

KDM MCQ QUESTIONS

1. Which of the following disciplines provides study of inertia forces arising from the combined effect of the mass and the motion of the parts

- (a) theory of machines
- (b) applied mechanics
- (c) mechanisms
- (d) kinetics
- (e) kinematics.

Ans: d

2. Which of the following disciplines provides study of relative motion between the parts of a machine

- (a) theory of machines
- (b) applied mechanics
- (c) mechanisms
- (d) kinetics
- (e) kinematics.

Ans: e

3. The type of pair formed by two elements which are so connected that one is constrained to turn or revolve about a fixed axis of another element is known as

- (a) turning pair
- (b) rolling pair
- (c) sliding pair
- (d) spherical pair
- (e) lower pair,

Ans: a

4. Which of the following is a lower pair

- (a) ball and socket
- (b) piston and cylinder
- (c) cam and follower
- (d) (a) and (b) above
- (e) belt drive.

Ans: d

5. If two moving elements have surface contact in motion, such pair is known as

- (a) sliding pair
- (b) rolling pair
- (c) surface pair
- (d) lower pair
- (e) higher pair.

Ans: e

6. The example of lower pair is

- (a) shaft revolving in a bearing
- (b) straight line motion mechanisms
- (c) automobile steering gear
- (d) all of the above
- (e) none of the above.

Ans: d

7. Pulley in a belt drive acts as

- (a) cylindrical pair
- (b) turning pair
- (c) rolling pair
- (d) sliding pair
- (e) surface pair.

Ans: c

8. The example of rolling pair is

- (a) bolt and nut
- (b) lead screw of a lathe
- (c) ball and socket joint
- (d) ball bearing and roller bearing
- (e) all of the above.

Ans: d

9. Any point on a link connecting double slider crank chain will trace a

- (a) straight line
- (b) circle
- (c) ellipse
- (d) parabola
- (e) hyperbola.

Ans: c

10. The purpose of a link is to

- (a) transmit motion
- (b) guide other links
- (c) act as a support
- (d) all of the above
- (e) none of the above.

Ans: d

11. A universal joint is an example of

- (a) higher pair
- (b) lower pair
- (c) rolling pair
- (d) sliding pair

(e) turning pair.

Ans: b

12. Rectilinear motion of piston is converted into rotary by

- (a) cross head
- (b) slider crank
- (c) connecting rod
- (d) gudgeon pin
- (e) four bar chain mechanism.

Ans: b

13. The values of velocity and acceleration of piston at near dead center for a slider-crank mechanism will be

- (a) 0, and more than $c\omega^2r$
- (b) 0, and less than $c\omega V$
- (c) 0, 0
- (d) $c\omega r$, 0
- (e) none of the above.

Ans: a

14. The example of spherical pair is

- (a) bolt and nut
- (b) lead screw of a lathe
- (c) ball and socket joint
- (d) ball bearing and roller bearing
- (e) none of the above.

Ans: c

15. Cross head and guides form a

- (a) lower pair
- (b) higher pair
- (c) turning pair
- (d) rolling pair
- (e) sliding pair.

Ans: e

16. A circular bar moving in a round hole is an example of

- (a) incompletely constrained motion
- (b) partially constrained motion
- (c) completely constrained motion
- (d) successfully constrained motion
- (e) none of the above

Ans: a

17. If some links are connected such that motion between them can take place in more than one direction, it is called

- (a) incompletely constrained motion
- (b) partially constrained motion
- (c) completely constrained motion
- (d) successfully constrained motion
- (e) none of the above.

Ans: a

18. If there are L number of links in a mechanism then number of possible inversions is equal to

- (a) $L + 1$
- (b) $L - 1$
- (c) L
- (d) $L + 2$
- (e) $L - 2$.

Ans: c

19. Kinematic pairs are those which have two elements that

- (a) have line contact
- (b) have surface contact
- (c) permit relative motion
- (d) are held together
- (e) have dynamic forces.

Ans: c

20. The lower pair is a

- (a) open pair
- (b) closed pair
- (c) sliding pair
- (d) point contact pair
- (e) does not exist.

Ans: b

21. Which of the following has sliding motion

- (a) crank
- (b) connecting rod
- (c) crank pin
- (d) cross-head
- (e) cross head guide.

