Unit 6 - Week 4

Assignment 4

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

Due on 2019-09-25, 23:59 IST.

1) For $i \neq j$ which of the following are true — 1 point

a. $\{r\}_i^T[M]\{r\}_j = 1$
b. $\{r\}_i^T[M]\{r\}_j = 0$
c. $\{r\}_i^T[K]\{r\}_j = 1$
d. $\{r\}_i^T[K]\{r\}_j = 0$

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.
d.

2) The first two Eigen-values of the matrix $[M]^{-1}[K]$ are 4 and 9. The two natural frequencies of the system are — 1 point

a. 2 and 3
b. 4 and 9
c. 16 and 81
d. None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:

3) The force vibration response of an MDOF system due to an applied load and non-zero initial condition is always — 1 point

a. Normal modes
b. Natural frequencies
c. Mode shapes
d. Initial conditions

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
b.
c.
d.

4) The free vibration response of an MDOF system due to a given initial condition is always dependent on — 1 point

a. Normal modes
b. Natural frequencies
c. Mode shapes
d. Initial conditions

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
b.
c.
d.

5) The modal matrix of an MDOF system is given as $[\Phi]$. The modal matrix is not mass normalized. The relation between the physical degree of freedom $\{u\}$ and generalized co-ordinate $\{\eta\}$ is given as, — 1 point

a. $\{u\} = [\Phi]\{\eta\}$
b. $\{\eta\} = [\Phi]\{u\}$
c. $\{u\} = [\Phi]^T\{\eta\}$
d. $\{\eta\} = [\Phi]^T\{u\}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

6) The mass normalized modal matrix of an MDOF system is given as $[\Phi]$. Relation between $\{u\}$ and $\{\eta\}$ is given as, — 1 point

a. $\{u\} = [M][\Phi]\{\eta\}$
b. $\{u\} = [M][\Phi]^T\{\eta\}$
c. $\{u\} = [\Phi]\{\eta\}$
d. $\{u\} = [\Phi]^T\{\eta\}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

7) The two lumped masses of a 2-dof system are equal. One of the mode shape of the system is $\begin{Bmatrix}1\\2\end{Bmatrix}$. The other mode shape can be — 1 point

a. $\begin{Bmatrix}2\\-1\end{Bmatrix}$
b. $\begin{Bmatrix}-2\\1\end{Bmatrix}$
c. $\begin{Bmatrix}1\\-1\end{Bmatrix}$
d. $\begin{Bmatrix}1\\1\end{Bmatrix}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

8) In Question.7, assume the masses are equal to 'm'. One of the mass normalized mode shape is, — 1 point

a. $\frac{1}{\sqrt{10m}}\begin{Bmatrix}1\\2\end{Bmatrix}$
b. $\frac{1}{10m}\begin{Bmatrix}1\\2\end{Bmatrix}$
c. $\frac{1}{\sqrt{6m}}\begin{Bmatrix}1\\2\end{Bmatrix}$
d. $\frac{1}{5m}\begin{Bmatrix}1\\2\end{Bmatrix}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

9) The equation of motion of a generic 2-dof system is, — 1 point

a. Coupled differential equation
b. Coupled algebraic equation
c. Uncoupled differential equation
d. Uncoupled differential equation

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

10) Modal expansion theorem states that any arbitrary response of an MDOF system can be expressed in terms of it's — 1 point

a. Free vibration response
b. Normal modes
c. Forced vibration response
d. None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

11) The equation obtained after modal analysis of an MDOF system is similar to the equation of motion of — 1 point

a. SDOF system
b. 2-DOF system
c. Spring-mass system
d. None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

12) The main blue fit of modal analysis is the _____ of the MDOF system. — 1 point

a. simplifying
b. transforming
c. decoupling
d. none of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

13) The mass and stiffness matrices of a 2-dof system is $\begin{bmatrix}m & 0\\0 & 2m\end{bmatrix}$ and $\begin{bmatrix}2k & -k\\-k & k\end{bmatrix}$. The mode shapes of the system are — 1 point

a. $\begin{Bmatrix}1\\1\end{Bmatrix}$ and $\begin{Bmatrix}1\\1.6\end{Bmatrix}$
b. $\begin{Bmatrix}1\\-0.28\end{Bmatrix}$ and $\begin{Bmatrix}1\\1.78\end{Bmatrix}$
c. $\begin{Bmatrix}1\\1\end{Bmatrix}$ and $\begin{Bmatrix}1\\1.78\end{Bmatrix}$
d. $\begin{Bmatrix}1\\-0.28\end{Bmatrix}$ and $\begin{Bmatrix}1\\1.6\end{Bmatrix}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

14) The mass-normalized mode shapes of the system given in Question.13 are — 1 point

a. $\frac{1}{\sqrt{1.15m}}\begin{Bmatrix}1\\-0.28\end{Bmatrix}$ and $\frac{1}{\sqrt{0.6m}}\begin{Bmatrix}1\\2\end{Bmatrix}$
b. $\frac{1}{\sqrt{6m}}\begin{Bmatrix}1\\2\end{Bmatrix}$ and $\frac{1}{\sqrt{13m}}\begin{Bmatrix}1\\1.78\end{Bmatrix}$
c. $\frac{1}{\sqrt{1.15m}}\begin{Bmatrix}1\\-0.28\end{Bmatrix}$ and $\frac{1}{\sqrt{13m}}\begin{Bmatrix}1\\1.78\end{Bmatrix}$
d. $\frac{1}{\sqrt{m}}\begin{Bmatrix}1\\1\end{Bmatrix}$ and $\frac{1}{\sqrt{2.5m}}\begin{Bmatrix}1\\1.6\end{Bmatrix}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

15) The orthogonality of the mode shape exists because the mass and stiffness matrices are, — 1 point

a. Diagonal
b. Uncoupled
c. Square
d. Symmetric

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.