

Question Bank of MCQ type of Subject TOM (4th SEM Mechanical)

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1 _____ is the study to know the displacement, velocity and acceleration of a part of the machine.

- a. Kinematics*
- b. Kinetics*
- c. Statics*
- d. All of the above*

2 In Theory of machines _____ deals with various forces when the body is stationary.

- a. Kinematics*
- b. Kinetics*
- c. Statics*
- d. All of the above*

3 In reciprocating engine, which of the following restraining body does not exist?

- a. Connecting rod*
- b. Crank*
- c. Slider*
- d. Lever*

4 A kinematic pair consists of

- a. Two links*
- b. Three links*
- c. Four links*
- d. Any number of links*

5 A kinematic pair cannot be classified according to

- a. Nature of contact between the links*
- b. Type of relative motion between the links*
- c. Nature of mechanical constraints between the links*
- d. Number of links connected*

6 Which of the following forms a higher pair?

- a. Sliding pair*
- b. Turning pair*
- c. Rolling pair*
- d. Turning pair*

7 A lower pair has

- a. Surface contact*

- b. Line contact*
- c. Point contact*
- d. All of the above*

8Ball bearing is an example of

- a. Rolling pair*
- b. Sliding pair*
- c. Turning pair*
- d. Spherical pair*

9A lower pair has

- i. Surface contact*
- ii. Line contact*
- iii. Point contact*

- a. i & ii*
- b. ii & iii*
- c. i & iii*
- d. All of the above*

10A rigid body in space has ___ degrees of freedom.

- a. Two*
- b. Three*
- c. Six*
- d. Eight*

11A link must be a

- a. Rigid body*
- b. Resistant body*
- c. Rigid as well as resistant body*
- d. None of the above*

12Links which do not suffer any deformation while transmitting motion are called

- a. Flexible link*
- b. Rigid link*
- c. Fluid link*
- d. None of the above*

13Flats belt running over a pulley forms

- a. A closed pair*
- b. A open pair*

c. A spherical pair

d. A screw pair

14A kinematic chain should have a minimum of

a. One link

b. Two links

c. Three links

d. Four links

15The relation between numbers of links and numbers of pairs is given as

a. $L=(2P-1)$

b. $L=(2P-4)$

c. $P=(2L-2)$

d. $P=(2L-1)$

16The three types of links are

a. Cross rigid and fluid

b. Rigid elastic and fluid

c. Rigid flexible and fluid

d. Strength rigid and flexible

17The double slider crank chain consist of

a. Two turning and two sliding pairs

b. One turning and one sliding pair

c. Two turning and one sliding pair

d. Three turning pair

18The force of friction acts in a direction _____ to the direction of motion of object.

a. Same

b. Opposite

c. Perpendicular

d. Downwards

19The force of friction depends upon

a. Nature of surface of contact

b. Material of objects in contact

c. Both 'a' and 'b'

d. None of the above

20 The body will move only when

- a. Force of friction = applied force
- b. Force of friction < applied force
- c. Force of friction > applied force
- d. All of the above

21 The ratio of the limiting force of friction (F) to the normal reaction (R) is known as

- a. Coefficient of friction
- b. Force of friction
- c. Angle of friction
- d. None of the above

22 The coefficient of friction (μ) is equal to

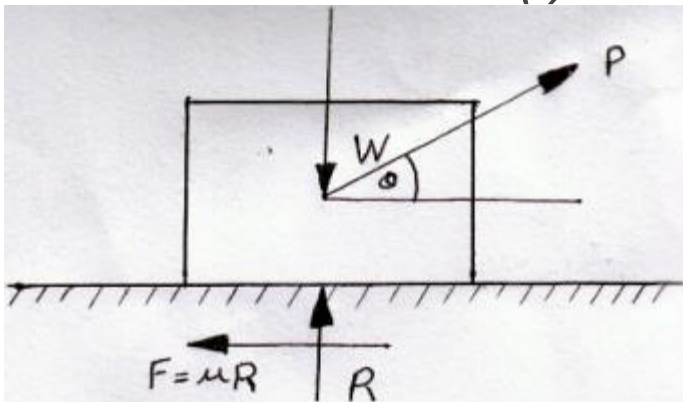
- a. $\tan\Phi$
- b. $\sin\Phi$
- c. $\cot\Phi$
- d. $\cos\Phi$