Ans: d

22. Which of the following mechanism is obtained from lower pair

- (a) gyroscope
- (b) pantograph
- (c) valve and valve gears

- (d) generated straight line motions
- (e) all of the above.

Ans: e

23. Which of the following would constitute a link

- (a) piston, piston rings and gudgeon pin
- (b) piston, and piston rod
- (c) piston rod and cross head
- (d) piston, crank pin and crank shaft
- (e) piston, piston-rod and cross head.

Ans: e

24. A completely constrained motion can be transmitted with .

- (a) 1 link with pin joints
- (b) 2 links with pin joints
- (c) 3 links with pin joints
- (d) 4 links with pin joints
- (e) all of the above.

Ans: d

25. Oldham's coupling is the

- (a) second inversion of double slider crank chain
- (b) third inversion of double slider crank chain
- (c) second inversion of single slider crank chain
- (d) third inversion of slider crank chain
- (e) fourth inversion of double slider crank chain.

Ans: b

26. Sense of tangential acceleration of a link

- (a) is same as that of velocity
- (b) is opposite to that of velocity
- (c) could be either same or opposite to velocity
- (d) is perpendicular to that of velocity
- (e) none of the above.

Ans: c

27. A mechanism is an assemblage of

- (a) two links
- (b) three links
- (c) four links or more than four links
- (d) all of the above
- (e) none of the above.

Ans: c

28. The number of links in pantograph mechanism is equal to

- (a) 2
- (b) 3
- (c) 4
- (d) 5
- (e) 6.

Ans: c

29. Elements of pairs held together mechanically is known as

- (a) closed pair
- (b) open pair
- (c) mechanical pair
- (d) rolling pair
- (e) none of the above.

Ans: a

30. Shaft revolving in a bearing is the following type of pair

- (a) lower pair
- (b) higher pair
- (c) spherical pair,
- (d) cylindrical pair
- (e) bearing pair.

Ans: a

31. Crowning on pulleys helps

- (a) in increasing velocity ratio
- (b) in decreasing the slip of the belt
- (c) for automatic adjustment of belt position so that belt runs centrally
- (d) increase belt and pulley life
- (e) none of the above.

Ans: c

32. Idler pulley is used

- (a) for changing the direction of motion of the belt
- (b) for applying tension
- (c) for increasing -velocity ratio
- (d) all of the above
- (e) none of the above.

Ans: b

33. In multi-V-belt transmission, if one of the belt is broken, we have to change the

- (a) broken belt
- (b) broken belt and its adjacent belts
- (c) all the belts
- (d) there is no need of changing any one as remaining belts can take care of transmission of load
- (e) all the weak belts.

Ans: c

34. The moment on the pulley which produces rotation is called

- (a) inertia
- (b) momentum
- (c) moment of momentum
- (d) work
- (e) torque.

Ans: e

35. Creep in belt drive is due to

- (a) material of the pulley
- (b) material of the belt
- (c) larger size of the driver pulley
- (d) uneven extensions and contractions due to varying tension
- (e) expansion of belt.

Ans: d

36. To transmit power from one rotating shaft to another whose axes are neither parallel nor intersecting, use

- (a) spur gear
- (b) spiral gear
- (c) bevel gear
- (d) worm gear
- (e) crown gear.

Ans: d

37. To obviate axial thrust, following gear drive is used

- (a) double helical gears having opposite teeth
- (b) double helical gears having identical teeth
- (c) single helical gear in which one of the teeth of helix angle α is more
- (d) miter gears
- (e) none of the above.

Ans: a

38. If D_1 and D_2 be the diameters of driver and driven pulleys, then belt speed is proportional to

- (a) D_1/D_2
- (b) D_2/D_1
- (c) D_1-D_2 .
- (d) D_1
- (e) D_1+D_2 .

Ans: d

39. In a four-bar chain it is required to give an oscillatory motion to the follower for a continuous rotation of the crank. For the lengths of 50 mm of crank and 70 mm of the follower, determine theoretical maximum length of coupler. The distance between fixed pivots of crank and followers is

- (a) 95 mm
- (b) slightly less than 95 mm
- (c) slightly more than 95 mm
- (d) 45 mm
- (e) none of the above.

