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



Unit 5 - Week 4

Course outline

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- Lesson 1 - Coulomb damping and equivalent viscous damping
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Week 4 Assignment

The due date for submitting this assignment has passed. **Due on 2018-03-07, 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) Energy dissipated per cycle in case of coulomb damping, when subjected to harmonic force $F(t) = F_0 \sin \omega t$ is 1 point

- $4\mu NX^2$
- $2\mu NX$
- $4\mu NX$
- $2\mu NX^2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$4\mu NX$

2) If $\omega/\omega_n = \sqrt{2}$ where ω is the frequency of excitation and ω_n is the natural frequency of vibration, then the transmissibility of vibration will be 1 point

- 0.5
- 1.0
- 1.5
- 2.0

No, the answer is incorrect.

Score: 0

Accepted Answers:

1.0

3) For vibration isolation to be effective the frequency ratio ω/ω_n should be 1 point

-
- $\omega/\omega_n > \sqrt{2}$
-
- $\omega/\omega_n < \sqrt{2}$
-
- $\omega/\omega_n = \sqrt{2}$
- none

No, the answer is incorrect.

Score: 0

Accepted Answers:

Week 7

Week 8

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$$\omega/\omega_n > \sqrt{2}$$

4) Transmissibility is the ratio of _____ 1 point

- force transmitted to the supporting structure and force impressed upon the system
- displacement amplitude of mass and displacement amplitude of supporting structure
- both (a) and (b)
- none of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

both (a) and (b)

5) The force transmissibility of a system, subjected to base excitation (with amplitude Y) resulting in a transmitted force F_T , is defined as 1 point

- F_T/KY
- XY/F_T
- F_T/K
- none

No, the answer is incorrect.

Score: 0

Accepted Answers:

F_T/KY

6) A spring-mass system is subjected to Coulomb damping. When a harmonic force of amplitude 120 N and frequency 2.5173268 Hz is applied, the system is found to oscillate with an amplitude of 75 mm. What is the coefficient of dry friction if $m = 2\text{kg}$ and $k = 2100\text{N/m}$? 2 points

- 0.5
- 0.4
- 0.3
- 0.1

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.1

7) A single degree of freedom system has a mass of 2 kg, stiffness 8 N/m and viscous damping ratio 0.02. The dynamic magnification factor at an excitation frequency of 1.5 rad/sec is 2 points

- 1.28
- 4.28
- 3.28
- 2.128

No, the answer is incorrect.

Score: 0

Accepted Answers:

2.128

8) A vibrating machine is isolated from the floor using springs. If the ratio of excitation frequency of vibration of machine to the natural frequency of the isolation system is equal to 0.5, the transmissibility ratio of isolation is 2 points



-
- 1/2
-
- 3/4
-
- 4/3
-
- 2

No, the answer is incorrect.

Score: 0

Accepted Answers:

4/3

9) A vibrating machine of 100 kg is mounted on a rubber pad which has stiffness of 500 N/m. Determine force transmitted to the foundation if the unbalanced force 500 N acts on it. The frequency ratio (ω/ω_n) is 1.5 and $\xi = 0.5$. 2 points

- 461.62 N
- 400.23 N
- 450 N
- 600.53 N

No, the answer is incorrect.

Score: 0

Accepted Answers:

461.62 N

10) A vibratory body of mass 150 kg supported on springs of total stiffness 1050 kN/m has a rotating unbalance force of 525 N at a speed of 6000 rpm. if the damping ratio is 0.3, determine transmissibility is 2 points

- 0.083
- 0.073
- 0.053
- 0.063

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.083

11) A machine 100kg has a 20 kg rotor with 0.5mm eccentricity. the mounting springs have $k=85 \times 10^3$ N/m, $\xi=0.02$. the operating speed of machine is 600 rpm and the unit constrained to move vertically. the force transmitted to the support 2 points

- 5 N
- 11 N
- 9 N
- 10.84 N

No, the answer is incorrect.

Score: 0

Accepted Answers:

10.84 N

12) An undamped system having mass equal to 10 kg is to be isolated from support vibrations (frequency 10 rad/sec) such that transmitted amplitude does not exceed $1/10^{\text{th}}$ that of support amplitude. The stiffness required for the system is 2 points

- 82 N/m
- 91 N/m
- 102 N/m



52 N/m

No, the answer is incorrect.

Score: 0

Accepted Answers:

91 N/m

13) A machine of one tone is acted upon by an external force of 2450 N at frequency of 1500 rpm. To reduce the effects of vibration, isolator of rubber a static deflection of 2 mm under the machine load and an estimated damping are used $\xi = 0.2$. The force (in newton) transmitted to the foundation is **2 points**

- 598.5
 487.5
 950.6
 798.8

No, the answer is incorrect.

Score: 0

Accepted Answers:

798.8

14) A spring-mass system, having a mass of 10 kg and a spring of stiffness of 4000 N/m, vibrates on a horizontal surface. The coefficient of friction is 0.12. When subjected to a harmonic force of frequency 2 Hz, the mass is found to vibrate with an amplitude of 40 mm. Find the amplitude of the harmonic force applied to the mass. **2 points**

- 100.5 N
 110.98 N
 97.98 N
 75.87 N

No, the answer is incorrect.

Score: 0

Accepted Answers:

97.98 N

15) P. $m\ddot{z} + c\dot{z} + kz = -m\ddot{y}$ **2 points**

Q. $m\ddot{x} + c\dot{x} + kx = me\omega^2 \sin\omega t$

R. $m\ddot{x} + kx \pm \mu N = f(t)$

S. $m\ddot{x} + c\dot{x} + kx = F_0 \sin\omega t$

1. system with coulomb damping
2. system with viscous damping
3. system subject to base excitation
4. system with rotating unbalance

- P3-Q4-R1-S2
 P1-Q3-R4-S2
 P2-Q1-R3-S4
 P4-Q2-R3-S1

No, the answer is incorrect.

Score: 0

Accepted Answers:

P3-Q4-R1-S2

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