MALLA REDDY ENGINEERING COLLEGE

(AUTONOMOUS)

I B.Tech II SEMESTER (MR15) – I MID QUESTION BANK

Subject: Engineering Mechanics

(Common for CE, ME and Min.E)

Module - 1

1.Force can be characterized by [ ]

(a) Point of application (b) Magnitude. Direction

(c) Direction (d) Point of application , magnitude and direction

2.The forces whose line of action lies in the same plane and are meeting at one point, are known as [ ]

(a)Coplanar concurrent force system (b) Coplanar non-concurrent force system

(c)Non- Coplanar non-concurrent force system (d) non- Coplanar concurrent force system

3. The resultant of the two forces can be defined as a force that [ ]

(a) Keep the system in equilibrium (b) has the greatest magnitude in the system

(c) has the same effect as the two forces (d) has the same effect as one force

4. In the case of gravity force distributed throughout the volume of a body. The point of application of gravitation at which the total weight can be assumed to be concentrated is called [ ]

(a) The center of gravity of the body (b) Centroid of the body

(c) Surface of the body (d) none of the above

5. Parallelogram law of forces states that if two forces acting simultaneously at a point be represented in magnitude and direction by two adjacent sides of a parallelogram, their resultant may be represented in magnitude and direction by [ ]

(a) Longer side of the other two sides

(b) Short side of the other two sides

(c) Diagonal of the parallelogram which passes through their points of intersection

(d) Diagonal of the parallelogram which does not pass through their point of intersection

6. The angle between two forces to make their resultant in minimum and maximum respectively are [ ]

(a) 0^o and 90^0 (b) 180^0 and 90^0 (c) 90^0 and 180^0 (d) 180^0 and 0^0

7. If two forces, acting at a point are represented by two sides of a triangle taken in order, select the condition that is satisfied [ ]

(a) The magnitude of the resultant is zero

(b) The third side taken in the same order represents their resultant

(c) The magnitude of the resultant is maximum

(d) The third side taken in the reverse order represents their resultant

8. Ifnumber of forces, acting at a point is represented by number sides of a polygon taken in order, select the condition that is satisfied [ ]

(a) The magnitude of the resultant is zero

(b) The closing side taken in the same order represents their resultant

(c) The magnitude of the resultant is maximum

(d) The closing side taken in the reverse order represents their resultant

9. If two forces P and Q (P>Q) act on the same straight line but in opposite direction, their resultant is [ ]
(a) P+Q (b) P/Q (C) Q-P (d) P-Q

10. The effect of a couple on bodies is to give [ ]
(a) Static equilibrium (b) Resultant (c) Equilibrant (d) Rotation of a body

11).Force is ----------quantity [ ]
(a) Scalar (b) vector (c) Physical (d) chemical

12). A particle is said to be in equilibrium when the resultant of all forces is acting on it is [ ]
(a) Zero (b) one (c) Twice (d) infinity

13). Parallogram law is used to determine the resultant of -------concurrent coplanar forces. [ ]
(a) One (b) two (c) Three (d) four

14). Couple is _____ vector [ ]
(a) Momentum (b) continuum (c) Force (d) moment

15). The algebraic sum of all forces forming a couple is [ ]
(a) One (b) zero (c) Moment (d) infinity

16). the distance between moment center and line of action of force is called as [ ]
(a) Magnitude of force (b) moment of force (c) Couple of force (d) arm of force

17). Moment type [ ]
(a) Clock wise moment (b) anti clock wise moment (c) Both a & b (c) none of the above

18). the tendency of a force to produce rotation about some point is called [ ]
(a) Moment of a force (b) momentum of a force (c) force (d) none of the above

19).what is the unit of moment. [ ]
(a) N (b) KN (c) KN-M (c) KG-M

20). what is the unit of force. [ ]
(a) N (b) KG (c) KN (d) both a&c

21).The term 'force' may be defined as an agent which produces or tends to produce, destroys or tends to destroy motion. [ ]
(a) Agree (b) Disagree (c) zero (c) none of the above