Ans: b

40. A body having moment of inertia I_1 is rotating at 210 RPM and is in contact with another body at rest having I_2 . The resultant speed after impact will be

- (a) 90 RPM
- (b) 100 RPM
- (c) 80 RPM
- (d) data are insufficient
- (e) none of the above.

Ans: a

41. Inertia force acts

- (a) perpendicular to the acceleration force
- (b) along the direction of acceleration force
- (c) opposite to the direction of acceleration force
- (d) in any direction w.r.t. acceleration force depending on the magnitude
- (e) none of the above.

Ans: c

42. Which is the false statement about the properties of instantaneous centre

- (a) at the instantaneous center of rotation, one rigid link rotates instantaneously relative to another for the configuration of mechanism considered
- (b) the two rigid links have no linear velocities relative to each other at the instantaneous centre
- (c) the two rigid links which have no linear

velocity relative to each other at this center have the same linear velocity to the third rigid link

- (d) the double centre can be denoted either by O2 or OI2, but proper selection should be made
- (e) none of the above.

Ans: d

43. According to Kennedy's theorem, if three bodies have plane motions, their instantaneous centers lie on

- (a) a triangle
- (b) a point
- (c) two lines
- (d) a straight line
- (e) a curve.

Ans: d

44. In a rigid link OA, velocity of A w.r.t. will be

- (a) parallel to OA
- (b) perpendicular to OA
- (c) at 45° to OA
- (d) along AO
- (e) along OA.

Ans: b

45. Two systems shall be dynamically equivalent when

- (a) the mass of two are same
- (b) e.g. of two coincides
- (c) M.I. of two about an axis through e.g. is equal
- (d) all of the above
- (e) none of the above.

Ans: d

46. The velocity of any point in mechanism relative to any other point on the mechanism on velocity polygon is represented by the line

- (a) joining the corresponding points
- (b) perpendicular to line as per (a)
- (c) not possible to determine with these data
- (d) at 45° to line as per (a)
- (e) none of the above.

Ans: a

47. The absolute acceleration of any point P in a link about center of rotation O is

- (a) along PO
- (b) perpendicular to PO
- (c) at 45° to PO
- (d) along OP

(e) none of the above.

Ans: e

48. Angular acceleration of a link can be determined by dividing the

(a) centripetal component of acceleration

with length of link

(b) tangential component of acceleration with

length of link

(c) resultant acceleration with length of

link

(d) all of the above

(e) none of the above.

Ans: b

49. Corioli's component of acceleration exists whenever a point moves along a path that has

(a) linear displacement

(b) rotational motion

(c) tangential acceleration

(d) centripetal acceleration

(e) none of the above.

Ans: b

50. A circle passing through the pitch point with its center at the center of cam axis is known as

(a) pitch circle

(b) base circle

(c) prime circle

(d) outer circle

(e) cam circle.

Ans: a

51. The pressure angle of a cam depends upon

(a) offset between centre lines of cam and follower

(b) lift of follower

(c) angle of ascent

(d) sum of radii of base circle and roller follower

(e) all of the above.

Ans: e

52. If brakes are applied on front wheels of a car and if it moves on a level road, then retardation of the car is calculated using the formula

a. μg

b. $[\mu g (1-x)] / (1 + \mu h)$

- c. $(\mu g x) / (1 - \mu h)$
- d. none of the above

Ans: b

53. Double block brake is a type of

- a. Band brake
- b. Internal expanding shoe brake
- c. Shoe brake
- d. None of the above

Ans: c

54. Which energy is absorbed by the brakes of an elevator during braking process?

- a. Potential energy
- b. Kinetic energy
- c. Both a. and b.
- d. None of the above

Ans: a

55. In single shoe brake, when is uniform normal pressure observed between block and drum?

- a. $\theta < 60^\circ$
- b. $2\theta < 90^\circ$
- c. $2\theta < 60^\circ$
- d. $\theta > 30^\circ$

Ans: b

56. Which type of brakes have wooden blocks placed inside flexible steel band?

- a. Block brake
- b. Band brake
- c. Band and Block brake
- d. Pivoted block brake

Ans: c

57. Determine the power transmitted if dead weight on brake is 70 kg and engine has a speed of 300 rpm. One end of the rope has a diameter of 0.05 m is attached to a spring balance which has reading of 150 N, diameter of drum is 1 m.

