Code No: RT22352 **R13** SET - 1

II B. Tech II Semester Regular/Supplementary Examinations, April/May-2017
THEORY OF MACHINES
(Agricultural Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

~~~~~~

PART –A

1. a) Define kinematic chain. How does it differ from a mechanism (4M)
   b) What is the difference between simple gear train and compound gear train? Explain with help of sketches (4M)
   c) What is meant by static and dynamic unbalance in machinery? How can the balancing be done? (4M)
   d) What is the function of a governor? How does it differ from a fly wheel? (4M)
   e) What parameters influencing the pressure angle in radial cam operating knife edge follower? (3M)
   f) State, how pressure angle varies in cycloidal gears? (3M)

PART -B

2. a) Explain the difference between mechanism and machine (6M)
   b) What is inversion? Explain with help of suitable sketches the inversion of slider crank chain mechanism. (10M)

3. a) Explain interference and how is this avoided. (5M)
   b) In the epicyclic gear shown in Figure 1, the wheel C is keyed the shaft B and wheel F is keyed to the shaft A, C and F rotate together on a pin fixed to the arm G, C has 35 teeth, D has 65 teeth, E has 32 teeth and F has 68 teeth. If A rotates at 60rpm and B rotates at 28 rpm in the opposite direction to A, find the speed and direction of arm G. (11M)

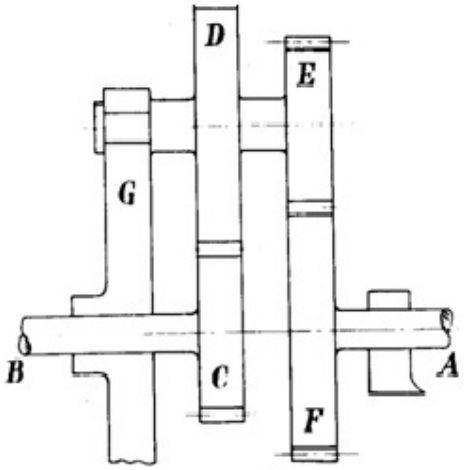

Figure 1
~~~~~~

4. a) When do you prefer chain drives? What are its advantages over belt drives (5M)
   b) A punching machine punches 3 cm holes in a 4 cm plate. It does 540 N.m work per sq. cm of sheared area. The punch has a stroke of 10 cm and punches one hole every 10 second. The maximum speed of the flywheel at the radius of gyration is 28 m/s. Find the weight of the wheel if the speed at this radius is not to fall below 25 m/s during each punch. (11M)

5. a) What is a clutch? Classify the clutches and write at least one practical application for each. (6M)
   b) A single disc clutch with both side of the disc effective is used to transmit 10kW power at 900rpm. The axial pressure is limited to $0.085\,N/mm^2$. If the external diameter of the friction lining is 1.25 times the internal diameter, find the required dimensions of the friction lining and the axial force exerted by the springs. Assume uniform wear conditions. The coefficient of friction may be taken as 0.3 (10M)

6. a) What are centrifugal governors? How do they differ from inertia governors? (6M)
   b) Each arm of a porter governor is 400mm long. The upper arms are pivoted on the axis of the sleeve and the lower arms are attached to the sleeve at a distance of 40mm from the axis. Each ball has a mass of 6 kg and the weight on the sleeve is 50kg. Find the range of speed of the governor if the extreme radii of rotation of the balls are 260mm and 300mm (10M)

7. Four masses A,B,C and D are completely balanced. Masses C and D make angles of 90^0 and 210^0 respectively with B in the same sense. The planes containing B and C are 300mm apart. Masses A, B, C and D can be assumed to be concentrated at radii of 360, 480, 240 and 300mm respectively. The masses B, C and D are 15kg, 25kg and 20kg respectively. Determine i) The mass A and its angular position ii) The positions of planes A and D. (16M)