AU/IP/IEM/PR/ME - 403

B.E. IV Semester Examination, June 2015

Theory of Machines and Mechanisms

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice. www.rgpvonline.com

ii) All parts of each questions are to be attempted at one place.

iii)All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit I

1. a) Define kinematic chain.

b) Define with suitable example

i) Mechanism

c) How are kinematic pairs classified? Explain with example.

d) Show that an Ackerman steering gear does not satisfied the fundamental equation of steering _clear at all Positions. Whv is it widly used?

OR

What is kutzbach's criterion for degree of freedom of plane mechanism? In what why Gruebler's criterion is different from it.

Unit - II

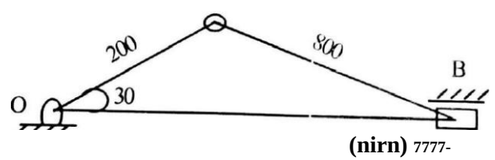
2. a) What is a configuration diagram? What is its use?

b) What is velocity ofrubbing? How is it found?

c) What do you mean by centrode of a body? What are its types?

d) In a slider crank mechanism, the lengths of crank and connecting rod are 200 mm and 800 mm respectively. Locate all the I-centre of the mechanism for the position of crank when it has

turned 30° from the inner dead center. Also find the velocity of the slider and angular velocity



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OR

State and prove Kennedy's theorem as applicable to instantaneous centers of rotation of three bodies. How it is helpful in locating various instantaneous centers of mechanism.

Unit - III

3. a) Define term :

i) Pitch circle

ii) Pitch diameter

b) Define term :

i) Pitch point

ii) Circular pitch

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

d) Two gears is mesh have module of 8 mm and a pressure angle of 20°. The larger gear has 57 while the pinion has 23 teeth. If addenda on pinion and gears wheels are equal to on module

i) The T he number of pair of teeth in contact

ii) The angle of action of pinion and gear wheel

iii) The ratio of the sliding to rolling velocity at

a) The beginning of contact

b) Pitch point

c) End of contact OR

Find relations to71et determine velocity ratio and center distance of helical gears?

4. a) What are the requirements of high speed CAM?

b) Discuss various types of CAMS.

c) Define: Base circle, Pitch circle, **Trace** point, Pitch **curve and Pressure** angle.

d) Derive relations for velocity and acceleration for convex CAM with flat faced follower.

OR

What is tangent cam? Find expression for velocity and acceleration of a roller for such CAM?

Unit V

5. a) What do you mean by spin, precession and gyroscopic planes?

b) In what way the angular velocity can be represented by a vector?

c) Explain the gyroscopic effect on four wheeled vehicles? . www.rgpvonline.com

d) How do the gyroscopic couple and centrifugal ft wee makes the rider of a **two wheeler to tilt on** one side? Derive the relation for the limiting speed of the vehicle?

OR

What is the effect of gyroscopic couple on mobility of a four wheeler while negotiating a curve? In what way this effect along with that of the centrifugal force limit the speed of