determine the natural frequency (in rad/sec) of vibrometer, if the frequency of vibration part is 12 rad/sec **2 points**

- 5.66
- 6.6
- 4.55
- 3.25

No, the answer is incorrect.

Score: 0

Accepted Answers:

5.66

7) A vibrometer indicate 2% error in measurement and its natural frequency is 5 Hz. If the lowest frequency that can be measured is 40 Hz, then the value of the damping ratio (ξ) will be **2 points**

- 0.3
- 0.35
- 0.4
- 0.25

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.35

8) What is the relative velocity of the end of the cantilever reed with respect to base for the system shows in figure? The base is performing a harmonic motion $y = 0.8 \sin 10t$ cm in a direction perpendicular to the reed. the natural frequency of the system is twice the disturbing frequency. **2 points**

- 0.26 cm
- 0.36 cm



- 0.4 cm
- 0.9cm

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.26 cm

9) What will be the maximum percent error of an accelerometer in the frequency- ratio $0 < r \leq 0.5$ range with a damping ratio of $\xi=0$. **2 points**

- 43.33
- 33.3
- 23.66
- 50.63

No, the answer is incorrect.

Score: 0

Accepted Answers:

33.3

10) A vibration measuring device is used to find the acceleration of a machine running at 125 rpm, if the natural frequency of the instrument is 6 Hz and it shows 0.005 cm. the acceleration reading (in cm/ sec^2) is **2 points**

- 4.526
- 6.236
- 5.625
- 2.325

No, the answer is incorrect.

Score: 0

Accepted Answers:

6.236

11) A seismic instrument with a natural frequency of 6 Hz is used to measure the vibration of a machine operating at 120 rpm. The relative displacement of seismic mass as read from the instrument is 0.05 mm. determine the amplitude of vibration of the machine. Neglect damping. **2 points**

- 0.105 mm
- 0.206 mm
- 0.305 mm
- 0.409 mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.409 mm

12) A spring-mass system, having a static deflection of 10 mm and negligible damping, is used as a vibrometer. When mounted on a machine operating at 4000 rpm, the relative amplitude is recorded as 1 mm. Find the maximum values of velocity (in cm/s) of the machine. **2 points**

- 25.55
- 32.65
- 41.65



52.3

No, the answer is incorrect.

Score: 0

Accepted Answers:

41.65

13A vibrometer having a natural frequency of 1 Hz and $\xi = 0.2$ is attached to a structure that performs a harmonic motion. The amplitude of the recorded values is 7 mm. Find the amplitude of motion of the vibrating structure (in mm) when its frequency is 50 rad/s. **2 points**

4.56

6.89

9.78

2.36

No, the answer is incorrect.

Score: 0

Accepted Answers:

6.89

14A 3kg mass is suspended in a box by a spring as shows in figure, the box is put on the platform having vibration $y = \sin 6t$ cm. given $k = 6000\text{N/m}$, then the absolute amplitude (in cm) of the mass will be **0 points**

0.045

0.2145

0.0146

0.814

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.814

15A spring-mass system with $m = 0.8$ kg and $k = 15,000$ N/m with negligible damping, is used as a vibration pickup. When mounted on a structure vibrating with an amplitude of 6 mm, the total displacement of the mass of the pickup is observed to be 14 mm. Find the frequency (in Hz) of the vibrating structure. **2 points**

16.45

19.4

22.7

26.2

No, the answer is incorrect.

Score: 0

Accepted Answers:

16.45

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