Kadi Sarva Vishwavidhyalaya
LDRP INSTITUTE OF TECHNOLOGY & RESEARCH, GANDHINAGAR.

B.E. (Mechanical Engineering) Semester - V

MID SEMESTER EXAM

Day	**: Saturday**	**Branch**	**: Mechanical**
Date	**: 23/08/2014**	**Subject Name**	**: Theory of Machine**
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** A slider-crank mechanism with the following dimensions is acted upon by a force F = 2 kN at B as shown in fig.1: OA = 100 mm, AB = 450 mm. Determine the input torque T on the link OA for the static equilibrium of the mechanism. **05**

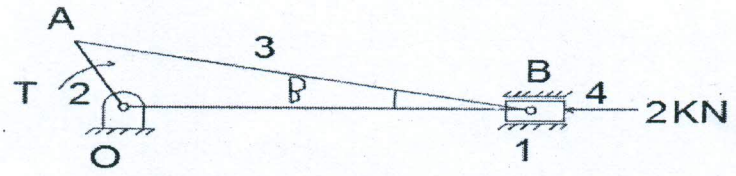

Fig.1

B What are turning moment diagrams? What information can be avail from them? **05**

Q-2 **A** What is meant by a self locking and self energized brake? **05**

B The mass of a flywheel is 5000 kg with radius of gyration 2 m and the mean speed of an engine is 240 rpm. If the fluctuation of energy is 100 kN-m, find the maximum and minimum speeds of the flywheel. **05**

OR

Q.2 **A** Synthesize a function generator to generate a function $y = \sin x$ in the region $0 \leq x \leq 2\pi$, using Chebyshev spacing taking three precession points. Assume initial crank angle, $\theta i = 300$, initial rocker angle, $\varphi i = 600$, $\Delta\theta = 600$ and $\Delta\varphi = 900$. Take fixed link length 50 mm. **05**

B **05**

a) Define: 1) point of concurrency 2) FBD
b) Define constraint forces
c) Friction at turning pair is taken into account by _____
d) Friction at sliding pair is taken into account by_____

Q.3	**a**	A porter governor has all the four arms of 300 mm each. All the upper arms as well as the sleeve arms are pivoted on the axis of rotation. The mass of each governor ball is 1 kg. The mass of the sleeve is 20 kg. Find the speed of rotation, when the balls rotate at a radius of 150 mm.	5
	b	Define (i) Hunting (ii) Sensitiveness (iii) Sleeve lift and (iv) Isochronisms (v) Stability for governor.	5

OR

Q.3	**a**	Explain the term height of governor. Derive an expression for height in case of Watt governor.	5
	b	A Porter governor has arms of 380 mm long. The upper arms are pivoted at the axis of the sleeve and lower arms are attached to the sleeve at a distance of 40 mm from the axis. Each fly ball has a mass of 5 kg and weight on sleeve is 45 kg. Find the range of speed of the governor if the extreme radii of rotation of the balls are 250 mm and 300 mm.	5

**********ALL THE BEST**********