



Reg. No. :

Name :

**Fifth Semester B.Tech. Degree Examination, September 2014
(2008 Scheme)
(Special Supplementary)
08.503 : THEORY OF MACHINES (MP)**

Time : 3 Hours

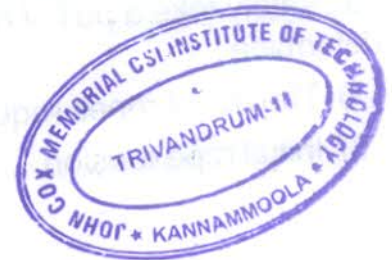
Max. Marks : 100

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

PART – A

1. What is meant by degree of freedom ?
2. What is meant by a kinematic chain ?
3. Explain watt mechanism.
4. What is meant by Coriolis component of acc^n ?
5. What is meant by open belt drive ? Explain.
6. What are the advantages of V belt drive ?
7. Distinguish between initial tension and centrifugal tension in a belt.
8. What are the classification of gears based on position of axes of the shafts ?
9. Differentiate between circular pitch and diametral pitch.
10. What are the different type of followers ?

(4x10=40 Marks)



PART – B

Module – I

11. Explain the different inversions of a single slider crank chain. 20
- OR
12. The crank of a reciprocating engine is rotating at 130 rpm. The length of the crank and connecting rod are 30 cm, $\phi 10$ cm respectively. Find the velocity of a point A when the crank has turned through 45° with the horizontal as shown in figure (1). 20

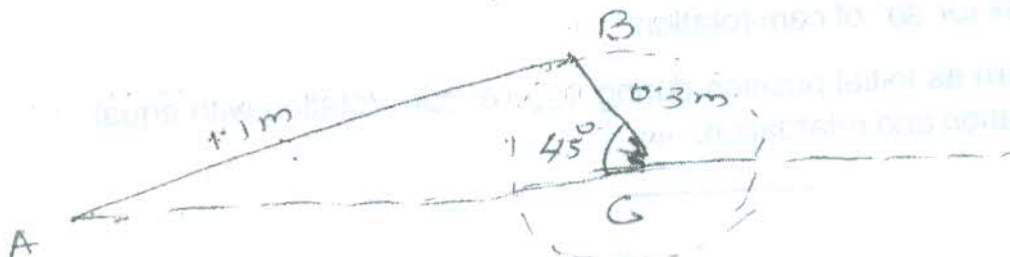


Fig. (1)



Module – II

13. A link AB of a four bar linkage ABCD revolves uniformly at 120 rpm in a clockwise direction. Find the angular acceleration of link BC and CD and acceleration of point E in the link BC. Given AB = 7.5 cm, BC = 17.5 cm, EC = 5 cm, CD = 15 cm, DA = 10 cm and $\angle BAD = 90^\circ$. 20

OR

14. a) Derive an expression for the tension ratios of a V belt drive. 20
- b) A rope drive transmits 75 kW through a 150 cm diameter 45° grooved pulley rotating at 200 rpm. The coefficient of friction between the rope and the pulley groove is 0.3 and angle of lap is 160° . Each rope has mass of 0.6 Kg/m and can safely take a pull of 800 N. Taking centrifugal tension into account determine :
- The no. of ropes required for the drive.
 - Initial rope tension.

Module – III

15. a) What are the different types of gear trains ? 20
- b) The centre distance between the two shafts which are connected by two left handed helical gears is 37 cm. The shaft angle is 60° and normal module is 6 mm. If the gear ratio is 2 and larger gear is having 70 teeth, then find the helix angles of the two gears.

OR

16. A cam with 40 mm as minimum diameter is rotating clockwise at a uniform speed of 900 rpm and has to give the following motion to a roller follower 10 mm in diameter. 20
- Follower to complete outward stroke of 30 mm during 90° of cam rotation with equal uniform acceleration and retardation.
 - Follower to dwell for 60° of cam rotation.
 - Follower to return its initial position during 120° of cam rotation with equal uniform acceleration and retardation.