

2E2005	Roll No. _____	Total No of Pages: 3
	2E2005	
	B. Tech. II-Sem. (Back) (Back) Exam., Oct.-Nov. - 2020 205 Engineering Mechanics	

Time: 2 Hours

Maximum Marks: 48
Min Passing Marks: 15

Instructions to Candidates:

Attempt three questions, selecting one question each from any three unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

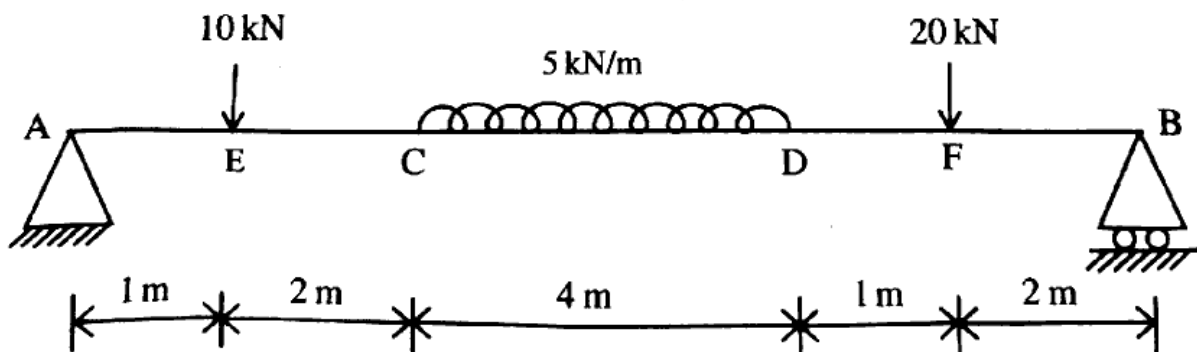
1. NIL

2. NIL

UNIT- I

Q.1 (a) Describe force and state its application. Give a detailed classification of system of force. [6]

(b) Determine the support reactions for the beam loaded as shown in figure. [10]



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OR

- Q.1 (a) State and prove Varignon's theorem. [8]
(b) Write short notes on the following - [2×4=8]
(i) Lami's theorem
(ii) Principle of virtual work

UNIT- II

- Q.2 (a) Explain the reversibility and law of machine. [8]
(b) Determine the moment of inertia of a thin elliptical disk of mass m , having axial radius of a and b . [8]

OR

- Q.2 (a) There are four pulleys in a third system of pulleys an effort of 200 N is required to lift an unlock weight. If the efficiency of this machine is 70%, find the weight lifted. <https://www.rtuonline.com> [8]
(b) A machine lifts a load of 250 N by an effort of 160 N at another instant the same machine lifts the load of 375 N by an effort of 175 N. If the velocity ratio of the machine is 20, determine - [8]
(i) Law of machine
(ii) Efficiency of the machine at 375 N
(iii) Efforts lost in friction at 250 N load

UNIT- III

- Q.3 (a) Derive an expression the total length of the belt required for open belt drive. [8]
(b) Write short notes on the following - [2×4=8]
(i) Angle of Repose
(ii) Effect of slip on belt drive

OR

- Q.3 (a) Derive an expression for the limiting ratio of tension in a V-belt over pulley. [8]
(b) A flat belt transmits 20 kW power from a pulley of 100 cm diameter running at 300 rpm. The angle of lap on the pulley is 160° . Find the width of the belt if the maximum tension is limited to 200 N/ cm. Take $\mu = 0.3$. [8]

UNIT- IV

- Q.4 (a) Find range, time of flight and maximum height for a projectile motion. [8]
(b) Define and explain Newton's law of motion for rotational motion. [8]

OR

- Q.4 (a) A parachute of 300 N weight falling with uniform acceleration from rest descends 5m in first 3 second. Determine the resultant air force on the parachute. [8]
(b) Find the acceleration and tension in the string of the system shown in figure. Coefficient of the friction $\mu = 0.2$ for all planes of the contact. Pulley is smooth, also determine the velocity of the system in 5 seconds after starting from rest. [8]

UNIT- V

- Q.5 (a) Write short notes on the following – [2×4=8]
(i) Principle of work and energy
(ii) Principle of linear impulse and momentum
(b) Two balls A and B of mass 200gm each, moving in opposite direction with the velocities 3m/sec and 2m/sec respectively collide elastically. If no energy is lost during the collision, determine their velocities after collision. [8]

OR

- Q.5 (a) A block of weight 100 N slides along an inclined plane making an angle 30° with horizontal having initial velocity of 2 m/s. The distance travelled by the body along the plane is 2m and after that it strikes the spring whose stiffness is 50 N/mm. Take $\mu = 0.2$. Find the compression of the spring. [8]
(b) Write short notes on the following – [2×4=8]
(i) Law of conservation of energy
(ii) Principle of angular momentum