22).If the resultant of two equal forces has the same magnitude as either of the forces, then the angle between the two forces is [ ]
(a) 30° (b) 60° (c) 90° (d) 120

23). If a number of forces are acting at a point, their resultant will be inclined at an angle θ with the horizontal, such that [ ]
(a) $\tan\theta = \sum H/\sum V$ (b) $\tan\theta = \sum V/\sum H$ (c) $\tan\theta = \sum V \times \sum H$ (d) $\tan\theta = \sqrt{\Sigma V + \Sigma H}$

24). The angle between two forces when the resultant is maximum and minimum respectively are [ ]
(a) 0° and 180° (b) 180° and 0° (c) 90° and 180° (d) 90° and 0°

25). The resultant force is single force which produces the same effect as produced by all the given forces acting on a body. [ ]
(a) True (b) False (c) Both a&b (d) none of the above

26). Two like parallel forces are acting a distance of 24mm a part and their resultant is 20N. it the line of action of the resultant 6mm from any given force, the two forces are. [ ]
(a) 15N and 5N (b) 20N and 5N (c) 15N and 15N (d) none of this

27). Which of the following is a scalar quantity? [ ]
(a) Force (b) speed (c) velocity (d) acceleration

28). The rate of change of momentum is directly proportional to the impressed force, and takes place in the same direction in which the force acts. This statement is known as. [ ]
(a) Newton's first law of motion (b) Newton's second laws of motion
(c) Newton's third law of motion (d) none of these

29). The process of finding out the resultant force is called---------- forces [ ]
(a) Composition (b) Resultant (c) resolution (d) none of these

30). If a number of forces acting at a point be represented in magnitude and direction by the three side of a triangle, taken in order , then the forces are not in equilibrium. [ ]

(a) Agree (b) Disagree (c) both a &b (d) none of these

31). If a given forces acting on a body ---------- the position of the body, but keeps it in equilibrium, then its effect is to produce internal stress in the body. [ ]

(a) Change (b) does not change (c) Zero (d) none of these

32). The principle of transmissibility of forces states that, when a force acts up on a body, its effect is [ ]

(a) Same at every point on its line of action
(b) Different at different points on its line of action
(c) Minimum, if it is acts at the center of gravity of the body
(d) Maximum, if it is acts at the center of gravity of the body

33). If three forces acting at a point represented in magnitude and direction by the three side of a triangle, taken in order, then the forces are in equilibrium. [ ]

(a) Yes (b) no (c) both a &b (d) none of these

34). Newton's second law of motion----------a relation between force and mass of a moving body. [ ]

(a) Gives (b) does not give (c) Between (d) none of these

35). The resultant of two forces P and Q acting at an angle θ is [ ]

(a) $\sqrt{P^2 + Q^2 + 2PQ \sin\theta}$ (b) $\sqrt{P^2 + Q^2 + 2PQ \cos\theta}$

(c) $\sqrt{P^2 + Q^2 - 2PQ \cos\theta}$ (d) $\sqrt{P^2 + Q^2 - 2PQ \tan\theta}$

36).Non- coplanar concurrent forces those forces which [ ]

(a) Meet at one point, but their lines of action do not lie on the same plane
(b) Do not meet at one point and their lines of action do not lie on the same plane
(c) Meet at one point and their lines of action also lie on the same plane
(d) Do not meet at one point, but their lines of action lie on the same plane

37). Concurrent forces are those forces whose line of action [ ]

(a) Lie on the same line (b) Meet at one point (c) Meet on the same plane (d) None of these

38).the polygon law of forces states that if a number of forces, acting simultaneously on a particle. be represented in magnitude and direction by the sides of a polygon taken in order , then their resultant is represented in magnitude and direction by the closing side of the polygon, taken in opposite direction [ ]

(a) Correct (b) in correct (c) Infinity (d) none of these

39). Varignon's theorem of moment states that if a number of coplanar forces acting on a particle are in equilibrium, then [ ]

(a) Their algebraic sum is zero
(b) Their line of action are at equal distances
(c) The algebraic sum of their moments about any point in their plane is zero
(d) The algebraic sum of their moments about any point is equal to the moment of their resultant force about the same point.

