Day	: Monday	**Branch**	: Mechanical
Date	: 25/08/2014	**Subject Name**	: Kinematics of Machines
Duration	: 90 MINUTES	**Max. Marks**	: 30

Instructions: 1) All questions are **compulsory**.
2) Figures to the **right** indicate full marks.
3) Use of scientific calculator is permitted.
4) Assume suitable data if necessary stating the same.

Q.1 **A** Difference   **05**
1) Machine V/S Mechanism
2) Completely constraint motion V/S successfully constraint motion

B What is inversion of mechanism? Explain with neat sketch inversion of double slider   **05**
crank chain mechanism

OR

B For the kinematic linkages shown in fig.1, calculate the following.   **05**
- The number of ternary links
- The number of other (quaternary, etc.) links
- The number of total links
- The number of loops
- The number of pair with 1 DOF
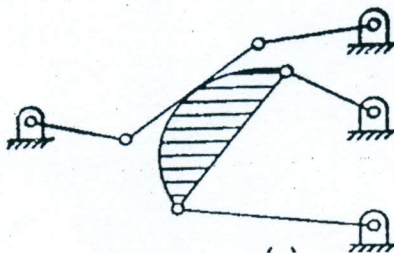- The number of pair with 2 DOF
- Total number of DOF

Fig.1

Q.2 **A** Construct a cam profile for a knife edge follower. Minimum radius of cam = 30mm,   **07**
Stroke of follower = 24mm, Angle of rise = 90^0, Dwell after rise = 60^0, Angle of
return = 120^0, Dwell after return for rest of the period. Follower to move
outwards with uniform velocity and return back with simple harmonic motion.
The follower is offset to right by 15mm.

B Classify followers and explain with neat sketch.   **03**

OR

Q.2 **A** Draw the profile of a cam operating a roller reciprocating follower and with the   07
following data: Minimum radius of cam =25 mm , Lift = 30 mm, Roller Diameter = 15
mm The cam lifts the follower for 120° with SHM followed by a dwell period of 30°.
Then the follower lowers down during 150° of the cam rotation with uniform
acceleration and deceleration followed by a dwell period.

B What are the application of cam and follower?   03

Q.3 **A** A power of 75 KW is transmitted by a multi plate clutch which is quite old at 1800   07
RPM. Axial intensity of pressure is not to exceed 15 N/mm^2. The coefficient of friction
for the friction surfaces is 0.20. The external radius of friction surface is 120 mm
and is equal to 1.25 times the internal radius. Determine the no. of plates required
on driving and driven shaft to transmit the required power. Justify the condition
assumed.

B What is overhauling and self locking of screw?   03

OR

Q.3 **A** For a single plate friction clutch, the external and internal radii are 140 mm and 70   07
mm, and it transmits 20 kW at 2000 rpm. For uniform wear theory, determine the
Torque and maximum, minimum pressure at the contact surfaces. Assume μ = 0.3.

B Derive an expression for the efficiency of an inclined plane when a body moves up a   03
plane.

**********BEST OF LUCK**********