Subject Name & Code : Engineering Mechanics (23PC104C) Exam Name : Q2

1. The unit of linear acceleration is [C]
   A) kg-m B) m/s C) m/s² D) rad/s²

2. The angular velocity (in rad/s) of a body rotating at N r.p.m. is [B]
   A) p N/60 B) 2 p N/60 C) p N/120 D) p N/180

3. The linear velocity of a body rotating at ω rad/s along a circular path of radius r is given by [A]
   A) ωr B) ω/r C) ωs.r D) ωs/r

4. When a particle moves along a straight path, then the particle has [A]
   A) tangential acceleration only B) centripetal acceleration only C) Normal acceleration D) acceleration

5. When a particle moves with a uniform velocity along a circular path, then the particle has [B]
   A) Normal acceleration only B) centripetal acceleration only C) Normal velocity only D) acceleration only

6. When the motion of a body is confined to only one plane, the motion is said to be [A]
   A) plane motion B) rectilinear motion C) curvilinear Motion D) Motion

7. _____ is the simplest type of motion and is along a straight line path. [A]
   A) rectilinear motion B) curvilinear Motion C) transilation Motion D) rotational motion

8. _____ is the motion along a curved path. [C]
   A) plane motion B) rotational motion C) curvilinear Motion D) rectilinear motion

9. Displacement of a body is a _____ quantity. [B]

A) scalar B) vector C) scalar and vector D) force

10. A train covers 60 miles between 2 p.m. and 4 p.m. How fast was it going at 3 p.m.? [B]

A) 60 mph B) 30 mph C) 40 mph D) 50 mph

11. The relative velocity of B with respect to A in a rigid link AB is [B]

A) parallel to AB B) perpendicular to AB C) along AB D) inclined to AB

12. The magnitude of linear velocity of a point B on a link AB relative to point A is [A]

A) ωx AB B) 2ω(AB) C) 1/ωAB D) 1/2(ωx AB)

13. The direction of linear velocity of any point on a link with respect to another point on the same link is [B]

A) parallel to the link joining the points B) perpendicular to the link joining the points C) inclined to the link joining the points D) along the link joining the points

14. The two links OA and OB are connected by a pin joint at O. If the link OA turns with angular velocity ω1 rad/s in the clockwise direction and the link OB turns with angular velocity ω2 rad/s in the anti-clockwise direction, then the rubbing velocity at th [C]

A) ω1.ω2.r B) (ω1-ω2)r C) (ω1+ω2)r D) (ω1-ω2)2r

15. ABCD is a four bar mechanism in which AB = 310mm and CD = 450mm. AB and CD are both perpendicular to the fixed link AD. If the velocity of B at this condition is v. Then the velocity of C is [C]

A) v B) 2/3 v C) 3/2 v D) 9/4 v

16. A thin circular disc is rolling with a uniform linear speed, along a straight path on a plane surface. Which of the following statement is correct in this regard? [D]

A) tangential acceleration only B) acceleration only C) both tangential and centripetal acceleration D) centripetal acceleration only

17. A thin circular disc is rolling with a uniform linear speed, along a straight path on a plane surface. Which of the following statement is correct in this regard? [B]

A) All points of the disc have the same velocity. B) The centre of the disc has zero acceleration C) The centre of the disc has centrifugal acceleration. D) The point on the disc making contact with the plane surface has zero acceleration.

18. The component of the accelertion, parallel to the velocity of the particle, at the given instant is called [B]

A) radial component B) tangential component C) coriolis component D) normal component

19. The component of the accelertion, perpendicular to the velocity of the particle, at the given instant is called [A]

A) radial component B) tangential component C) coriolis component D) normal component

20. A point B on a rigid link AB moves with respect to A with angular velocity ?rad/s. The total acceleration of B with respect to A will be equal to [C]

A) vector sum of radial component and coriolis component B) vector sum of tangential component and coriolis component C) vector sum of radial component and tangential component D) vector difference of radial component and tangential component

21. the component of the toatal momentum of two bodies along the x axis ramians the------befor and after impact. [D]

A) half B) twice C) zero D) same

22. Sum of P.E and K.E during motion is called [B]

A) work enrgy principle B) principle of conservation of energy C) principle of impulse momentum D) principle of Virtual work

23. momentum is [A]

A) conserved B) nonconserved C) components D) no expression

24. name the priciples applied between two positions of particle. [D]

A) work enrgy principle B) principle of conservation of energy C) principle of impulse momentum D) principle of conservation of energy & work enrgy

25. When the motion of a body is along a straight line path, it is called [B]

A) translatory motion B) plane motion C) curvilinear motion D) rotational motion

26. The acceleration of a particle at any instant has two components, radial component and tangential component. These two components will be [B]

A) parallel to each other B) perpendicular to each other C) inclined at 45 in degrees D) opposite to each other

