

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

1. Mechanics is the branch of science which deals with the
 - (A) Laws of forces and its effect on bodies
 - (B) Repair of machines
 - (C) Laws of thermodynamics
 - (D) None of the above
2. The branch of physical science dealing with nature of motion only without any reference of the force causing it is known as
 - (A) Kinetics
 - (B) Kinematics
 - (C) Statics
 - (D) Hydrostatics
3. Which one is more rigid
 - (A) Cork
 - (B) Chalk
 - (C) Wood
 - (D) Rubber
4. The branch of science dealing with motion along with forces causing it is known as
 - (A) kinetics
 - (B) statics
 - (C) kinematics
 - (D) hydrostatics
5. A force which prevents a body from being deformed is called
 - (A) An active force
 - (B) A passive force
 - (C) An internal force
 - (D) An external force
6. Which of the following statement is correct?
 - (A) A force is an agent which produces or tends to produce motion
 - (B) A force is an agent which stops or tends to stop motion
 - (C) A force may balance a given number of forces acting on a body
 - (D) Both (A) and (B)
7. Force is a
 - (A) Scalar quantity
 - (B) Vector quantity
 - (C) Linear quantity
 - (D) Unpredictable
8. The triangle law of forces is applicable for the resultant of

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

- (A) Two forces
- (B) Three forces
- (C) Four forces
- (D) Any number of forces

9. The parallelogram law of forces is applicable for the resultant of

- (A) Four forces
- (B) Two forces
- (C) Three forces
- (D) Any number of forces

10. The polygon law of forces is used for finding out resultant of

- (A) Parallel forces
- (B) Colinear forces
- (C) Coplanar concurrent forces
- (D) Noncoplanar concurrent forces

11. The resultant (R) in case of parallelogram law of forces is given mathematically as

- (A) $\sqrt{P^2+Q^2+2PQ\cos\Theta}$
- (B) $\sqrt{P^2+Q^2-2PQ\cos\Theta}$
- (C) $\sqrt{P^2-Q^2+2PQ\cos\Theta}$
- (D) $\sqrt{P^2-Q^2-2PQ\cos\Theta}$

12. The resultant in parallelogram law of forces has maximum value when the angle between two forces is equal to

- (A) 30°
- (B) 90°
- (C) 180°
- (D) 0°

13. The resultant of parallelogram law of forces has minimum value when the angle between the two forces is equal to

- (A) 0°
- (B) 60°
- (C) 90°
- (D) 180°

14. The moment of a force about any point is geometrically equal to _____ area of the triangle whose base is the line representing the force and vertex is the point about which the moment is required.

- (A) Same
- (B) Half
- (C) Twice

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(D) None of the above

15. The algebraic sum of the moments of a given system of forces about a point is equal to the moment of their resultant about the same point. This statement is known as
(A) Lami's theorem
(B) Varignon's principle
(C) Newton's law of motion
(D) Cosine law

16. If ΣH is the algebraic sum of resolved part of forces in a horizontal direction and ΣV is the algebraic sum of resolved part of forces in a vertical direction then resultant R is equal to
(A) $\Sigma H + \Sigma V$
(B) $\Sigma H^2 + \Sigma V^2$
(C) $\sqrt{(\Sigma H)^2 + (\Sigma V)^2}$
(D) $\sqrt{(\Sigma H^2 + \Sigma V^2)}$

17. According to lami's theorem the three forces
(A) Must be equal
(B) Must be at 120° to each other
(C) Must be both (A) and (B)
(D) May not be any of the two

18. The lami's theorem is applicable only for
(A) Coplanar forces
(B) Concurrent forces
(C) Coplanar concurrent forces
(D) Any type of forces

19. If a body is in equilibrium we may conclude that
(A) No forces are acting on the body
(B) The resultant of all forces acting on it is zero
(C) The moment of all the forces about any point is zero
(D) Both (B) and (C)

20. If the sum of all the forces acting on a body is zero then the body may be in equilibrium provided the forces are
(A) Concurrent
(B) Parallel
(C) Like parallel
(D) Unlike parallel