40). If three coplanar forces acting at a point are in equilibrium, then each force is proportional to the sine of the angle between the two other forces. [ ]

(a) Correct (b) in correct (c) infinity (d) none of these

41). A couple produces [ ]

(a) translatory motion (b) rotational motion
(c) combined translatory and rotational motion (d) none of the above

42). The resultant of two forces P and Q is doubled, the new resultant is perpendicular to P. then [ ]

(a) P=Q (b) Q=R (c) Q=2R (d) none of the above

43). The resultant of two forces P and Q (such that P>Q) acting along the same straight line , but in opposite direction, is given by [ ]

(a) P+Q (b) P-Q (c) P/Q (d) Q/P

44). The laws of motion involved in the recoil of gun is [ ]

(a) Newton's first law of motion (b) Newton's second law of motion
(c) Newton's third law of motion (d) none of these

45). Two equal and opposite parallel forces whose line of action are different, can be replaced by a single force parallel to the given force. [ ]

(a) Correct (b) incorrect (c) Both a&b (d) none of these

46). which of the following statement is correct? [ ]

(a) The algebraic sum of the forces, constituting the couple is zero.

(b) The algebraic sum of the forces, constituting the couple, about any point is the same.

(c) A couple cannot be balanced by a single force but can be balanced only by a couple of opposite sense.

(d) All the above

47). The unit force in S.I. system of units is. [ ]

(a) Dyne (b) kilogram (c) Newton (d) watt

48). Joule is the unit of [ ]

(a) Force (b) work (c) power (d) velocity

49). The three forces 100N,200N,300N have their line of action parallel to each other but act in opposite direction. These forces are known as. [ ]

(a) Coplanar concurrent forces (b) Coplanar non-concurrent forces

(c) Like parallel forces (d) unlike parallel forces

50). Coplanar con concurrent forces are those forces which---------- at a point, but their line of action lies on the same plane [ ]

(a) Meet (b) does not meet (c) Not collinear (d) none of these

UNIT-1

Answers:

1.d	11.b	21.a	31.b	41.b
2.a	12.a	22.d	32.a	42.b
3.c	13.b	23.b	33.a	43.b
4.a	14.c	24.a	34.a	44.c
5.c	15.b	25.a	35.b	45.b
6.d	16.d	26.a	36.a	46.d
7.d	17.c	27.b	37.b	47.c
8.d	18.a	28.b	38.a	48.b
9.d	19.c	29.a	39.c	49.d
10.d	20.d	30.b	40.a	50.b

Module -2

1. The necessary condition of equilibrium of a body is [ ]

(a)$\sum X=0$ (b) $\sum Y=0$ (c) $\sum X=0$ and $\sum Y=0$ (d) none

2. The necessary condition of equilibrium of a body is [ ]

(a)$\sum X=0$ (b) $\sum Y=0$ (c) $\sum X=0$ and $\sum Y=0$ $\sum M=0$ (d) none

3. If three forces acting at a point are in equilibrium, each force will be proportional to the sine of the angle between the other two forces. The statement is according to [ ]

(a) Varignon's theorem (b) Lami's theorem

(c) Triangle theorem (d) coplanar force theorem

4. The Lami's theorem is used to analysis: [ ]

(a) Two concurrent forces in equilibrium (b) Three concurrent forces in equilibrium

(c) More than three concurrent forces in equilibrium (d) none of the above

5. The algebraic sum of the moments of a given a system of forces, about any point in the plane of the forces is equal to the moment of their resultant about the same point. [ ]

(a) Varignon's theorem (b) Lami's theorem

(c) Triangle theorem (d) coplanar force theorem

6. Two parallel forces opposite direction and same magnitude separated by a certain distance is called [ ]
(a) Couple (b) Lami's theorem (c) Triangle theorem (d) coplanar force theorem

