Unit Test 1

TOM Question Bank (17412)

Chapter1

Q-1 Define the following terms with one example(3M)

a) Higher pair
b) Lower pair

Q-2 Explain the sliding pair with neat sketch.(3M)

Q-3 Define the following terms with one example(3M)

a) Kinematic link
b) Kinematic pair

Q-4 Define the terms statics and kinematics.(3M)

Q-5 Define the terms with one example. i)Kinematic pair ii)kinematic link (3M)

Q-6Explain crank and slotted lever mechanism with neat sketch.(4 M))

Q-7State the inversions of four bar chain mechanism and explain any one with neat sketch.(4M)

Q-8 Give the classification of kinematic pairs. Explain any one.(4M)

Chapter3

Q-1Define the following terms with one example. (3M)

i) Pitch Circle ii) Pressure Angle iii)Lift of follower

Q-2 State any three applications of cam.(3M)

Q-3 Compare the knife edge follower with roller follower.(3M)

Q-4Give the classification of followers and explain any one with neat sketch.(4M)

Q-5 Draw the profile of disc cam to give uniform velocity motion during outstroke of 40mm to a roller follower of diameter 20mm during the first half of cam rotation. The return of the cam takes place with SHM during remaining half of cam rotation. Draw the displacement diagram.(4M)

Q-6 Draw the profile of cam to raise a valve with SHM through 45mm in $1/4^{th}$ of revolution, keep it fully raised through $1/10^{th}$ revolution and to lower it with uniform acceleration and

retardation in 1/6th revolution. The minimum radius of cam is 40mm.The axis of valve passes through axis of the cam shaft. Consider knife edge follower. (8M)

Q-7 Draw the profile of a cam operating a roller reciprocating follower having a lift of 40mm. The roller diameter is 20mm. The minimum radius of cam is 30mm. The cam raises the follower with SHM for 110^0 of its rotation followed by a period of dwell for 80^0. The follower descend for next 120^0 rotations of cam follower with uniform velocity followed by dwell period. (8M)

Chapter2

Q-1In reciprocating engine the crank is 250mm long and connecting rod is 1000mm long. The crank rotates at 150rpm. Find velocity and acceleration of piston and angular velocity and angular acceleration of connecting rod when the crank makes an angle of 30^0 to IDC. Use Relative velocity and acceleration method.(8M)

Q-2The crank and connecting rod of a steam engine are 0.5m and 2m long respectively. The crank makes 180rpm in clockwise direction. When it has turned through 45^0 from IDC ,Find the velocity of piston and angular velocity of connecting rod by relative velocity method.(**4M**)

Q-3 PQRS is a four bar chain with link PS fixed. The length of the link are PQ= 62.5mm;QR = 175mm; RS=112.5mm; and PS=200mm.The crank rotates at 10 rad/s clockwise. Draw the velocity and acceleration diagram when angle QPS=60^0.Q and R lie on same side of PS. Find angular velocity and angular acceleration of link QR.(8M)

Unit Test II

QUESTION BANK THEORY OF MACHINE

(17412)

Que. No. 1 Solve any three (3 x3 = 9)

Chap. 5 .Flywheel and Governor

1) Give the reason for providing flywheel in the engine.
2) Define fluctuation of energy and coefficient of fluctuation of energy.
3) Compare simple watt governor with porter governor giving two main points of difference.

Chap. 6. Brakes and Dynamometer

4) State the types of brakes used in railways. Comment on the material of the block of the brake.
5) How the Dynamometers are classified.

Chap. 7. Clutches and Bearings

6) Write the application of
   1) Single plate clutch
   2) Multi-plate clutch
7) Compare single plate clutch with multi-plate clutch on the basis of
   1) Power transmitted
   2) Size

Chap. 8. Balancing

8) Why is balancing of rotating parts necessary for high speed engine.
9) Explain the concept of balancing.

(Question No. 2 & Ques. No. 3) Solve any TWO(Each 4 marks)

Chap. 5 .Flywheel and Governor

1) What is the difference between centrifugal and inertia governor? Why are centrifugal governor preferred to the inertia governor?
2) Explain with sketch turning moment diagram for a four stroke I. C. engine.
3) Explain the working principle of centrifugal governor with sketch.

Chap. 6. Brakes and Dynamometer

4) State the principle of operation of an " Eddy current dynamometer" with neat labeled sketch
5) Explain the working internal expandingshoe brake with neat sketch.
6) A band and block brake has 12 wooden blocks each subtending an angle of 15^0 at the Centre of the brake drum of dia. 1m. The blocks are 5 cm thick. The two ends of the bands are attached on the opposite side of the differential brake lever at distances of 8 cm and 2 cm from the fulcrum. μ =0.3. Find the minimum force required to be applied at the end of the lever 1m long assuming that the drum rotates i) CW ii) CCW when the braking torque is 5000 Nm.

Chap. 7. Clutches and Bearings

7) A torque of 350 Nm is to be transmitted through a cone clutch having a mean dia. of 300 mm and semi cone angle of 15^0. The maximum normal pressure at the mean radius is 15 KN/m^2. μ= 0.3. Calculate the width of contact surface. Also find the axial force to engage the clutch.

8) A multi-plate clutch transmits 55 KW of power at 1800 r.p.m., μ =0.1 for friction surface. Axial intensity of pressure is not to exceed 160 KN/m^2. The internal radius is 80 mm and it is 0.7 times the external radius. Find the number of plates needed to transmit the required torque.
9) A shaft has number of collars integrates with it. The external dia. of the collars is 400 mm and the shaft dia. is 250 mm. If the intensity of pressure is 0.35 N/mm2uniform and μ = 0.05, Determine
   (i) Power absorbs when shaft runs at 105 rpm
   (ii) Number of collars required.
10) Draw neat labeled sketch of centrifugal clutch. State its application.

Chap. 8. Balancing

11) Four masses m1, m2, m3, m4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15m, 0.25 m and 0.3 m respectively, and the angle between successive masses are 45^0 , 75^0 and 135^0 . Find the position and magnitude of the balanced mass required, if its radii of rotation is 0.2 m .solve it graphically.
12) Three masses m1, m2, m3 are 100 kg, 200 kg, 150 kg respectively. The corresponding radii of rotation are 0.3 m, 0.15m, 0.25 m respectively, and the angle between m1 & m2 is 45^0, and m2 & m3 is 75^0 and m3 & m1 is 240^0 . Find the position and magnitude of the balanced mass required, if its radii of rotation is 0.2 m .solve it graphically.