

Roll No.

Total No. of Questions : 09]

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Paper ID [PE207]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 3rd)

THEORY OF MACHINES (PE - 207)

MAY 2008

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

- a) What do you understand by completely constrained motion?
- b) What is meant by reverted gear train, answer by giving an example.
- c) How the brake power is calculated in prony brake?
- d) Enlist the classification of followers.
- e) Discuss about the terms 'fluctuation of energy' and 'fluctuation of speed' as applied to Flywheels.
- f) Explain the SLIP phenomena in belt drives.
- g) Enlist the classification of kinematic pairs.
- h) Discuss briefly the function of a clutch in IC engines.
- i) Define cam, give names of any two types.
- j) Differentiate between addendum and dedendum of a gear tooth with the help of a neat sketch.

Section - B

(4 × 5 = 20)

- Q2) The crank of a slider crank mechanism is 15 cm and connecting rod is 60 cm long. The crank makes 300 rpm in the clockwise direction. When it is turned 45° from inner dead centre/position, determine the acceleration of the mid point of the connecting rod and angular acceleration of the connecting rod.

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- Q3) Sketch and explain the various inversion of a single slider crank mechanism.
- Q4) What do you understand by a flywheel? How maximum fluctuation of energy can be calculated in flywheels?
- Q5) With the help of neat diagram discuss the working principle of a cone clutch.
- Q6) An open belt drive connects two pulleys 120 cm and 50 cm diameters, on parallel shafts 4 m apart. The maximum tension in the belt is 1855.3 N. The coefficient of friction is 0.3. The driver pulley of diameter 120 cm runs at 200 rpm, calculate the power transmitted.

Section - C

(2 × 10 = 20)

- Q7) Draw the cam profile for cam with roller reciprocating follower. The axis of the follower passes through the axis of cam roller diameter = 5 mm, minimum radius of cam = 20 mm, total lift = 25 mm.
The cam has to lift the follower with SHM during 180° of cam rotation, then allow the follower to drop suddenly half way, and further return the follower with uniform velocity during the remaining 180° of cam rotation. Determine the maximum velocity and acceleration on the outstroke if cam rotates at a uniform speed of 100 rpm.
- Q8) Find an expression for minimum number of teeth on a pinion which is in mesh with a rack in order to avoid interference.
- Q9) The arm of an epicyclic gear train rotates at 100 rpm in the anticlockwise direction. The arm carries two wheels A and B having 36 and 45 teeth respectively. The wheel A is fixed and the arm rotates about the centre of wheel A. Find the speed of wheel B.

