

# Unit 3 - Week 1

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Week 1
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## Assignment 1

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2019-09-11, 23:59 IST.**

- 1) A massless cantilever beam of length L and flexural rigidity EI has a tip mass M. The natural frequency of beam is 1 point
- a.  $\sqrt{\frac{3EI}{ML^3}}$   
 b.  $\sqrt{\frac{2EI}{ML^3}}$   
 c.  $\sqrt{\frac{3EI}{ML^2}}$   
 d.  $\sqrt{\frac{2EI}{ML^2}}$
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 2) The length of the string of a simple pendulum is L. The natural frequency of the pendulum undergoing small displacement is 1 point
- a.  $\sqrt{\frac{g}{L}}$   
 b.  $\frac{L}{g}$   
 c.  $\sqrt{\frac{2g}{L}}$   
 d.  $\sqrt{\frac{2L}{g}}$
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 3) Which of the following conditions apply for a degree of freedom 1 point
- a. Small displacement/ rotation  
 b. Independent coordinate  
 c. Completely describe the motion  
 d. Measurable displacement
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: b, c
- 4) Number of initial conditions required to obtain free vibration response of a single degree of freedom system is 1 point
- a. One  
 b. None is required  
 c. Two  
 d. Either one or two
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: c
- 5) A single degree of freedom system consists of a spring k and mass m. The initial displacement given to single degree of freedom system is  $u_0 = B$  and the initial velocity is zero. The amplitude of free vibration of the system is 1 point
- a. B  
 b. 0  
 c.  $B\sqrt{\frac{k}{m}}$   
 d.  $B\sqrt{\frac{m}{k}}$
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 6) The phase angle of the above system is 1 point
- a. 0  
 b.  $\pi/2$   
 c.  $\pi$   
 d.  $3\pi/2$
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 7) The natural frequency of a single degree of freedom decreases when the mass 1 point
- a. Increases  
 b. Decreases  
 c. Does not have any effect  
 d. Can increase or decrease
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 8) Linear viscous damping force is written as 1 point
- a. Cu  
 b. Cu"  
 c. Cu'  
 d. Cu<sup>2</sup>
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: c
- 9) Damping factor is obtained from the damping coefficient as, 0 points
- a.  $\frac{C}{2\xi\omega_n m}$   
 b.  $\frac{C}{\xi\omega_n m}$   
 c.  $\frac{C}{2\xi\omega_n}$   
 d.  $\frac{C}{\xi\omega_n}$
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 10) For an under-damped, the damping ratio is, 1 point
- a. Less than one  
 b. Greater than one  
 c. Equal to one  
 d. None of the above
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 11) Which of the following real-life structures can be well approximated as a single degree of freedom system 1 point
- a. A multi-storied building  
 b. An overhead water tank  
 c. A cable car  
 d. A bridge
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: b, c
- 12) The equation of motion of a system can be derived using 1 point
- a. D' Alembert's principle  
 b. Principle of virtual work  
 c. Hamilton's principle  
 d. Euler-Lagrange equation
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a, b, c, d
- 13) The amplitude of an undamped system subjected to zero initial displacement and initial velocity  $V_0$  is. 1 point
- a.  $V_0$   
 b.  $\frac{V_0}{\omega_n}$   
 c.  $V_0\omega_n$   
 d.  $V_0\sqrt{\omega_n}$
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: b
- 14) Damping factor for jointed steel structures is 1 point
- a. Less than one  
 b. Greater than one  
 c. Equal to one  
 d. None of the above
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 15) Logarithmic decrement is measured as log of 1 point
- a. Summation of amplitudes  
 b. Difference of amplitudes  
 c. Square of amplitudes  
 d. Ratio of amplitudes
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: d
- 16) The response of critically damped system is 1 point
- a. Oscillating  
 b. Oscillating with decreasing amplitude  
 c. Non-oscillating  
 d. None of the above
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: c
- 17) Which of the following are damping models 1 point
- a. Viscous damping  
 b. Coulomb damping  
 c. Hysteretic damping  
 d. Dry friction damping
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a, b, c, d
- 18) The damped natural frequency of an under-damped system 1 point
- a. Less than  $\omega_n$   
 b. More than  $\omega_n$   
 c. Equal to  $\omega_n$   
 d. None of the above
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: a
- 19) The amplitude of an under-damped system due to initial displacement  $u_0$  and zero initial velocity is 1 point
- a.  $2u_0$   
 b. 0  
 c.  $u_0$   
 d.  $\frac{u_0}{2}$
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: c
- 20) The rate of amplitude decay in a system is highest for 1 point
- a. Over damping  
 b. Under damping  
 c. Critical damping  
 d. None of the above
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
Score: 0  
Accepted Answers: c