7. Sketching and shows the forces acting on a body and remove the all supporting elements is called [ ]
(a) Free body diagram (b) Couple (c) Triangle theorem (d) Lami's theorem

8. The force that cancels the effect of the force system acting on the body is known as [ ]
(a) Resultant (b) Neutral force (c) Balancing force (d) Equilibrant

9. When more than three concurrent forces in equilibrium, select the condition that is satisfied. [ ]
(a) All the forces must have equal magnitude.
(b) Polygon representing the forces will not close.
(c) The last side of the polygon will represent the resultant.
(d) Polygon representing the forces will close.

10. Three collinear forces F1, F2 and F3 are acting on a body. The maximum resultant of these forces occurs when [ ]
(a) All are acting in the same direction (b) Force, F3 is acting in opposite direction
(c) Forces F2 and F3 acting in a direction opposing forces F1. (d) Equilibrant

11).If one end of the beam is fixed and other end is free, then it is [ ]
(a) Cantilever beam (b) simply supported beam (c) Over hanging beam (c) fixed beam

12). ---------- are the structural members that are subjected to external forces and moments [ ]
(a) Beam (b) element (b) Load (c) support

13). Roller support has only ---------- reaction [ ]
(a) Vertical (b) horizontal (c) Inclined (d) none of the above

14).Hinged support has only ----------moment [ ]
(a) No (b) one (c) zero (d) twice

15).If the distance between any two particle of a body remains constant, it is called as ----------body [ ]
(a) Flexible body (b) rigid body (c) Deformable body (d) none of the above

16). A smooth cylinder lying on its convex surface remains in ----------equilibrium [ ]
(a) Stable (b) unstable (c) Neutral (d) none of the above

17). Dynamics deals with ---------- of the bodies [ ]
(a) Equilibrium (b) motion (c) mass (d) none of these

18). Statics deals with---------- of the bodies [ ]
(a) mass (b) motion (c) equilibrium (d) none of these

19). A body is said to be in dynamic equilibrium? [ ]
a) When it is moving around a circular path. b) When it is a. rest.
c) When it is moving with uniform velocity. d) When it is accelerated by the external force.

20). The two forces which form a couple? [ ]
a) Cannot be replaced by a single equivalent force. b) None of these.
c) Can be replaced by a single equivalent force. d) Are perpendicular to each other.

21). Buildings and bridges are an example of? [ ]
a) None of these b) Static equilibrium. c) Dynamic equilibrium d) Kinetic equilibrium.

22). Right hand rule is applied to find? [ ]
a) Neither the direction nor the magnitude. b) The magnitude of the vector
c) The direction of a vector obtained by the vector product of two vectors. d) None of these

23). The second condition of equilibrium states that, "a body will be in equilibrium, if the vector sum of all the torques acting on it is? [ ]
a) Maximum b) Zero c) One d) None of these.

24). Jumping of a paratrooper from an helicopter is an example of? [ ]
a) None of these b) Static equilibrium. c) Dynamic equilibrium. d) Kinetic equilibrium.

25). "A body will be in equilibrium if the resultant of all the forces acting on it is zero". This is called as? [ ]
a) First condition of equilibrium. b) Second condition of equilibrium

c) Third condition of equilibrium d) Fourth condition of equilibrium.

26). Two forces which cannot be replaced by a single equivalent force are said to form? [ ]

a) a bond b) a couple c) None of these. d) a pair

27). A body in equilibrium? [ ]

a) can move with constant velocity b) is always at rest

c) can move with variable acceleration d) can move with constant acceleration

28). A body is said to be in translational equilibrium if the net force on it is? [ ]

a) Maximum b) Zero c) One d) None of these.

29). In extended body in equilibrium may be considered a particle provided. [ ]

a) there is no moment of force b) all the forces are concurrent

c) line of action ot all forces meet in a point d) any one of the above

30). A particle moving with constant velocity may' be [ ]

a) In equilibrium b) accelerating c) retarding d) moving in circle.

