Unit 9 - Week 8

Week 8 Assignment

The due date for submitting this assignment has passed. Due on 2018-04-04, 23:59 IST.
As per our records you have not submitted this assignment.

This assignment contains 10 question. Each question has the indivisual mark.

1) The number of distinct natural frequencies for an *n*-degree-of-freedom system can be *1 point*

- n^{-1}
- n^2
- n^n
- n

No, the answer is incorrect.
Score: 0

Accepted Answers:
n

2) The fundamental natural frequency of a system is *1 point*

- the largest value
- the smallest value
- any value
- none

No, the answer is incorrect.
Score: 0

Accepted Answers:
the smallest value

3) Derive the equation of motion of system shown in the figure below and select the corresponding stiffness matrix of system. *3 points*

$$\begin{bmatrix} 3K & -2K & 0 \\ -2K & 3K & -K \\ 0 & -K & 3K \end{bmatrix}$$

$$\begin{bmatrix} K & -2K & 0 \\ -2K & 3K & -K \\ 0 & -K & 3K \end{bmatrix}$$

solution is available

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$$\begin{bmatrix} 3K & -2K & K \\ -2K & 3K & -K \\ K & -K & 3K \end{bmatrix}$$

$$\begin{bmatrix} 3K & -2K & 0 \\ -2K & 3K & -K \\ K & -K & 2K \end{bmatrix}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$\begin{bmatrix} 3K & -2K & 0 \\ -2K & 3K & -K \\ 0 & -K & 3K \end{bmatrix}$$

4) Mass matrix corresponding to the figure below is *2 poi*

$$\begin{bmatrix} m & 0 & 0 \\ m & m & 0 \\ m & m & m \end{bmatrix}$$

$$\begin{bmatrix} m & 0 & 0 \\ 0 & m & 0 \\ 0 & 0 & m \end{bmatrix}$$

$$\begin{bmatrix} m & m & m \\ m & m & m \\ m & m & m \end{bmatrix}$$

$$\begin{bmatrix} m & m & m \\ 0 & m & m \\ 0 & 0 & m \end{bmatrix}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$\begin{bmatrix} m & 0 & 0 \\ 0 & m & 0 \\ 0 & 0 & m \end{bmatrix}$$

5) The stiffness matrix of the system shown in figure below is *3 points*

$$\begin{bmatrix} 3k & -2k & 0 \\ -2k & 3k & -k \\ 0 & -k & 3k \end{bmatrix}$$

$$\begin{bmatrix} k & -k & 0 \\ -k & 2k & -k \\ 0 & -k & k \end{bmatrix}$$

$$\begin{bmatrix} 3k & -2k & 0 \\ -2k & 3k & -k \\ 0 & -k & 3k \end{bmatrix}$$

$$\begin{bmatrix} 3k & -2k & 0 \\ -2k & 3k & -k \\ 0 & -2k & 3k \end{bmatrix}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$\begin{bmatrix} k & -k & 0 \\ -k & 2k & -k \\ 0 & -k & k \end{bmatrix}$$

6) A vibrating system for which *3 points*

$$[m] = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}, \text{ and } \quad [K] = \begin{bmatrix} 1 & -2 & 1 \\ -2 & 4 & -2 \\ 1 & -2 & 1 \end{bmatrix}$$

Determine the eigenvalues for the above system and choose the correct option from the following:

$\lambda 1 = 0, \lambda 2 = 0, \lambda 3 = 4$

$\lambda 1 = 0, \lambda 2 = 2, \lambda 3 = 0$

$\lambda 1 = 0, \lambda 2 = 1, \lambda 3 = 4$

$\lambda 1 = 9, \lambda 2 = 0, \lambda 3 = 6$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\lambda 1 = 0, \lambda 2 = 0, \lambda 3 = 4$

7) A vibrating system for which *3 points*

$$[m] = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}, \text{ and } \quad [K] = \begin{bmatrix} 1 & -2 & 1 \\ -2 & 4 & -2 \\ 1 & -2 & 1 \end{bmatrix}$$

Determine the natural frequencies for the above system and choose the correct option from the following:

$\omega 1 = 0 rad/s, \omega 2 = 3 rad/s, \omega 3 = 2 rad/s$

$\omega 1 = 0 rad/s, \omega 2 = 1 rad/s, \omega 3 = 2 rad/s$

$\omega 1 = 0 rad/s, \omega 2 = 0 rad/s, \omega 3 = 2 rad/s$

$\omega 1 = 2 rad/s, \omega 2 = 0 rad/s, \omega 3 = 2 rad/s$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$\omega 1 = 0 rad/s, \omega 2 = 0 rad/s, \omega 3 = 2 rad/s$

8) Derive the equation of motion of system shown in the figure below and calculate the stiffness matrix for the system shown in the figure **0 points**

- $\begin{bmatrix} 2K & 2K & 0 \\ 2K & 3K & -K \\ 0 & -K & 4K \end{bmatrix}$
- $\begin{bmatrix} 3K & -2K & 0 \\ -2K & 3K & -K \\ 0 & -K & 4K \end{bmatrix}$
- $\begin{bmatrix} 3K & -2K & 0 \\ -2K & 3K & -K \\ 0 & -K & 4K \end{bmatrix}$
- $\begin{bmatrix} 3K & -2K & 0 \\ -K & 3K & -K \\ 0 & -K & 3K \end{bmatrix}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\begin{bmatrix} 3K & -2K & 0 \\ -2K & 3K & -K \\ 0 & -K & 4K \end{bmatrix}$

9) Derive the equation of motion of system shown in the figure below and choose the stiffness matrix of the system **3 points**

- $\begin{bmatrix} K1+K2 & -K2 & 0 \\ -K2 & K2+K3 & -K4 \\ 0 & -K4 & K3+K4 \end{bmatrix}$
- $\begin{bmatrix} K1+K2 & -K2 & 0 \\ -K2 & K2+K3 & -K3 \\ 0 & -K3 & K4 \end{bmatrix}$
- $\begin{bmatrix} K1+K2 & -K2 & 0 \\ -K2 & K3 & -K3 \\ 0 & -K3 & K3+K4 \end{bmatrix}$
- $\begin{bmatrix} K1+K2 & -K2 & 0 \\ -K2 & K2+K3 & -K3 \\ 0 & -K3 & K3+K4 \end{bmatrix}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\begin{bmatrix} K1+K2 & -K2 & 0 \\ -K2 & K2+K3 & -K3 \\ 0 & -K3 & K3+K4 \end{bmatrix}$

10) Derive the equation of motion of system shown in the figure below and choose correct damping matrix of the system from the following options. **3 points**

$$\begin{bmatrix} c & 0 & 0 \\ 0 & 2c & -c \\ 0 & -c & 3c \end{bmatrix}$$

$$\begin{bmatrix} c & 0 & 0 \\ 0 & c & -c \\ 0 & -c & 2c \end{bmatrix}$$

$$\begin{bmatrix} c & 0 & 0 \\ 0 & c & -c \\ 0 & -c & 3c \end{bmatrix}$$

$$\begin{bmatrix} c & 0 & 0 \\ 0 & 2c & -c \\ 0 & -c & 3c \end{bmatrix}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$\begin{bmatrix} c & 0 & 0 \\ 0 & c & -c \\ 0 & -c & 3c \end{bmatrix}$$

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