

FACULTY OF ENGINEERING
B.E. 2/4 (M/P/AE) II – Semester (Main) Examination, June 2014

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)

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| 1 | Explain Grubler's criteria. | 2 |
| 2 | Sketch and explain peaucerlien mechanism. | 3 |
| 3 | Write short note on Freudenstein's method for synthesis. | 3 |
| 4 | What is the condition for maximum power transmitted by belt drive? | 2 |
| 5 | Write the laws of friction. | 3 |
| 6 | With a neat sketch explain prony brake dynamometer. | 3 |
| 7 | Classify cams with respect to their shapes. | 2 |
| 8 | Discuss relative merits and demerits of belt and rope drive for transmission of power. | 3 |
| 9 | Give an expression for velocity of sliding in gears. | 2 |
| 10 | Write about epicyclic gear trains. | 2 |

PART – B (50 Marks)

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|----|---|----|
| 11 | Explain with neat sketches the inversions of slider crank chain also give practical applications for each. | 10 |
| 12 | In a slider crank mechanism, the lengths of the crank and the connecting rod are 200 mm and 800 mm respectively. Locate all the I-centres of the mechanism for the position of the crank when it has turned 30° from the inner dead centre. Also find the velocity of the slider and the angular velocity of the connecting rod if the crank rotates at 40 rad/sec. | 10 |
| 13 | The shaft of a collar thrust bearing rotates at 200 rpm and carries an end thrust of 10 tonnes. The outer and the inner diameters of the bearing are 480 mm and 280 mm respectively. If the power lost in friction is not to exceed 8 kW, determine the coefficient of friction of the lubricant of the bearing. | 10 |
| 14 | Draw the profile of the cams when the follower moves with cycloidal motion as given below:
a) Out stroke with maximum displacement of 44 mm during 180° of cam rotation.
b) Return stroke for next 150° of cam rotation.
c) Dwell for the remaining 30° of cam rotation.
The minimum radius of the cams is 20 mm and diameter of the roller is 10 mm. The axis of the roller follower passes through the cam shaft axis. | 10 |

- 15 An epicyclic gear train is shown in Fig. 1. The number of teeth on A and B are 80 and 200. Determine the speed of the arm a
- If A rotates at 100 rpm clockwise and B at 50 rpm counter-clockwise.
 - If A rotates at 100 rpm clockwise and B is stationary.

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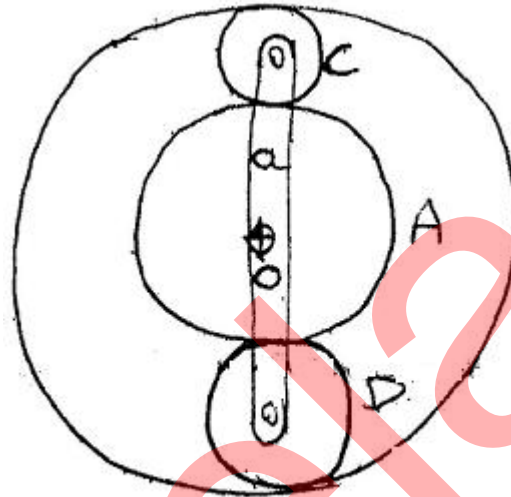


Fig. 1

- 16 (a) A spur gear has 30 teeth and a module of 1.4 mm. It rotates at 360 rpm. Determine its circular pitch and pitch line velocity.
- (b) Sketch and explain internal expanding shoe brake.
- 17 Write short notes on the following:
- Belt-transmission dynamometer
 - Ackerman's steering gear mechanism
 - Self locking and self energizing brake.

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