



Reg. No. :

Name :

Fifth Semester B.Tech. Degree Examination, November 2014
08.503 : THEORY OF MACHINES (MP)
(2008 Scheme)

Time : 3 Hours

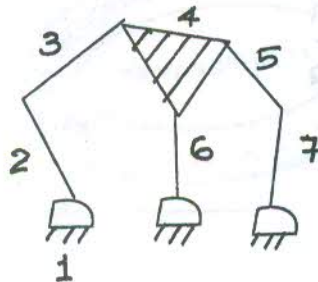
Max. Marks : 100

Instruction : Answer all questions from Part – A and one from each Module of Part – B.

PART – A



1. Derive an equation for finding the Coriolis acceleration.
2. Which theory is generally used in the design of clutch, uniform wear or uniform pressure ? Why ? Using that theory, derive the equation for the torque transmitted in a flat collar.
3. Derive the equation for finding the centrifugal tension of a belt drive. What is the effect of centrifugal tension on the power transmitted by belt ?
4. With a neat sketch mark all the force components acting at the contact point, when two helical gears are mating ?
5. With sketches explain the difference between circular arc cam and tangential cam.
6. Find the degrees of freedom for the given mechanism.



7. State and prove Law of Gearing.
8. Derive the fundamental equation for correct steering.
9. What is meant by chordal action of chain drive ?
10. With a neat sketch explain the working of Geneva mechanism. (10×4=40 Marks)

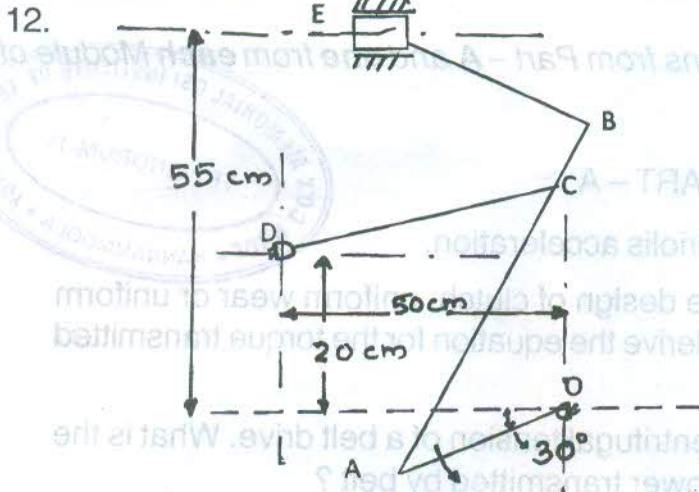


PART - B

Module - I

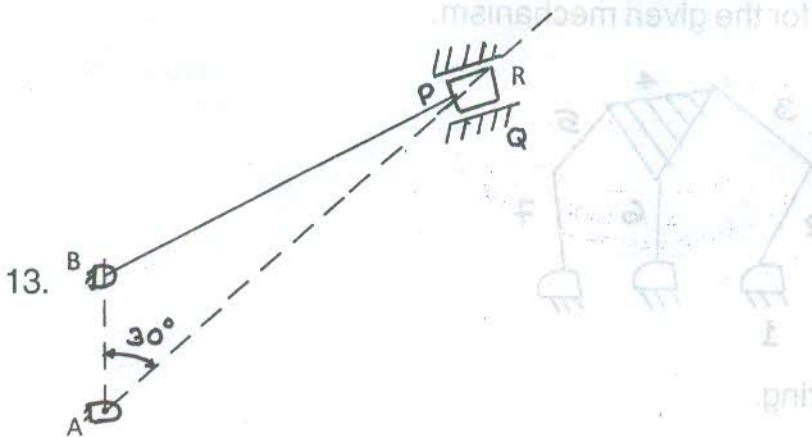
11. Design a four bar mechanism to generate a function $Y = X^{1.5}$ where X varies from 1 to 4. The input link is to rotate from 20° to 140° while the output link is to rotate from 240° to 340° . Use three accuracy points.

OR



Length of various links are $AB = 55$ cm, $AC = 45$ cm, $DC = 50$ cm and $BE = 35$ cm. Crank OA turns uniformly at 150 rpm has a length of 15 cm. Determine velocity of the slider E using instantaneous centre method.

Module - II



The one cylinder of a rotary engine shown here has fixed crank length AB as 220 mm. The connecting rod BP is 550 mm. The engine body rotates about A at 450 rpm. The line of stroke along AR is inclined at 35° to vertical. Find out the acceleration of the slider.

OR



14. A shaft with 400 rpm speed carries a pulley 400 mm diameter, which is driving another pulley with a speed reduction of 2 : 1 by means of rope drive. Power transmitted is 80 kW. Centre to centre distance of drive is 1.6 m and the angle of groove is 40° . Mass of rope is 0.15 kg/m and allowable strength is 2 N/mm². Initial tension of the rope is 600 N. Find the number of ropes required and diameter of rope. Take coefficient of friction as 0.2.

Module – III

15. An epicyclic gear train is composed of annular wheel A having 150 teeth. Meshing with A is wheel B, which drives wheel D through idler wheel C, D being concentric with A. Wheels B and C are carried on an arm which revolves clockwise at 100 rpm about the axis A and D. If the wheel B and D have 25 teeth and 40 teeth respectively, find the number teeth of the gear C and speed and sense of rotation of gear C.

OR

16. A cam operates an oscillating roller follower for the following data.

Diameter of roller = 15 mm, Minimum radius of the cam = 50 mm, Angle of ascent = 90° , Angle of descent = 120° , Angle of dwell between ascent and descent = 70° . During the beginning of ascent, follower axis is horizontal. The angle at the beginning of ascent between follower axis and line joining cam centre and fulcrum centre is 40° . The ascent of the cam takes place with cycloidal motion and descent in SHM. Draw the profile of cam. Angle traced by cam during oscillation is 30° .

(3×20=60 Marks)

