FACULTY OF ENGINEERING

B.E. 2/4 (M/P) II – Semester (Main) Examination, May 2013

Subject: Kinematics of Machines

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1.	Classify kinematic pairs and give example of each one.	(3)
2.	Differentiate Davis and Ackerman's steering gear mechanisms.	(3)
3.	Derive an expression for Coriolis component of acceleration.	(3)
4.	Define friction circle and friction axis.	(3)
5.	Draw the displacement diagram for follower with SHM.	(3)
6.	Define brake and dynamometer.	(2)
7.	Classify the cams with respect to types of motions.	(2)
8.	Compare involute and cycloidal tooth profile.	(2)
9.	What is undercutting in gears.	(2)
10.	Find the train value of a reverted gear train.	(2)

PART – B (50 Marks)

11. What is inversion of a mechanism? Explain inversions of single-slider crank mechanism. (10)

12. For the mechanism shown in Fig. 1, determine the angular velocity of link AB. (10)
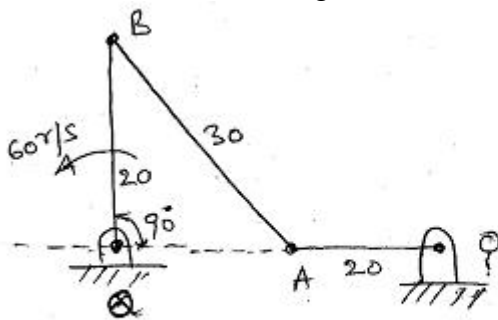

Fig-1. (All dimensions are in mm)

13. A shaft has a number of collars integral with it. The external diameter of the collars is 400 mm and the shaft diameter is 250 mm. If the uniform intensity of pressure is 0.35 N/mm^2 and its coefficient of friction is 0.05, estimate: (i) power absorbed in overcoming the friction when the shaft runs at 150 r.p.m. and carries a load of 150 kN and (ii) number of collars required. (10)

14. A cam drives a flat reciprocating follower in the following manner:

During first 120° rotation of the cam, follower moves outwards through a distance of 20 mm with SHM. The follower dwells next 30° of cam rotation. During next 120° of cam rotation, the follower moves inwards with SHM. The follower dwells for the next 90° of cam rotation. The minimum radius of the cam is 25 mm. Draw the profile of the cam. (10)

15. The pitch circle diameter of the smaller of two spur wheels which mesh externally and have involute teeth is 100 mm. the number of teeth are 16 and 32. The pressure angle is 20° and addendum is 0.32 of the circular pitch. Find the length of the path of contact of pair of teeth. (10)

16. A flat belt, 8 mm thick and 100 mm wide transmits power between two pulleys, running at 1600 m/min. The mass of the belt is 0.9 Kg/m length. The angle of lap in the smaller pulley is 165° and coefficient of friction between the belt and pulley is 0.3. If the maximum permissible stress in the belt is 2 MN/m^2, find (i) maximum power transmitted (ii) initial tension in the belt. (10)

17.(a) What is interference in gears? How to avoid it? (5)
   (b) Explain epicyclic gear train with neat sketch. (5)

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