CA 1(Engineering Mechanics) _2021_22

1. Match the list I with the list II using the codes given below.

	I		II
A	Co-planer forces	1	Lines of action of all forces lie in same plane but do not pass.
B	Concurrent forces	2	Line of action of all forces lie in same plane and pass through a common point.
C	Concurrent coplanar forces	3	Lines of action of all forces lie in the same plane.
D	Collinear forces	4	Lines of action of al forces pass through a common point.
		5	Lines of action of all forces lie along the same line.

(1 Point)

- A-5 B-4 C-1 D-3
- A-4 B-3 C-2 D-1
- A-4 B-5 C-2 D-1
- A-3 B-4 C-2 D-5

2. Consider the following statements:

I. The general case of a system of forces in space which are neither concurrent nor parallel can always be reduced to a resultant force, applied at an arbitrary point and a resultant couple

II. The simplest possible representation of a system of forces in space is a wrench.

III. There are only six independent conditions of equilibrium for the general case of a system of forces in space.

(1 Point)

- (●) I is correct
- ( ) I and III are correct.
- ( ) II and III are correct.
- ( ) I, II and III are correct.

3. What is not the condition for the equilibrium in three dimensional system of axis?

(1 Point)

- ( ) $\sum F_x=0$
- ( ) $\sum F_y=0$
- ( ) $\sum F_z=0$
- (●) $\sum F=0$

4. Principle of transmissibility states that

(1 Point)

- (●) Force acting on the body is a sliding vector.
- ( ) Force acting on the body is a rolling vector.
- ( ) Force acting on the body is a welding vector.
- ( ) Force acting on the body is a unit vector.

5. Which of the following is correct?
(1 Point)

- The application of the conditions of the equilibrium of the body is valid only in the 2D
- The application of the conditions of the equilibrium of the body is valid only in the 3D
- The application of the conditions of the equilibrium of the body is valid only in the 1D
- The application of the conditions of the equilibrium of the body is valid throughout

6. Force vector is along 4i – 4k direction and has a magnitude 100N and another force vector is along 4i +2j -4k and has a magnitude of 120N. What is the resultant of both forces?
(1 Point)

- 80i + 40j – 80k N
- 80i – 40j – 80k N
- 151i + 40j – 80k N
- 151i+ 40j – 151k N

7. Which of the following statement is true?
(1 Point)

- A scalar is any physical quantity that can be completely specified by its magnitude
- A vector is any positive or negative physical quantity that can be completely specified by its magnitude
- A scalar is any physical quantity that requires both a magnitude and a direction for its complete description
- A scalar is any physical quantity that can be completely specified by its direction

8. What is cos α for force vector F = A i+ B j+C k (Given α, β and γ are the angles made by the vector with x, y and z axis respectively)?
(1 Point)

- B /|F|
- C/|F|
- A/|F|
- 1

9. What does the moment of the force measure?
(1 Point)

- The tendency of rotation of the body along any axis
- The moment of inertia of the body about any axis
- The couple moment produced by the single force acting on the body
- The total work is done on the body by the force

10. Consider the following statements: The algebraic sum of moment of a system of concurrent force in a plane becomes equal to zero
I. If the centre of moment lies on the line of action of resultant
II. If the resultant is equal to zero and the forces are in equilibrium.
(1 Point)

- I alone is correct
- II alone is correct
- Both I and II are correct
- Neither I nor II are correct.

11. The couple is a scalar quantity and the force is vector quantity and hence only force can be simplified in free body diagrams.
(1 Point)

- The first part of the statement is false and other part is true
- The first part of the statement is false and other part is false too
- The first part of the statement is true and other part is false
- The first part of the statement is true and other part is true too

12. The coordinate of the Force vector AB is A (2, 0, 2) and B (-2, 3.46, 3). What are its directions?
(1 Point)

- -0.742i + 0.643j + 0.186k
- 0.742i – 0.643j – 0.186k
- -0.742i – 0.643j + 0.186k
- -0.742i + 0.643j – 0.186k

13. A ladder is not in equilibrium against a smooth vertical wall, then it can be made in equilibrium by
(1 Point)

- Increasing the angle of inclination with horizontal
- Increasing the area of the ladder.
- Decreasing the angle of inclination with horizontal.
- Decreasing the area of the ladder.

14. Given that the moment of all the concurrent force system in space acting on the body about some axis is zero and the forces are concurrent, implies
(1 Point)

- Resultant force intersects the axis
- Resultant force is zero
- Resultant force line of action parallel to the axis
- any of the (a), (b) and (c) can be true

15. The tendency of rotation of the body along any axis is also called _____
(1 Point)

- Moment of inertia
- Moment of couple
- Torque
- Force