21. If two colinear forces P and Q are acting on a body in the same direction then their resultant is equal to
(A) $P-Q$

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

- (B) $P+Q$
- (C) $\sqrt{P^2-Q^2}$
- (D) $P \times Q$

22. The system of forces whose resultant is zero are called

- (A) Non concurrent forces
- (B) Coplanar collinear forces
- (C) Equilibrium forces
- (D) Non coplanar forces

23. The rate of change of displacement of a body w.r.t. time is called

- (A) Speed
- (B) Retardation
- (C) Acceleration
- (D) Velocity

24. If a body moves vertically downwards its acceleration is equal to

- (A) $+g$
- (B) $-g$
- (C) $>g$
- (D) $<g$

25. The acceleration of a particle at any instant is expressed as

- (A) $a = dv/dx$
- (B) $a = dv/dt$
- (C) $a = dx/dt$
- (D) $a = dv \cdot dx$

26. Force is equal to

- (A) Mass \times density
- (B) Mass \times acceleration
- (C) Mass \times distance
- (D) Mass \times velocity

27. The another name of newton's first law of motion is called as

- (A) Law of moments
- (B) Triangle law
- (C) Law of inertia
- (D) Polygon law

28. According to newton's second law of motion the rate of change of momentum is equal to the

- (A) Acceleration
- (B) Retardation
- (C) Velocity

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(D) Applied force

29. When the particles of a body moves in a straight parallel path the motion is known as
(A) Rectilinear
(B) Curvilinear
(C) Rotary
(D) None of the above

30. The total momentum of two bodies after collision will
(A) Increase
(B) Decrease
(C) Remain constant
(D) None of the above

31. Momentum of a body is the product of its
(A) Mass and acceleration
(B) Mass and velocity
(C) Mass and displacement
(D) Mass and temperature

32. In S.I. system the unit of momentum is
(A) Kg/cm²
(B) Kg-m/s²
(C) Kg-m/s
(D) Kiloforce

33. If a bullet of mass 'm' is ejected from a gun of mass 'M' with a velocity 'v' then the velocity of recoil is
(A) mv/M
(B) Mv/m
(C) $-mv/M$
(D) $-Mv/m$

34. According to law of conservation of momentum
(A) $m_1v_1 - m_2v_2 = (m_1+m_2)v$
(B) $m_1v_1 + m_2v_2 = (m_1+m_2)v_2$
(C) $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$
(D) $m_1v_2 + m_2v_1 = m_1v_1 + m_2v_2$

35. According to law of conservation of momentum
(A) Momentum before impact > momentum after impact
(B) Momentum before impact < momentum after impact
(C) Momentum before impact = momentum after impact
(D) None of the above

36. According to Newton's law of collision of elastic bodies the velocity of separation is equal to

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(where e = coefficient of restitution)

- (A) The velocity of approach
- (B) $e \times$ velocity of approach
- (C) velocity of approach/ e
- (D) $e +$ velocity of approach

37. The coefficient of restitution 'e' is always

- (A) Equal to one
- (B) Less than one
- (C) More than one
- (D) Equal to two

38. When two colliding bodies before impact are moving along the line of impact is known as

- (A) Oblique impact
- (B) Direct impact
- (C) Restitution
- (D) None of the above

39. What is the acceleration produced when a mass of 8kg body is applied with a force of 30N?

- (A) 3.75 m/s^2
- (B) 4 m/s^2
- (C) Zero
- (D) 1 m/s^2

40. The unit of work in S.I. system is

- (A) Newton
- (B) Joule
- (C) Watt
- (D) Joule/s

41. Pick up the correct one.

- (A) The rate of doing work is energy
- (B) The product of mass and velocity is energy
- (C) Capacity of doing work is energy
- (D) Product of mass and acceleration is energy

42. Potential energy possessed by a body is given by relation

- (A) mgh
- (B) mh
- (C) mh/g
- (D) $(\frac{1}{2})mv^2$

43. Potential energy is due to

- (A) Motion of body

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(B) Chemical reaction between two metals
(C) Fissioning between two atoms
(D) Position of the body

44. When the spring of a watch is wound it will possess
(A) Kinetic energy
(B) Heat energy
(C) Flow energy
(D) Potential energy