27. The centre of gravity of a coupler link in a four bar mechanism will experience [D]

A) no acceleration B) only linear acceleration C) only angular acceleration D) both linear and angular acceleration

28. When a point moves along a straight line, its acceleration will have [B]

A) radial component only B) tangential component only C) coriolis component only D) radial and tangential components both

29. When a point at the end of a link moves with constant angular velocity, its acceleration will have [A]

A) radial component only B) tangential component only C) coriolis component only D) radial and tangential components both

30. The coriolis component of acceleration acts [D]

A) along the sliding surface B) parallel to the sliding surface C) inclined to the sliding surface D) perpendicular to the sliding surface

31. The coriolis component of acceleration is taken into account for [C]

A) slider crank mechanism B) four bar chain mechanism C) quick return motion mechanism D) no mechanism

32. 1. The coriolis component of acceleration depends upon [C]

A) angular velocity of the link and slider B) angular velocity of the link C) zero velocity D) velocity of slider

33. A body in motion will be subjected to coriolis acceleration when that body is [D]

A) in plane rotation with variable velocity B) in plane translation with variable velocity C) in plane motion which is a resultant of plane translation and rotation D) restrained to rotate while sliding over another body

34. A car starts from rest and accelerates uniformly to a speed of 72 km. p.h. over a distance of 500 m. Calculate the acceleration. [B]

A) 0.3m/s² B) 0.4m/s² C) 0.5m/s² D) 0.6m/s²

35. A car starts from rest and accelerates uniformly to a speed of 72 km. p.h. over a distance of 500 m. Calculate the time taken to attain the speed. [A]

A) 50 s B) 60 s C) 70 s D) 80 s

36. A car starts from rest and accelerates uniformly to a speed of 72 km. p.h. over a distance of 500 m. If a further acceleration raises the speed to 90 km. p.h. in 10 seconds, find this acceleration and the further distance moved. [D]

A) 0.4m/s² B) 0.3m/s² C) 0.6m/s² D) 0.5m/s²

37. A car starts from rest and accelerates uniformly to a speed of 72 km. p.h. over a distance of 500 m. A further acceleration raises the speed to 90 km. p.h. in 10 seconds.The brakes are now applied to bring the car to rest under uniform retardation in 5 se [C]

A) 200 m B) 300 m C) 225 m D) 335 m

38. A wheel accelerates uniformly from rest to 2000 r.p.m. in 20 seconds. What is its angular acceleration? [A]

A) 10.475rad/s² B) 11.475rad/s² C) 12.475rad/s² D) 13.475rad/s²

39. A wheel accelerates uniformly from rest to 2000 r.p.m. in 20 seconds.How many revolutions does the wheel make in attaining the speed of 2000 r.p.m.? [A]

A) 333.4 B) 444.4 C) 555.4 D) 666.4

40. A horizontal bar 1.5 metres long and of small cross-section rotates about vertical axis through one end. It accelerates uniformly from 1200 r.p.m. to 1500 r.p.m. in an interval of 5 seconds. What is the linear velocity at the beginning? [D]

A) 288.6 m/s B) 388.6 m/s C) 488.6 m/s D) 188.6 m/s

41. A horizontal bar 1.5 metres long and of small cross-section rotates about vertical axis through one end. It accelerates uniformly from 1200 r.p.m. to 1500 r.p.m. in an interval of 5 seconds. What is the linear velocity at the end of the interval? [A]

A) 235.5 m/s B) 335.5 m/s C) 435.5 m/s D) 535.5 m/s

42. A horizontal bar 1.5 metres long and of small cross-section rotates about vertical axis through one end. It accelerates uniformly from 1200 r.p.m. to 1500 r.p.m. in an interval of 5 seconds. What is the normal component of the acceleration of the mid-poin [C]

A) 2.7m/s² B) 3.7m/s² C) 4.7m/s² D) 5.7m/s²

43. A horizontal bar 1.5 metres long and of small cross-section rotates about vertical axis through one end. It accelerates uniformly from 1200 r.p.m. to 1500 r.p.m. in an interval of 5 seconds. What is the tangential component of the acceleration of the mid- [C]

A) 18287m/s² B) 18387m/s² C) 18487m/s² D) 18587m/s²

44. The force which acts along the radius of a circle and directed _____ the centre of the circle is known as centripetal force. [B]

A) away from B) towards C) at D) beside

45. The unit of mass moment of inertia in S.I. units is [C]

A) m² B) kgf-m-s² C) kg-m² D) N-m

46. Joule is a unit of [B]

A) force B) work C) power D) energy

47. The energy possessed by a body, for doing work by virtue of its position, is called [A]

A) potential energy B) kinetic energy C) electrical energy D) chemical energy

48. When a body of mass moment of inertia I (about a given axis) is rotated about that axis with an angular velocity, then the kinetic energy of rotation is [C]

