

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-VI Examination May 2011****Subject code: 161806****Subject Name: Mechanics of machines-I****Date: 24/05/2011****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Derive an expression for the length of an open belt drive. **07**
(b) Define dynamometer & describe the construction & operation of a Rope brake dynamometer. **07**
- Q.2** (a) Classify centrifugal governors. Derive and explain the relation between the height of the porter governor & angular speed of the balls by the method of resolution of forces. **07**
(b) Explain the function of flywheel, coefficient of fluctuation of speed & derive an expression for energy stored in a flywheel. **07**
- OR**
- (b) (1) Explain various terms used in governors with neat sketch. **07**
(2) Explain: sensitiveness, stability & hunting in case of governors.
- Q.3** (a) Classify various types of followers with neat sketches. **07**
(b) Draw the displacement, velocity & acceleration diagrams for a follower when it moves with simple harmonic motion. **07**
- OR**
- Q.3** (a) Classify various types of cam & explain various types of terms in radial cams with neat sketch. **07**
(b) Draw a displacement, velocity & acceleration diagrams when the follower moves with uniform velocity. **07**
- Q.4** (a) What do you understand by the instantaneous centre of rotation in kinematic machines. Explain space and body centrodes. **07**
(b) Explain properties of instantaneous centre & types of instantaneous centres. **07**
- OR**
- Q.4** (a) Explain motion of a link & describe the method to find the velocity of a point on a link by relative velocity method. **07**
(b) Explain & draw acceleration diagram for slider crank mechanism. **07**
- Q.5** (a) Explain the term “gear train”. Derive the expression of speed ratio for compound gear train. **07**
(b) Derive an expression for the minimum number of teeth required on the pinion in order to avoid interference in involute gear teeth when it meshes with wheel. **07**
- OR**
- Q.5** (a) In a flat belt drive the initial tension is 2000N. The coefficient of friction between the belt and the pulley is 0.3 & the angle of lap on the smaller pulley is 150. The smaller pulley has a radius of 200 mm & rotates at 500 r.p.m. find power in transmitted in kw. **07**
(b) Calculate the vertical height of a watt governor when it rotates at 60 rpm. Find the change in vertical height when its speed increases to 61 rpm. Also calculate the sensitiveness of the governor. **07**