45. One Horse-Power is equal to ____ watts.
(A) 764
(B) 754
(C) 746
(D) 748

46. Formula of kinetic energy
(A) $2mv^2$
(B) $mv^2/3$
(C) $mv^2/2$
(D) $mv/2$

47. A body is allowed to fall from a tower of height 'h'. The total sum of energy possessed by it is max. at
(A) The top of tower
(B) The bottom of tower
(C) The middle of tower
(D) Sum of energy will remain same

48. 1 watt is equal to
(A) 0.1 J/s
(B) 1 J/s
(C) 10 J/s
(D) 100 J/s

49. The P.E. of mass 10kg raised through a height of 1 metre is (take $g=9.8m/s^2$)
(A) 980 Nm
(B) 98 Nm
(C) 10 Nm
(D) 100 Nm

50. Pick up the correct statement.
(A) Energy can be created and destroyed in this universe.
(B) Energy can neither be created nor be destroyed but can be converted from one form to another.
(C) Energy can be created but cannot be destroyed.

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(D) Energy cannot be created but can be destroyed.

51. _____ is the phenomena that resist the movement of the two surfaces in contact.
(A) Friction
(B) Motion
(C) Circular movement
(D) Rotation

52. The frictional force always acts _____ to the surface of the application of the friction.
(A) Tangential
(B) Perpendicular
(C) Parallel
(D) Normal

53. What is not the condition for the equilibrium in free body diagram for calculation of the normal forces?
(A) $\sum F_x = 0$
(B) $\sum F_y = 0$
(C) $\sum F_z = 0$
(D) $\sum F \neq 0$

54. One of the uses of the centroid is as in the simplification of the loading system the net force acts at the _____ of the loading body.
(A) The center axis
(B) Centriod
(C) The corner
(D) The base

55. The friction experienced by a body, when in motion, is known as
(A) Rolling friction
(B) Dynamic friction
(C) Static friction
(D) Limiting friction

56. The point, through which the whole weight of the body acts, irrespective of its position, is known as
(A) Centre of percussion
(B) Centre of mass
(C) Centre of gravity
(D) Moment of inertia

57. The angular velocity (in rad / s) of a body rotating at N revolutions per minute is
(A) $\pi N / 60$
(B) $\pi N / 180$
(C) $2\pi N / 60$
(D) $2\pi N / 180$

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

58. The maximum efficiency of a lifting machine is

- (A) $1/m$
- (B) $V.R./m$
- (C) $m/V.R.$
- (D) $1/(m \times V.R.)$

59. The centre of gravity of a semi-circle lies at a distance of _____ from its base measured along the vertical radius.

- (A) $3r/8$
- (B) $4r/3\pi$
- (C) $8r/3$
- (D) $3r/4\pi$

60. Moment of inertia of a triangular section of base (b) and height (h) about an axis through its base, is

- (A) $bh^3/4$
- (B) $bh^3/8$
- (C) $bh^3/12$
- (D) $bh^3/36$

61. A machine having an efficiency less than 50%, is known as

- (A) reversible machine
- (B) non-reversible machine
- (C) neither reversible nor non-reversible machine
- (D) ideal machine

62. Moment of inertia of a rectangular section having width (b) and depth (d) about an axis passing through its C.G. and parallel to the depth (d), is

- (A) $db^3/12$
- (B) $bd^3/12$
- (C) $db^3/36$
- (D) $bd^3/36$

63. In actual machines, mechanical advantage is _____ velocity ratio.

- (A) Equal to
- (B) Greater than
- (C) Less than
- (D) Can't say

64. A rubber ball is dropped from a height of 2 m. If there is no loss of velocity after rebounding, the ball will rise to a height of

- (A) 1m
- (B) 2m
- (C) 3m

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(D) 4m

65. Moment of inertia of a circular section about its diameter (d) is

- (A) $\pi d^3/16$
- (B) $\pi d^3/32$
- (C) $\pi d^4/32$
- (D) $\pi d^4/64$

66. In a screw jack, the effort required to lower the load is _____ the effort required to raise the same load.

- (A) Less than
- (B) Equal to
- (C) More than
- (D) Can't say

67. The static friction

- (A) bears a constant ratio to the normal reaction between the two surfaces
- (B) is independent of the area of contact, between the two surfaces
- (C) always acts in a direction, opposite to that in which the body tends to move
- (D) all of the above

68. The moment of inertia of a solid cylinder of mass m , radius r and length l about the longitudinal axis or polar axis is