Where Φ = angle of friction

23 The force of friction (F) is equal to

- a. $\mu R/2$
- b. μR
- c. $2\mu R$
- d. $\mu R/3$

24 The value of Normal reaction (R) for the following figure is



- a. $W - P\sin\vartheta$
- b. $W + P\sin\vartheta$
- c. $P - W\sin\vartheta$
- d. $P + W\sin\vartheta$

Where, W = Weight of block, P = Applied force, μ = Coefficient of friction, ϑ = Angle

25When the two surfaces in contact have a thick layer of lubricant in between them, it is known as

- a. Solid friction*
- b. Rolling friction*
- c. Greasy friction*
- d. Film friction*

26When the two surfaces in contact have a very thin layer of lubricant in between them, it is known as

- a. Solid friction*
- b. Rolling friction*
- c. Greasy friction*
- d. Film friction*

27The force of friction is maximum when the surface

- a. Is on the point of motion*
- b. Is at rest*
- c. Is moving*
- d. The friction remains same at all points*

28The types of threads used in Screw jacks are

- a. Metric thread*
- b. Square*
- c. ACME*
- d. Buttress*

29For a single started thread, the lead is equal to

- a. $p/2$*
- b. p*
- c. $2p$*
- d. $p/3$*

Where $p =$ pitch

30The slope of the thread with horizontal is known as

- a. helix*
- b. lead*
- c. pitch*
- d. helix angle*

31The flat pivot bearing is used to bear

- a. axial thrust*
- b. radial thrust*
- c. both radial and axial thrust*
- d. None of the above*

32In plate clutch, the clutch plate is placed

- a. Before flywheel
- b. After pressure plate
- c. In between pressure plate and flywheel
- d. None of the above

33 The clutch is placed in four-wheeler, in between

- a. Engine and gear box
- b. Gear box and differential
- c. Propeller shaft and differential
- d. None of the above

34 The radius of friction circle is independent of

- a. Weight of the shaft
- b. Radius of the shaft
- c. Coefficient of friction
- d. All of the above

35 In rotation of shaft, the power lost in friction is given by

- a. $W \times \mu \times V$ Watts
- b. $W \times \mu \times V$ Kilo-watts
- c. $W \times \mu / V$ Watts
- d. $W \times \mu / V$ Kilo-watts

Where, W =Weight of shaft, μ =Coefficient of friction, V = Velocity of shaft (in m/s)

36 The ratio of tension of two sides of a flat belt is given by

- a. $e^{-\mu\theta}$
- b. $e^{\mu\theta}$
- c. $e \times \mu \times \theta$
- d. None of the above

37 Crowning of a pulley is done to

- a. Prevent the slipping of a belt
- b. To increase the tension of a belt
- c. To increase the angle of contact
- d. None of the above

38 The power transmitted by a belt drive is (T_1 =Tension on tight side, T_2 =Tension on slack side, where v = linear velocity, ω = angular velocity)

- a. $(T_1 - T_2) \times v$
- b. $(T_1 - T_2) \times \omega$
- c. $(T_1 - T_2) / v$
- d. $(T_1 - T_2) / \omega$

39 The ratio of tension of two sides of a v-belt is given by

- a. $e^{-\mu\vartheta\operatorname{cosec}\alpha}$ b. $e^{\mu\vartheta\operatorname{cosec}\alpha}$ c. $e \times \mu \times \operatorname{cosec}\vartheta$ d. None of the above

where μ = coefficient of friction, ϑ = angle of contact, $\sin\alpha = (r_1 + r_2)/x$

40 The angle of contact (ϑ) for crossed belt drive is given by

- a. $180 - 2\alpha$ b. $180 + 2\alpha$ c. $180 - \alpha$ d. $180 + \alpha$

The value of α is given by $\sin\alpha = (r_1 + r_2)/x$

Where r_1 = Radius of larger pulley

r_2 = Radius of smaller pulley

x = Distance between the centers of the two pulleys.

