

Code No: RT22352

R13**SET - 1****II B. Tech II Semester Supplementary Examinations, November-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 instantaneous center with example (3M)
- b) What is reverted gear train? Where it is used? (4M)
- c) State, how pressure angle varies in cycloidal gears? (4M)
- d) How does the porter governor differ from a watt governor (4M)
- e) What types of governors are used in marine applications? Why? (3M)
- f) State the primary unbalanced and secondary unbalanced forces of reciprocating masses and when the secondary unbalanced force is insignificant? (4M)

PART -B

2. In a slider crank mechanism, the crank is 480 mm long and rotates at 20 rad/s in the counter clockwise direction. The length of the connecting rod is 1.6m. When the crank turns 60° from the inner-dead centre, determine i) the velocity and acceleration of the slider ii) angular velocity and angular acceleration of the connecting rod. (16M)
3. The following data refer to two mating involute gears of 20° pressure angle: (16M)
Number of teeth on pinion =20; Gear Ratio=2; Speed of Pinion 250 rpm;
Module =12mm; If the addendum of each wheel is such that the path of approach and path of recess on each side are half the maximum possible length each, find
a) addendum for both the wheels, b) the length of arc of contact and
c) the maximum sliding velocity during approach and recess.

Code No: RT22352

R13**SET - 1**

4. a) Derive the condition for maximum power transmission in a belt drive? (6M)
b) A pulley is driven by a flat belt running at a speed of 600m/min. The coefficient of friction between the pulley and the belt is 0.3 and the angle of lap is 160 degrees. (10M)
If the maximum tension in the belt is 700N, find the power transmitted by a belt.
5. A multiple disc clutch has three discs on the driving shaft and two on the driven shaft, providing four pairs of contact surfaces. The outer diameter of the contact surfaces is 250mm and inner diameter is 150mm. Determine the maximum axial intensity of pressure between the discs for transmitting 18.75kW at 500 rpm. Assume uniform wear and coefficient of friction as 0.3 (16M)
6. a) Explain hunting and sensitiveness of a governor. (6M)
b) Derive the expression for the power of a porter governor. (10M)
7. A shaft carries four masses A, B, C and D placed in parallel planes perpendicular to the shaft axis and in this order along the shaft. The masses of B and C are 353 N and 245 N respectively and both are assumed to be concentrated at a radius of 15 cm, while the masses in planes A and D are both at a radius of 20 cm. The angle between the radii of B and C is 100° and that between B and A is 190° , both angles being measured in the same sense. The planes containing A and B are 25 cm apart and those containing B and C are 50 cm apart. If the shaft is to be in complete dynamic balance, determine i) Masses of A and D ii) distance between the planes containing C and D iii) angular position of the mass D. (16M)