(d) Prove that for a band and block brake

$$\frac{T_n}{T_o} = \frac{(1+\mu \tan\theta)^n}{(1-\mu \tan\theta)^n}$$

where $T_n$ is tension to right side.

$T_o$ is tension in slack slide.

$\mu$ is coefficient of friction. 7



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## B. E. (Fourth Semester) EXAMINATION, June, 2015

## (New Course)

## (Branch : Mech.)

## Kinematics of Machines

Time : Three Hours ] [ Maximum Marks : 80

[ Minimum Pass Marks : 28

**Note :** Solve all five questions. Each questions carries 16 marks. Attempt each question worth 16 marks.

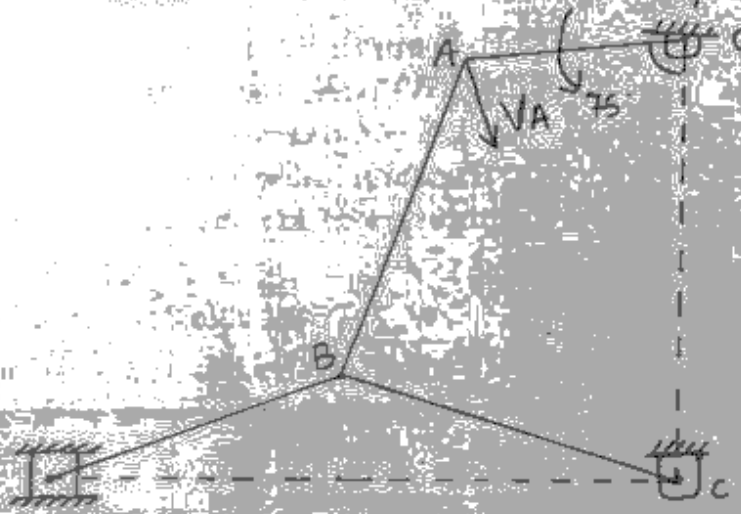
1. (a) What is mechanism ? 2

(b) Draw and explain any two inversions of four-bar mechanism. 7

(c) Draw and explain Ackerman steering gear. 7

(d) In given figure, the angular velocity of the crank OA is 600 rpm. Determine the linear velocity of the slider D and the angular velocity of link BD when the crank is inclined at an angle of 75° to the vertical. The dimensions of various links are OA = 28 mm, AB = 44 mm, BC = 49 mm and BD = 46 mm. The distance between the centr

of rotation O and C is 65 mm. The path of travel of the slider is 11 mm below the fixed point C. The slider moves along a horizontal path and OC is vertical.




2. (a) What is Pantograph ? 2

(b) Make Klien's construction of acceleration diagram for piston and cylinder arrangement. 14

(c) Make derivation for Coriolis component of acceleration 14

3. (a) What is prime circle of a cam ? 2

(b) Make displacement, velocity and acceleration diagrams when the follower moves with simple harmonic motion. Also make derivation for maximum acceleration. 14





(c) Make derivation for the velocity and acceleration for circulator arm cam. 14

4. (a) Define law of gearing. 2

(b) Derive an equation for minimum number of teeth to avoid interference in involute teeth. 7

(c) What is path of contact ? Derive relation for its magnitude. 7

(d) Two 20° involute spur gears mesh externally and give a velocity relation of 3. Module is 3 mm and the addendum is equal to 1.1 module. If then pinion rotates at 120 rpm, determine :

(i) Minimum number of teeth on each wheel to avoid interference.

(ii) The number of pairs of teeth in contact.

5. (a) Define angle of repose. 2

(b) Explain Mitchell thrust bearing. 7

(c) How do we classify daynamometers ? Explain Belt transmission dynamometers. 7