- a. 8.851 kW
- b. 8.851 W
- c. 1319.46 W
- d. none of the above

Ans: a

58. Identify the type of absorption dynamometer ?

- a. Epicyclic dynamometer
- b. Prony brake dynamometer
- c. Torsion dynamometer
- d. Tatham dynamometer

Ans: b

59. Which of the following statements is/are false?

- a. To prevent heat generated due to friction, rope brake dynamometers are provided with cooling water
- b. Angle of twist upto $1/10$ of degree can be measured by Glibson flash light torsion dynamometer
- c. In pneumatic brakes, the ratio between hydraulic pressure and air pressure is 15:1
- d. All the above statements are false

Ans: b

60. The velocity ratio of two pulleys connected by an open belt or crossed belt is

- a) directly proportional to their diameters
- b) inversely proportional to their diameters
- c) directly proportional to the square of their diameters
- d) inversely proportional to the square of their diameters

Ans: b

61. Two pulleys of diameters d_1 and d_2 and at distance x apart are connected by means of an open belt drive. The length of the belt is

- a) $\pi/2 (d_1 + d_2) 2x + (d_1 + d_2)^2/4x$
- b) $\pi/2 (d_1 - d_2) 2x + (d_1 - d_2)^2/4x$

- c) $\pi / 2 (d_1 + d_2) 2x + (d_1 - d_2)^2 / 4x$
d) $\pi / 2 (d_1 - d_2) 2x + (d_1 + d_2)^2 / 4x$

Ans: c

62. Due to slip of the belt, the velocity ratio of the belt drive

- a) decreases
b) increases
c) does not change
d) none of the mentioned

Ans: a

63. When two pulleys of different diameters are connected by means of an open belt drive, then the angle of contact taken into consideration should be of the

- a) larger pulley
b) smaller pulley
c) average of two pulleys
d) none of the mentioned

Ans: b

64. The power transmitted by a belt is maximum when the maximum tension in the belt (T) is equal to

- a) TC
b) 2TC
c) 3TC
d) 4TC

Ans: c

65. The velocity of the belt for maximum power is

- a) $\sqrt{T/3m}$
b) $\sqrt{T/4m}$
c) $\sqrt{T/5m}$
d) $\sqrt{T/6m}$

Answer: a

66 - The centrifugal tension in belts

- a) increases power transmitted
b) decreases power transmitted
c) have no effect on the power transmitted
d) increases power transmitted upto a certain speed and then decreases

Answer: c

67 -When the belt is stationary, it is subjected to some tension, known as initial tension. The value of this tension is equal to the

- a) tension in the tight side of the belt
- b) tension in the slack side of the belt
- c) sum of the tensions in the tight side and slack side of the belt
- d) average tension of the tight side and slack side of the belt

Answer: d

68 - The relation between the pitch of the chain (p) and pitch circle diameter of the sprocket (d) is given by

- a) $p = d \sin (600/T)$
- b) $p = d \sin (900/T)$
- c) $p = d \sin (1200/T)$
- d) $p = d \sin (1800/T)$

Answer: d

69.Clutch and coupling perform the same action.

- a) Both being permanent joints
- b) No they are different type of joints
- c) Both being temporary joints
- d) None of the listed

Answer: b

70.. Eddy current clutch is a type of friction clutch.

- a) Yes
- b) No, it is an electromagnetic type clutch
- c) It is a mechanical clutch
- d) None of the listed

Answer: b

71.The force of friction between a rolling body and a surface over which it rolls is called

- A. sliding friction
- B. rolling friction
- C. limiting friction
- D. vertical friction

Answer: b

72. A cyclist keeps on pedaling to overcome

- A. velocity
- B. inertia
- C. position
- D. friction

Answer: d

73. When we walk or run, to push the ground backward we need

- A. inertia
- B. position
- C. friction
- D. velocity

Answer: c

74. The ratio between the force of the limiting friction and the normal reaction is

- A. always negative
- B. always zero
- C. constant
- D. variable

Answer: c

75. The maximum value of friction is known as the

- a. initial friction
- b. force of limiting friction
- c. fixed friction
- d. inertia

Answer: b