41. The angle of contact (ϑ) for open belt drive is given by

- a. $180 - 2\alpha$ b. $180 + 2\alpha$ c. $180 - \alpha$ d. $180 + \alpha$

The value of α is given by $\sin\alpha = (r_1 - r_2)/x$

Where r_1 = Radius of larger pulley

r_2 = Radius of smaller pulley

x = Distance between the centers of the two pulleys.

42. The centrifugal tension (T_c) in the belt is given by

- a. $T_c = m \times v^2$ b. $T_c = 2m \times v^2$ c. $T_c = m / v^2$ d. $T_c = 2m / v^2$

where m = mass of belt per unit length, v = velocity of belt in m/s

43. Maximum power will be transmitted by belt when

- a. $T_{max} = 3m \times v^2$ b. $T_{max} = 2m \times v^2$ c. $T_{max} = 2m / v^2$ d. $T_{max} = 3m / v^2$

where T_{max} = Maximum tension, m = mass of belt per unit length

v = velocity of belt in m/s

44. The initial tension (T_0) in a belt is given by

- a. $T_0 = (T_1 - T_2)/2$ b. $T_0 = (T_1 + T_2)/2$ c. $T_0 = (T_1 - T_2) \times 2$ d. $(T_1 + T_2) \times 2$

Where T_1 = Tension on tight side of belt drive

T_2 = Tension on slack side of belt drive

45. The ratio of tension of two sides of a rope drive is given by

a. $e^{-\mu\vartheta \operatorname{cosec}\alpha}$ b. $e^{\mu\vartheta \operatorname{cosec}\alpha}$ c. $e \times \mu \times \operatorname{cosec}\vartheta$ d. None of the above

where μ = coefficient of friction, ϑ = angle of contact, $\sin\alpha = (r_1 + r_2)/x$

46. In which of the following drives, there is no slip

- a. Open belt drive b. Crossed belt drive c. Rope drive d. Chain drive

47 Energy is stored in a flywheel in the form of

(A) Heat energy

(B) Solar energy

(C) Kinetic energy

(D) Potential energy

48 In vehicles, flywheel is placed in between

(A) Engine and clutch

(B) Clutch and Propeller shaft

(C) Propeller shaft and Differential

(D) Before engine

49-Following is (are) the function(s) of Flywheel.

(A) To store and release energy when needed during the work cycle

(B) To reduce the amplitude of speed fluctuations

(C) To reduce the power capacity of motor

(D) All of the above

50-Flywheel is used in

(A) Punch press

(B) Drilling machine

(C) Surface grinder

(D) Milling machine

51-Flywheel are generally made from

- (A) Cast Iron*
- (B) High strength steel*
- (C) Ceramics*
- (D) All of the above*

52-Split flywheel is made to

- (A) Avoid cooling stresses*
- (B) Minimize large centrifugal forces*
- (C) Reduce weight*
- (D) All of the above*

53-If the load on the engine is constant, the mean speed will be constant from the cycle, then

- (A) The governor will not operate but flywheel will be acting*
- (B) The flywheel will be acting but governor will not operate*
- (C) Both flywheel and governor will be acting*
- (D) Both flywheel and governor will not be acting*

54-When the torque required by the machine is more than the torque supplied by the motor, the flywheel is

- (A) Accelerated*
- (B) Retarded*
- (C) Rotating with constant speed*
- (D) Any of the above*

55The difference the maximum and minimum speeds during a cycle is called

- (A) Fluctuation of speed*

- (B) Maximum fluctuation of speed*
- (C) Coefficient of fluctuation of speed*
- (D) None of the above*

56 The ratio of maximum fluctuation of speed to the mean speed is called

- (A) Fluctuation of speed*
- (B) Maximum fluctuation of speed*
- (C) Coefficient of fluctuation of speed*
- (D) None of the above*

30

57-Reciprocal of Coefficient of fluctuation of speed is called

- (A) Fluctuation of speed*
- (B) Coefficient of steadiness*
- (C) Maximum fluctuation of speed*
- (D) None of the above*

*58-For four stroke engine, work done/cycle is
(where T_m is the mean torque)*

- (A) πT_m*
- (B) $2\pi T_m$*
- (C) $3\pi T_m$*
- (D) $4\pi T_m$*

59 The mass moment of inertia of a solid circular disk is given by

- (A) $mR^2/2$*
- (B) $mR^2/3$*
- (C) $2mR^2/3$*
- (D) $mR^2/4$*

60-The coefficient of fluctuation of energy =

- (A) Maximum fluctuation of energy / work done per cycle*
- (B) Fluctuation of energy / Work done per cycle*

