Exam.Code:0940
Sub. Code: 7048

1059

B.E. (Mechanical Engineering) Fourth Semester
MEC-403: Theory of Machines – II

Max. Marks: 50

Time allowed: 3 Hours

NOTE: *Attempt* _five_ *questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

   a) Differentiate between involute and cycloidal tooth profile

   b) Differentiate between reverted and epicyclic gear train

   c) What is meant by undercutting of gears?

   d) Differentiate between radial and offset follower.

   e) Distinguish between Oldham Coupling and Universal Joint.   (5x2)

UNIT – I

II. A tangent cam with a base circle diameter 50mm operates a roller follower 20mm in diameter. The line of stroke of the roller follower passes through the axis of cam. Angle between tangential faces of the cam is 60°, speed of the shaft is 200r.p.m. and lift of the follower is 15mm. Calculate main dimensions of the cam, acceleration of the follower at beginning of lift and at the apex of the circular nose.   (10)

III. In a reciprocating engine, engine speed is 240 r.p.m, length of stroke is 30cm and connecting rod is 60cm long between the centres. When the piston has travelled 8cm from the inner dead centre, then find out angular position of the crank, velocity and acceleration of the piston and angular velocity of connecting rod.   (10)

IV. A turbine rotor of a ship has a mass of 2.2 tonnes and rotates at 1800r.p.m. clockwise when viewing from left. Radius of gyration of rotor is 32cm. Determine gyroscopic couple and its affect when the ship turns at a radius of 250m with a speed of 25km/hr and when the ship pitches with bow rising at angular velocity 0.8rad/sec.   (10)

UNIT – II

V. A pinion having 30 teeth drives a gear with 80 teeth. Profile of the gears is involute with 20° pressure angle, 12mm module and 10mm addendum. Find length of path of contact, arc of contact and contact ratio.   (10)

P.T.O.

VI.   4 masses A, B, C, D are completely balanced. Masses C and D make angles 900 and 1950 respectively with that of mass B in counterclockwise direction. The rotating mass of B is 25kg, C is 40kg and D is 35kg. Radius of rotation of B is 200mm, C is 100mm and D is 180mm. Planes B and C are 250mm apart. Determine the following:-

      a)   Mass if A and its angular position with mass B

      b)   Position of all planes relative to the plane of mass A.   (5,5)

VII.   Write short notes on <u>any two</u> of the following:-

      a)   Interference in toothed gearing.

      b)   Rack and Pinion

      c)   Couple polygon and force polygon

x-x-x