A) 0.5 I.ω B) I.ω C) 0.5 I.ω² D) I.ω²

49. The wheels of a moving car possess [D]

A) potential energy only B) kinetic energy of translation only C) kinetic energy of rotation only D) kinetic energy of translation and rotation both

50. The bodies which rebound after impact are called [B]

A) inelastic bodies B) elastic bodies C) solid bodies D) regid body

51. The coefficient of restitution for inelastic bodies is [A]

A) zero B) between zero and one C) one D) more than one

52. Which of the following statement is correct ? [D]

A) The kinetic energy of a body during impact remains constant B) The kinetic energy of a body before impact is equal to the kinetic energy of a body after impact. C) The kinetic energy of a body before impact is less than the kinetic energy of a body after impact. D) The kinetic energy of a body before impact is more than the kinetic energy of a body after impact.

53. A body of mass m moving with a constant velocity v strikes another body of same mass m moving with same velocity but in opposite direction. The common velocity of both the bodies after collision is [B]

A) v B) 2v C) 4v D) 8v

54. An electric motor drives a machine through a speed reducing gear of ratio 9/1. The motor armature,with its shaft and gear wheel, has moment of inertia 0.6 kg-m².The rotating part of the driven machine has moment of inertia 45 kg-m². The driven machine has [A]

A) 1764 W B) 2764 W C) 3764 W D) 4764 W

55. The flywheel of a steam engine has a radius of gyration of 1 m and mass 2500 kg. The starting torque of the steam engine is 1500 N-m and may be assumed constant. Determine : Angular acceleration of the flywheel. [B]

A) 0.6 rad/s² B) 0.8 rad/s² C) 0.1 rad/s² D) 0.19 rad/s²

56. The flywheel of a steam engine has a radius of gyration of 1 m and mass 2500 kg. The starting torque of the steam engine is 1500 N-m and may be assumed constant. Determine : Kinetic energy of the flywheel after 10 seconds from the start. [C]

A) 50 kJ B) 60 kJ C) 45 kJ D) 80 kJ

57. Which of the following objects have momentum? [A]

A) An electron is orbiting the nucleus of an atom. B) A UPS truck is stopped in front of the school building. C) The high school building rests in the middle of town. D) acceleration two bodies

58. A truck driving along a highway road has a large quantity of momentum. If it moves at the same speed but has twice as much mass, its momentum is _____ [C]

A) zero B) quadrupled C) doubled D) unchanged

59. The study of moment of bodies without reference to mass or force is. [B]

A) Kinetics B) Kinematics C) Statics D) Mechanics.

60. Relation between linear velocity and angular velocity is-----Where V = Linear velocity and w= Angular velocity [C]

A) V= rxw B) V=r/w C) w=rxV D) w=r/V

61. The displacement of a point [C]

A) Is independent of the distance and the direction of movement of the point B) Is always less than the distance traversed by the point C) Is a vector from initial to final position of the point D) Implies the distance moved by the point

62. The distance travelled by a body moving with uniform acceleration in the n th second is equal to [D]

A) un+1/2an B) u+2a(n-1) C) 2u+a(2n-1) D) u+1/2a(2n-1)

63. If a body moves in such a way that all its particles move in parallel planes and travel the same distance, then the body is said to be [A]

A) Motion of translation B) Motion of translation and rotation C) Motion of rotation D) no Motion

64. A body starting with initial velocity zero, moves in straight line as per law $S=2t^3-t^2-2$. The acceleration of partial after 1 second will be [C]

A) $5m/s^2$ B) $8m/s^2$ C) $10m/s^2$ D) $12m/s^2$

65. If s body is having motion of translation as well as motion of rotation, then total kinetic energy is equal to [C]

A) 1/2mv^2 B) 1/2mv^2 + 1/2mw^2 C) 1/2mv^2 + 1/2wI^2 D) 1/2vm^2 + 1/2 wI^2

66. Degree of freedom of a rigid body implies the [D]

A) Constraints to its motion B) the body can have Angular motion C) Angles that it may turn through D) Total number of modes of displacement

67. The instantaneous center of rotation [C]

A) Can exit for any space motion B) Is a hypothetical concept to sole problems C) Must exist for any plane motion D) Should also be the instantaneous center of acceleration

68. If a body is moving in a circular path, the motion of the body is [B]

A) Irrotational B) Rotational C) transilation D) rigid

69. The unit vector ‘ normal’ to a curve [B]

A) Is the same as the radial unit vector B) Is directed towards the local center of curvature C) Is directed outwards along the join of the center of curvature and the point. D) Should be perpendicular to the path of the point.

70. The combined motion of rotation and translation [C]

A) The motion of translation takes place before the motion of rotation. B) no motion of rotation takes place before the motion of rotation. C) Both motion takes place before the motion of rotation D) The motion of translation takes place after the motion of rotation.

