

mechanism. Lengths of links are 6mm, 28mm, 49mm and 44mm and  $\omega = 100 \text{ rad/sec}$ .

- Q.5 Explain the construction of cam profile for SHM to the roller follower of the cam. Also derive the expression for max. velocity and acceleration of the follower.
- Q.6 Derive the expression of the ratio of belt tension for rope drive.
- Q.7 Explain construction and working of Rope brake dynamometer with neat sketches.

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**3rd Sem. / Packaging Tech.**  
**Subject : Theory of machine**

Time : 3 Hrs.

M.M. : 100

**SECTION-A**

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

- Q.1
- a) Kinematic pair
  - b) Structure
  - c) Oldham's coupling
  - d) Klein's construction
  - e) Angular acceleration of the connecting rod of a reciprocating engine
  - f) prime circle referred to cam
  - g) Types of followers
  - h) Cone clutch
  - i) Uniform wear theory
  - j) Laws of friction
  - k) Turning moment diagram

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- l) Coefficient of fluctuation of speed
- m) Types of gears
- n) slip and creep
- o) Concept of balancing
- p) Balancing of several rotating masses in same plane.
- q) Degree of freedom
- r) Lateral vibrations

### SECTION-B

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

- Q.2
- i) Kinematic link may be a machine component but machine component may not be the kinematic link. Explain the statement.
  - ii) What is difference between mechanism and machine.
  - iii) Define inversions of quadric cycle chain mechanism.
  - iv) Explain spatial mechanism.
  - v) Explain the term instantaneous center.

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- vi) Explain relative angular velocities of point of two kinematic links.
- vii) Explain different types of cam with neat sketches.
- viii) Derive an expression for displacement, velocity and acceleration of a circular arc cam with flat footed follower when follower is in contact with flank.
- ix) Derive an expression for the efficiency of screw jack considering the collar friction.
- x) Draw and explain porter governor
- xi) Derive length of belt for cross belt drive.
- xii) Draw and explain Reverted gear train.
- xiii) Draw and explain band brake.
- xiv) Explain various balancing grades.
- xv) Explain critical speed of shaft.

### SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.3 Explain whitworth quick return mechanisms.
- Q.4 Draw the velocity polygon for the four-bar

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