- (A) $mr^2/2$
- (B) $mr^2/4$
- (C) $mr^2/6$
- (D) $mr^2/8$

69. A couple produces

- (A) translatory motion
- (B) rotational motion
- (C) combined translatory and rotational motion
- (D) none of the above

70. For a self locking machine, the efficiency must be

- (A) Equal to 50%
- (B) Less than 50%
- (C) Greater than 50%
- (D) 100%

71. The velocity ratio for the third system of pulleys is

- (A) n
- (B) n^2
- (C) 2^n

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(D) $2^n - 1$

72. The theorem of perpendicular axis is used in obtaining the moment of inertia of a

- (A) Triangular lamina
- (B) Square lamina
- (C) Circular lamina
- (D) Semi-circular lamina

73. As radius of gyration is indirectly to the parallel axis theorem, parallel axis theorem uses the

_____ of the distance.

- (A) Square root
- (B) Square
- (C) Cube root
- (D) Cube

74. The distance in the parallel axis theorem is multiplied by

- (A) Area
- (B) Volume
- (C) Linear distance
- (D) Both (A) & (B)

75. The maximum value of the frictional force is called _____

- (A) Limiting friction
- (B) Non-limiting friction
- (C) Limiting action friction
- (D) Non-limiting action friction

76. The frictional force is directly proportional to the _____

- (A) Applied load
- (B) Type of surface used
- (C) The normal force
- (D) The horizontal load

77. The angle of the inclination of wedge over which the block is sliding is determined by which of the following trigonometric function?

- (A) Tangent inverse
- (B) Sine
- (C) Cosine
- (D) Secant

78. The coefficient of kinetic friction is _____ than coefficient of static friction.

- (A) Smaller
- (B) Larger
- (C) Slightly larger

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(D) Highly large

79. A heavy ladder resting on floor and against a vertical wall may not be in equilibrium, if
(A) The floor is smooth, the wall is rough
(B) The floor is rough, the wall is smooth
(C) The floor and wall both are smooth surfaces
(D) The floor and wall both are rough surfaces

80. The units of moment of inertia of an area are
(A) Kg-m²
(B) m⁴
(C) kg/m²
(D) m³

81. On a ladder resting on smooth ground and leaning against vertical wall, the force of friction will be
(A) Towards the wall at its upper end
(B) Away from the wall at its upper end
(C) Upwards at its upper end
(D) Downwards at its upper end

82. The ratio of static friction to dynamic friction is always
(A) Equal to one
(B) Less than one
(C) Greater than one
(D) None of the above

83. Coefficient of friction is the
(A) Angle between normal reaction and the resultant of normal reaction and the limiting friction
(B) Ratio of limiting friction and normal reaction
(C) The friction force acting when the body is just about to move
(D) The friction force acting when the body is in motion

84. Pick up the incorrect statement from the following:
(A) The C.G. of a circle is at its centre
(B) The C.G. of a triangle is at the intersection of its medians
(C) The C.G. of a rectangle is at the intersection of its diagonals
(D) The C.G. of a semicircle is at a distance of $r/2$ from the centre

85. The angle which an inclined plane makes with the horizontal when a body placed on it is about to move down is known as angle of
(A) Friction
(B) Limiting friction
(C) Repose

ENGINEERING MECHANICS OBJECTIVE (2ND SEM)

Prepared by

A.N.Biswal and P.Mahapatra

(D) Kinematic friction

86. In actual machines

- (A) M.A.>V.R.
- (B) M.A.=V.R.
- (C) M.A.<V.R.
- (D) M.A.=1

87. The centre of gravity a *T*-section 100 mm × 150 mm × 50 mm from its bottom is

- (A) 50mm
- (B) 75mm
- (C) 87.5mm
- (D) 125mm

88. The mechanical advantage of a lifting machine is the ratio of

- (A) Distance moved by effort to the distance moved by load
- (B) Load lifted to the effort applied
- (C) Output to the input
- (D) None of the above

89. In ideal machines, mechanical advantage is _____ velocity ratio.

- (A) Equal to
- (B) Less than
- (C) Greater than
- (D) None of the above

90. When a body falls freely under gravitational force, it possesses _____ weight.

- (A) No
- (B) Maximum
- (C) Minimum
- (D) None of the above