SRI RAMAKRISHNA INSTITUTE OF TECHNOLOGY, COIMBATORE-10
(Approved by AICTE, New Delhi – Affiliated to Anna University, Chennai)
Department of Mechanical Engineering

Class	: III Year	Semester	: VI
Topic	: Static Force Analysis	Max Marks	: 46
Duration	: 50 Minutes	Date	: 08-08-13

Part A (Answer all Questions)

1. Draw the turning moment diagram of a single cylinder double acting steam engine.
2. Explain the turning moment diagram of a four stroke cycle internal combustion engine.
3. Discuss the turning moment diagram of a multicylinder engine.

Part B (Answer all Questions)

1. A punching press is driven by a constant torque electric motor. The press is provided with a flywheel that rotates at maximum speed of 225 r.p.m. The radius of gyration of the flywheel is 0.5 m. The press punches 720 holes per hour; each punching operation takes 2 second and requires 15 kN-m of energy. Find the power of the motor and the minimum mass of the flywheel if speed of the same is not to fall below 200 r. p. m.

2. A machine punching 38 mm holes in 32 mm thick plate requires 7 N-m of energy per sq. mm of sheared area, and punches one hole in every 10 seconds. Calculate the power of the motor required. The mean speed of the flywheel is 25 metres per second. The punch has a stroke of 100 mm. Find the mass of the flywheel required, if the total fluctuation of speed is not to exceed 3% of the mean speed. Assume that the motor supplies energy to the machine at uniform rate.

3. A riveting machine is driven by a constant torque 3 kW motor. The moving parts including the flywheel are equivalent to 150 kg at 0.6 m radius. One riveting operation takes 1 second and absorbs 10 000 N-m of energy. The speed of the flywheel is 300 r.p.m. before riveting. Find the speed immediately after riveting. How many rivets can be closed per minute?

4. A punching press is required to punch 40 mm diameter holes in a plate of 15 mm thickness at the rate of 30 holes per minute. It requires 6 N-m of energy per mm2 of sheared area. If the punching takes 1/10 of a second and the r.p.m. of the flywheel varies from 160 to 140, determine the mass of the flywheel having radius of gyration of 1 metre.