

Code No: R22032

**R10****SET - 1****II B. Tech II Semester Supplementary Examinations, November-2017****KINEMATICS OF MACHINERY**

(Com. to ME, AME, MM)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** QuestionsAll Questions carry **Equal** Marks

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1. a) How many inversions will be obtained from a double slider crank chain and explain all inversions with sketches.  
b) Explain mechanical advantage and transmission angle related to Four- bar mechanism.
2. Design a pantograph for an indicator to be used to obtain the indicator diagram of an engine. The distance between the fixed point and the tracing point is 160 mm. The indicator diagram should be four times. The gas pressure inside the cylinder of the engine.
3. Locate all instantaneous centers of the slider crank mechanism; the length of crank OB and Connecting rod AB are 125 mm and 500 mm respectively. The crank speed is 600 rpm clockwise. When the crank has turned  $45^\circ$  from the IDC. Determine (i) velocity of slider 'A' (ii) Angular Velocity of connecting rod 'AB'.
4. Derive Davis Steering gear mechanism with neat sketch and mention why it is not preferred?
5. Draw the profile of a cam operating a roller reciprocating follower and with the following data:  
Minimum radius of cam = 25 mm; lift = 30 mm; Roller diameter = 15 mm. The cam lifts the follower for  $120^\circ$  with SHM, followed by a dwell period of  $30^\circ$ . Then the follower lowers down during  $150^\circ$  of cam rotation with uniform acceleration and retardation followed by a dwell period. If the cam rotates at a uniform speed of 150 RPM. Calculate the maximum velocity and acceleration of follower during the descent period.
6. Two shafts whose centers are 1 m apart are connected by a V belt drive. The driving pulley is supplied with 100 kW and has an effective diameter of 300 mm. It runs at 375 rpm. The angle of groove on the pulley is  $40^\circ$ . The permissible tension in  $400 \text{ mm}^2$  cross sectional area of the belt is 2.1 MPa. The density of the belt is  $1100 \text{ kg/mm}^3$  coefficient of friction is 0.28. Estimate number of belts required.
7. a) Define the following W.r.t gears:  
i) pressure angle ii) contact ratio iii) pitch circle iv) module  
b) Differentiate involute and cycloid tooth profile
8. In a reverted epicyclic train, the arm F carries two wheels A and D and a compound wheel B-C. Wheel A meshes with wheel B and Wheel D meshes with wheel C. The number of teeth on wheel A, D and C are 80, 48, and 72. Find the speed and direction of wheel D, when wheel A is fixed and arm F makes 200 rpm clockwise.