31). A body in equilibrium does not possess any [ ]

a) Velocity b) acceleration c) momentum d) speed

32). In static and dynamic equilibrium, the body does not possess any? [ ]

a) Acceleration neither linear nor angular b) velocity neither linear nor angular

c) Displacement d) None of these

33). Two forces which form a couple: [ ]

a) Arc perpendicular to each other b) Arc parallel to each other

c) Can be replaced by a single equivalent force d) Cannot be replaced by a single equivalent force

34). The particle moving with constant velocity may be: [ ]

a) Travelling in a circle b) In equilibrium c) Acceleration d) Changing in direction

35). All the bodies in equilibrium don't possess any: [ ]

a) Velocity b) None of these c) Shape d) Acceleration

36). If a body in similar circumstances stay where it is placed, then the body is said to be in _____ equilibrium: [ ]

a) Unstable b) Dynamic c) Neutral d) Stable

37). The principle of parallel forces states that the resultant of a number of .parallel forces is numerically equal to: [ ]

a) All of the above b) the algebraic sum of the force c) None of the above d) The sum of the forces

38). If a body is disturbed and it falls away from its original position, then the body is said to be in _____ equilibrium [ ]

a) Stable b) Dynamic c) Neutral d) Unstable

39). Two forces, which are equal in magnitude but opposite in. direction, acting along parallel lines constitute a [ ]

a) Moment arm b) None of these c) Moment d) Couple

40). The magnitude of the moment of a couple is equal to: [ ]

a) Area of the couple b) Magnitude of any of the forces forming the couple

c) magnitude of any of the force forming the couple d) None of these

41). If body is disturbed and it returns to its original.. Position then it is in _____ . Equilibrium: [ ]

a) Stable b) Dynamic c) Neutral d) Unstable

42). Two forces which are equal in magnitude but opposite in direction and not acting along the same line is a? [ ]

a) Torque b) Rotation c) Couple d) Motion

43). The greater the force, the larger will be the [ ]

a) mass b) Axis of rotation c) Centre of mass d) Torque

44). Clockwise rotation is taken as? [ ]

a) Neutral b) Infinity c) Negative d) Positive

45). Counter. Clockwise rotation is taken as? [ ]

a) Neutral b) Infinity c) Negative d) Positive

46). The direction of moment is: [ ]

a) Perpendicular to the direction of the applied force

b) Opposite to the direction of the applied force

c) The same as the direction of the corresponding applied force

d) Parallel to the direction of the applied force

47). Which of the following is NOT a condition for an object to be in static equilibrium? [ ]

a) It's in translational equilibrium. b) The object is at a constant velocity.

c) The object isn't moving. d) It's in rotational equilibrium.

48). Which of the following terms means that the forces on an object are balanced in three dimensions -- upward forces equal downward, left equal right, and foward equal back? [ ]

a) Rotational equilibrium b) Stationary c) Static equilibrium d) Translational equilibrium

49). If the directions of the force and the couple moments are both reversed, what will happen to the beam?

a) The beam will lift from A. b) The beam will lift at B.

c) The beam will be restrained. d) The beam will break.

50). Internal forces are not shown on a free-body diagram because the internal forces are_____ [ ]

A) Equal to zero B) Equal and opposite and they do not affect the calculations

C) Negligibly small D) Not important

Answers:

1.c	11.a	21.b	31.a	41.c
2.c	12.a	22.a	32.a	42.c
3.b	13.a	23.a	33.a	43.d
4.b	14.a	24.b	34.b	44.d
5.a	15.b	25.d	35.b	45.c
6.a	16.b	26.c	36.b	46.a
7.a	17.b	27.b	37.c	47.a
8.d	18.c	28.b	38.c	48.c
9.d	19.d	29.a	39.d	49.a
10.a	20.c	30.b	40.a	50.a