(C) Maximum fluctuation of energy / Mean speed

(D) Fluctuation of energy / Mean speed

61-The coefficient of fluctuation of speed, when the maximum and minimum speeds are 300rpm and 290 rpm

(A) 0.034

(B) 0.017

(C) 0.008

(D) 0/004

62-Maximum fluctuation of energy =

(A) Max. KE – Min. KE

(B) Max. KE + Min. KE

(C) (Max. KE – Min. KE)/2

(D) (Max. KE + Min. KE)/2

63-In case of solid disk flywheel, the mass (m) of disk is given by

(A) $\pi R^2 t \rho$

(B) $(\pi/2)R^2 t \rho$

(C) $3\pi R^2 t \rho$

(D) $(3/2)\pi R^2 t \rho$

64-For two stroke engine, work done/cycle is

(where T_m is the mean torque)

(A) πT_m

(B) $2\pi T_m$

(C) $3\pi T_m$

(D) $4\pi T_m$

65-The flywheel is accelerated when

(A) Driving torque > Load torque

(B) Driving torque < Load torque

(C) Driving torque = Load torque

(D) Any of the above

66-Which of the following is (are) true?

(A) Cast iron has poor tensile strength compared to steel

(B) Failure of cast iron flywheel is sudden and total

(C) Machinability of cast iron flywheel is poor compared to steel flywheel

(D) All of the above

67 Which one of the following is a lower pair?

p(A) Cam and follower

(B) Toothed gearing

(C) Shaft rotating in bush

(D) None

68 The average tensions on the tight and slack side of a flat belt drive system are 700N and 400N respectively. If the linear velocity of the belt is 5m/s, the power transmitted by the system would be about:

(A) 1.5 kW

(B) 3 kW

(C) 5 kW

(D) 10 kW

69The motion transmitted between the teeth of two spur gears is generally:

(A) Sliding

(B) Rolling

(C) Rotary

(D) Partly sliding and partly rolling

70-The product of circular pitch and diametral pitch equals:

(A) π

- (B) 1*
- (C) Infinity*
- (D) None*

71 In a flat belt drive, the belt is subjected to maximum tension 'T' and a centrifugal tension 'T_c'. For maximum power transmission:

- (A) $T=T_c$*
- (B) $T=2T_c$*
- (C) $T=3T_c$*
- (D) $T=4T_c$*

72 Which of the following is not a common section of V-belts?

- (A) F*
- (B) C*
- (C) E*
- (D) A*

73-A rack is a gear of infinite

- (A) Pitch*
- (B) Module*
- (C) Diameter*
- (D) Number of teeth*

74 The circular pitch of a toothed wheel with 24 teeth and a module of 4.25 mm is:

- (A) 1.35 mm*
- (B) 4.25 mm*
- (C) 6.67 mm*
- (D) 13.35 mm*

75-The maximum efficiency of a worm and worm wheel system in terms of friction angle (Φ) is:

(A) $(1-\cos \Phi) / (1+\cos \Phi)$

(B) $(1-\sin \Phi) / (1+\cos \Phi)$

(C) $(1-\sin \Phi) / (1+\sin \Phi)$

(D) $(1-\tan \Phi) / (1+\tan \Phi)$

76 In a multiple disc clutch, n_1 and n_2 are the number of discs on the driving and driven shafts respectively. Then the number of pairs of contact surface is:

(A) $n_1 + n_2$

(B) $n_1 + n_2 - 1$

(C) $n_1 - n_2$

(D) None

77A reverted gear train is one in which the output and input shaft:

(A) Rotates in opposite directions

(B) Are co-axial

(C) Are at right angles to each other

(D) None

78-When two spur gears having involute profiles on their teeth engage the line of action is tangential to:

(A) Pitch circle

(B) Dedendum circle

(C) Addendum circle

(D) Base circle

79 A worm has a lead angle of 22.5° . This corresponds to a helix angle of:

(A) 22.5°

(B) 45°

(C) 55°

(D) 67.5°

80-Which of the following is not a friction clutch?