71. The friction experienced by a body, when in motion, is known as [B]

A) rolling friction B) dynamic friction C) limiting friction D) static friction

72. Two balls of equal mass and of perfectly elastic material are lying on the floor. One of the ball with velocity v is made to struck the second ball. Both the balls after impact will move with a velocity [B]

A) v B) v/2 C) v/4 D) v/8

73. The velocity ratio in case of an inclined plane inclined at angle θ to the horizontal and weight being pulled up the inclined plane by vertical effort is [A]

A) sin θ B) cos θ C) tan θ D) cosec θ

74. The time of flight (t) of a projectile on an upward inclined plane is(where u = Velocity of projection, a = Angle of projection, and ß = Inclination of the plane with the horizontal.) [D]

A) T= (g cosß) / (2u sin(a-ß)) B) T= (2u sin(a-ß)) / (g cosß) C) T= (g cosß) / (2u sin(a+ß)) D) s

75. The unit of angular acceleration is [C]

A) N-m B) m/s C) m/s^2 D) rad/s^2

76. name the priciples applied between an interval of time [C]

A) work enrgy principle B) principle of conservation of energy C) principle of impulse momentum D) principle of conservation of energy & work enrgy

77. Which of the following is an equation of linear motion?(where, u and v = Initial and final velocity of the body, a = Acceleration of the body, and s = Displacement of the body in time t seconds.) [D]

A) $v=u+at$ B) $s=ut+1/2at^2$ C) $v^2=u^2+2as$ D) all of these

78. The range of a projectile is maximum, when the angle of projection in degrees is [B]

A) 30 B) 45 C) 70 D) 90

79. It is the geometry of motion. [B]

A) static B) kinematics C) kinetic D) dynamics

80. It is the branch of mechanics that relates the force acting on a body to its mass and acceleration. [D]

A) static B) kinematics C) kinetic D) dynamics

81. The ____ expresses the relation between the external forces applied to a system of particles and the effective force on each particle of the system. [B]

A) Newtons Law of Motion B) D'alemberts principle C) Inertia force of particle D) motion law

82. It is defined as the motion of a rigid body in which a straight live passing through any two point of the body always remain parallel to its initial position. [A]

A) Translation B) velocity C) acceleration D) force

83. The motion of translating body moving in a straight line is called _____. [A]

A) Rectilinear translation B) Curvilinear translation C) parallel axis D) kinematic equation of motion

84. The path of the translating body is curved, the motion becomes _____. [B]

A) Rectilinear translation B) Curvilinear translation C) parallel axis D) kinematic equation of motion

85. The area under a v-t curve represents the change in _____ [A]

A) displacement B) velocity C) mass D) acceleration

86. The area under an a-t curve represents the change in _____ [D]

A) displacement B) velocity C) force D) acceleration

87. The normal component of acceleration is expressed by_____. [A]

A) an=v²/r B) at=dv/dt C) at=ds/dt D) at=dt/ds

88. It is define as that motion of rigid body in which the particles move in a circular paths with their centers on a fixed straight line [B]

A) Translation B) Rotation C) Acceleration D) energy

89. _____ is measured in radians by the angular distance swept through by any radians of or line in the rotating body [A]

A) Angular displacement B) Angular velocity C) Angular acceleration D) angular diplacement

90. It is defined as the motion of rigid body in which all particles in the body remain at a constant distance from a fixed reference plane. [B]

A) angular velocity B) plane motion C) rotation D) translation

91. The expression w/2gv² is defined as [B]

A) resultant work B) kinetic energy C) acceleration D) potential energy

92. The expression U=SX.ds define as [B]

A) kinetic energy B) resultant work C) work energy equation D) workdone

93. motion is subjected to acceleration due to gravity called [C]

A) projection B) trajectory C) projectile D) curce

94. horizontal velocity component in a trajectory is [B]

A) 1 B) zero C) neglect D) half of verical

95. path followed by trajectory called [B]

A) projection B) trajectory C) projectile D) curce

96. maximum speed to avoid skidding [A]

A) V=vμgr B) V=vμgr C) V>μgr D) V<μgr

97. maximum speed to avoid over turnning [A]

A) V=vμrb/h B) V=vμrb/h C) V>μrb/h D) V<μrb/h

98. which the two bodies exert very large force on each other is called [A]

A) impact B) strike C) absorb D) collison

99. coefficient of restitution = [A]

A) velocity of separation / velocity of approach B) velocity of approach /velocity of separation C) 1/(velocity of separation - velocity of approach) D) 1/(velocity of separation * velocity of approach)

100. frictional force equal to the inertia force to the external forces acting on particle and equal to sum ti zero is called [C]

A) Newton's principle B) Gliber's principle C) D'Allembert's priciple D) Galileo's principle