Module -3

1). The center of gravity of a rectangle lies at a point where its two diagonals meet each other. [ ]

(a) Agree (b) disagree (c) infinity (d) none of these

2). The term centriod is [ ]

(a) the same as center of gravity (b) the point of suspension (c) moment of inertia (d) none of these

3). The center of gravity a T- section 100mmx150mmx50mm from its bottom is [ ]

(a) 50mm (b) 75mm (c) 87.5mm (d) 125mm

4). The center of gravity of a triangle lies at a point where its medians intersect each other. [ ]

(a) True (b) false (c) infinity (d) none of these

5). The center of gravity of a right angled triangle lies at its geometrical center. [ ]

(a) Correct (b) in correct (c) in ward (d) none of these

6). The center of gravity of a hemi sphere lies at a distance of 3r/8 from its base measured along the vertical radius. [ ]

(a) Correct (b) in correct (c) out ward (d) none of these

7). The center of a gravity of a right circular solid cone is at a distance of ---------- from its base, measured along the vertical axis (where H= height of a right circular solid cone) [ ]

(a) h/2 (b) h/3 (c) h/4 (d) h/6

8). The axis passing through the centroid is called as---------- [ ]

(a) Parallel axis (b) centroidal axis (c) perpendicular axis (d) none of these

9).the ---------- of the body is the ratio between mass of the body to the volume of the body. [ ]

(a) center gravity (b) centriod c) density (d) none of these

10). Centriod used to calculate the ---------- of the bodies [ ]

(a) volumes (b) mass (c) areas (d) none of these

11). Center of gravity is used to calculate the ----------of the bodies [ ]

(a) areas (b) volumes (c) surfaces (d) none of these

12).the centriod and center of mass coincide if the ---------- is uniform throughout the body [ ]

(a) areas (b) density (c) mass (d) volume

13).the center of area of a plane figure is known as ---------- [ ]

(a) center of gravity (b) centriod (c) moment of inertia (d) none of these

14). The center of a gravity of a cylinder is at a distance of ---------- from its base, measured along the vertical axis (where H= height of the cylinder) [ ]

(a) b/2 (b) d/2 (c) h/2 (d) h/4

15).The center of a gravity of a sphere is at a distance of ---------- from its base, measured along the vertical axis. [ ]

(a) d/2 (b) b/2 (c) h/5 (d) h/4

16). The area of rectangle is ---------- [ ]

(a) bxd (b) b^2 (c) d^2 (d) none of these

17).the area of semi-circle is ---------- [ ]

(a) $\pi r^2/2$ (b) $\pi r2/4$ (c) bxd (d) none of these

18).the area of circle is ---------- [ ]

(a)πr^2 (b) $\pi r^2/2$ (c)) $\pi r^2/4$ (d) none of these

19). The area of quadrant is ---------- [ ]

(a) $\pi r^2/4$ (b) $\pi r2/2$

(c)πr^2 (d) none of these

20).The area of right angle triangle is ---------- [ ]

(a) 1/2bh (b) b/3

(c) h/3 (d) none of these

21).The quantity of matter in a body is called ---------- [ ]

(a) weight (b) density

(c) mass (d) none of these

22).the point , through which the whole weight of the body acts, irrespective of its position , is known as [ ]

(a) moment of inertia (b) center of gravity (c) center of percussion (d) center of mass

23). An irregular body may have more than one center of gravity. [ ]

(a) yes (b) no

(c) infinity (d) none of these

24). The centriod of a rectangle along x- axis is. [ ]

(a) b/2 (b) d/2

(c) bxd (d)none of these

25). The centriod of a rectangle along y- axis is [ ]

(a) d/2 (b) b/2

(c) b^2 (d) none of these

Answers:

1.a	11.b	21.c
2.b	12.b	22.b
3.c	13.b	23.b
4.a	14.c	24.a
5.b	15.a	25.b
6.a	16.a	
7.c	17.a	
8.b	18.a	
9.c	19.a	
10.c	20.a	