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DIPLOMA IN MECHANICAL ENGINEERING (DME)
DIPLOMA VIEP MECHANICAL ENGINEERING
ADVANCED LEVEL CERTIFICATE COURSE IN MECHANICAL ENGINEERING (DMEVI/ACMEVI)

Term-End Examination

December, 2012

BME-056 : THEORY OF MACHINE

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any seven** questions. Assume missing data suitably if any, use of scientific calculator **is allowed.***

1. Explain the following terms : 2½x4=10
   (a) Kinematic chain
   (b) Wrapping pair and Higher pair
   (c) Screw pair and cylindrical pair
   (d) Displacement, velocity and acceleration

2. (a) Explain the straight line motion mechanism with examples. 5
   (b) Give the classification of cams based on follower movement. 5

3. (a) Draw the cam profile and define the following terms. 6

(i) Tracing point

(ii) Pitch curve

(iii) Angle of ascent

(b) Give the classification of follower based on type of motion ie reciprocating or oscillating. 4

4. (a) Write the laws of dry friction. 3

(b) Prove that the velocity ratio for a screw jack is given by the equation $V.R = \frac{2\pi L}{P}$, where P is the applied force, L is the horizontal distance. 7

5. (a) Explain the working of conical clutch with neat sketch. 5

(b) What is rolling friction, how does it works in Ball and roller bearing ? 5

6. (a) Give the derivation for determining length of belt in crossed Belt drive. 5

(b) What is the value of centrifugal tension corresponding to maximum power transmitted ? 5

7. (a) Explain the working of simple gear train in both external meshing and internal meshing. 5

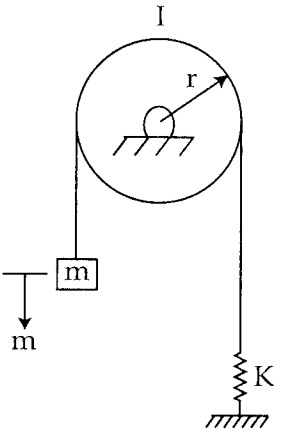
(b) A prime mover drives a DC generator by belt drive. The speed of prime mover and generator are 400 rpm and 600 rpm respectively. The diameter of driver pulley is 900 mm. The step in the drive is 4%. Determine the diameter of the generator if the belt thickness is 8 mm. 5

8. A shaft carries pulley of 150 cm diameter which rotate at 450 rpm. The ropes drive another pulley with a speed reduction 3 : 1. The drive transmits 210 kW. The grove angle is 30°. The distance between pulley centre is 3.0 m. The coefficient of friction between ropes and pulley is 0.25. The rope weighs 0.24 kg/m. The allowable stress for the rope is 175 N/cm^2. The initial tension in rope is limited to 700 N, determine. 10

(a) Number of ropes and rope diameter

(b) Length of each rope

9. (a) Determine the natural frequency of spring mass pulley system as shown in fig. 1. 5



(b) A damped system has following elements. 5

Mass = 6 kg, K = 2kN/m, C = 50N-sec/m

Determine (i) Damping factor (ii) Natural frequency (iii) Logarithmic decrement (iv) Number of cycles after which the original amplitude is reduced to 20%.

10. Write a short notes on ***any two*** of the following : 10

(a) Watt governor

(b) Porter governor

(c) Hartnell governor