(A) Plate clutch

(B) Jaw clutch

(C) Cone clutch

(D) Centrifugal clutch

81-Which gear is used for power transmission in parallel shafts?

(A) Worm gear

(B) Rack and pinion

(C) Helical gear

(D) Bevel gear

82-In spur gear of pitch diameter=168mm, module=3.5mm, the number of teeth will be

(A) 48

(B) 24

(C) 72

(D) 96

83 In a spur gear the pitch diameter 40mm, outside diameter 48 mm, module 4 mm, the number of teeth will be

(A) 10 teeth

(B) 20 teeth

(C) 30 teeth

(D) 40 teeth

84-The distance between two corresponding points of a teeth is known as

(A) Margin

(B) Lead

(C) Pitch

(D) None

85 If the equilibrium speed of a governor is constant for all radii of rotation of the fly balls within the working range, it is known as

(A) Isochronism

(B) Hunting

(C) Insensitiveness

(D) Stability

86 The amplitude of a body under damped vibration changes

1. During every cycle

2. After every 50 cycle

3. After every 100 cycle

4. After every 60 cycle

87 The fraction of unbalanced mass used for primary balancing of a reciprocating engine is

(A) 0.2

(B) 0.9

(C) 0.6

(D) 0.05

88 When the particles of the flywheel moves in a circle about the axis of the shaft, the vibrations are known as

1. Longitudinal vibrations

2. Transverse Vibrations

3. Torsional Vibrations

4. None of the above

89-A flywheel of moment of inertia 9.8 kgm^2 fluctuates by 30 rpm for a fluctuation in energy of 1936 joules. The mean speed of the flywheel is:

(A) 900 rpm

(B) 600 rpm

(C) 936 rpm

(D) 1200 rpm

90-The product of moment of inertia and angular velocity is known as:

(A) Angular torque

(B) Kinetic energy

(C) Angular momentum

(D) None of the above

91-The frictional torque transmitted in the case of flat pivot bearing for uniform pressure is:

(A) μWR

(B) $(1/3)\mu WR$

(C) $(2/3)\mu WR$

(D) $(1/2)\mu WR$

92-Which of the following is an example of friction clutch?

(A) Disc

(B) Cone

(C) Plate

(D) all of the above

93-The module is defined as the ratio of:

(A) Number of teeth to the pitch circle diameter

(B) Pitch circle diameter to number of teeth

(C) Circumference of the pitch circle to number of teeth

(D) None of the above

94 The shaft will be alternately twisted and untwisted if it is subjected to

- 1. Longitudinal vibrations*
- 2. Transverse Vibrations*
- 3. Torsional Vibrations*
- 4. None of the above*

95-When the axes of the first and last wheels of a compound gear train are co-axial then the train is known as

(A) Simple gear train

(B) Epicyclic gear train

(C) Reverted gear train

(D) Compound gear train

96 Which type of vibrations are also known as transient vibrations?

- a. Undamped vibrations*
- b. Damped vibrations*
- c. Torsional vibrations*
- d. Transverse vibrations*

97 The critical speed of a shaft as compared to the natural frequency of transverse Vibrations is

- a. Same*
- b. More*
- c. Less*
- d. There is no co relation between the two*

98 One Hertz is equal to

- a. 50c/sec*
- b. 60c/sec*
- c. 25c/sec*
- d. 1c/sec*

99 During transverse vibrations, shaft is subjected to which type of stresses?

a. Tensile stresses

b. Torsional shear stress

c. Bending stresses

d. All of the above

100. The amplitude of torsional Vibrations at the nodal point in a shaft is

- a. Maximum*
- b. Minimum*
- c. Zero*
- d. Average*

101 What are deterministic vibrations?

- a. Vibrations caused due to known exciting force**
- b. Vibrations caused due to unknown exciting force**
- c. Vibrations which are aperiodic in nature**
- d. None of the above**

102 Which of the following vibrations are classified according to magnitude of actuating force?

- a. Torsional vibrations**
- b. Deterministic vibrations**
- c. Transverse vibrations**
- d. All of the above**

103 In which type of vibrations, amplitude of vibration goes on decreasing every cycle?

- a. Damped vibrations**
 - b. Undamped vibrations**
 - c. Both a. and b.**
 - d. None of the above**
- 