BHARATI VIDYAPEETH INSTITUTE OF TECHNOLOGY
Question Bank (I-Scheme)

Name of subject: Applied Mechanics

Subject code: 22203

Unit Test: I

Course: CE

Semester: II

CHAPTER 1 (Mechanics and force system)

(2 Marks)

a. Define statics and dynamics.

b. Explain Bow's notation with the help of a neat sketch.

c. Define force and state its SI unit.

d. State the principle of transmissibility of force.

(4 Marks)

a. State four effects of forces on rigid body.

b. Explain classification of force system with neat sketch.

CHAPTER 2 (Simple Lifting machine)

(2 Marks)

a. State the relation between Mechanical Advantage, Velocity Ratio and Efficiency.

b. Define effort lost in friction and state its expression.

c. State law of machine and state its significance.

d. Draw nature of graph for load against ideal effort.

(4 Marks)

a. The law of certain machine is $P=W/50 + 8$ N and velocity ratio is 100. Find the maximum possible mechanical advantage and maximum possible efficiency, while lifting a load of 600 N. Also, what will be the efficiency.

b. In a machine, an effort of 2 N lifted a load of 30 N. If the effort lost due to friction at this load is 0.5 N, find the velocity ratio and efficiency of the machine.

c. In a lifting machine, a load of 10 KN is raised by effort of 300 N. If the efficiency is 75%, calculate mechanical advantage and velocity ratio. If the machine lifts 20 KN load by effort of 550 N, find the law of machine.

d. In a differential axle & wheel, the diameter of wheel is 400 mm and that of axle are 100 mm & 80 mm. If an effort of 50 N can lift a load of 1500 N, find velocity ratio and efficiency of the machine.

e. In a double purchase crab, the two pinion have 10 teeth each and the two spur wheel has 60 teeth each. The diameter of load drum is 20 cm and that of effort wheel is 60 cm. Find the velocity ratio.

f. Following observations were made in an experiment of simple lifting machine with the velocity ratio of 100.

Load	Effort
5 KN	150 KN
10 KN	200 KN

Determine law of machine and maximum efficiency of machine.

g. In a Weston's Pulley block, the radius of the smaller wheel is ¾ than that of larger wheel. What load is lifted by the pulley block with an effort of 100 N at an efficiency of 50%.

CHAPTER 3 (Resolution and Composition)

(2 Marks)

a. Define polar diagram with one example.

b. Define resolution of force.

c. State Varignon's theorem.

(4 Marks)

a. Find the components of force 100 KN (push) acting at 270^0 with x-axis.

b. ABCD is a square of 2m side. Along sides AB, CB, DC and AD, the force of 10, 20, 30 and 40 N are acting respectively. Find the resultant of forces from A.

c. Find the magnitude, direction and position of resultant force of four parallel like forces as shown in fig. Use Graphical method.
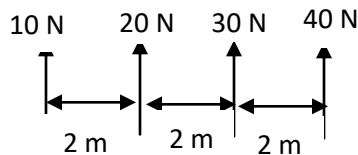
d. Find the angle between two equal forces P, if their resultant is also equal to P.

e. Find the resultant of all the forces as shown in fig. Mark its position and direction on a sketch.
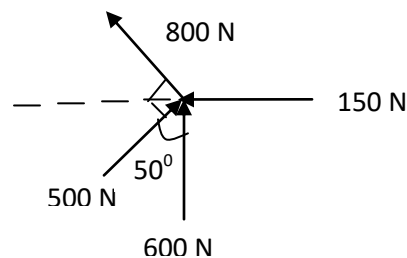
f. Four forces of 30 N (upward), 40N (downward), 70N (upward) and 60N (downward) are acting in a series. Distances between the forces are 400mm, 600mm and 800mm respectively. Find the moment of a couple.