Department of Electrical Engineering
Assignment
Date: 20/04/2020

Course Details

Course Title:	Basic Mechanical Technology	Module:	2nd
Instructor:		Total Marks:	30

Student Details

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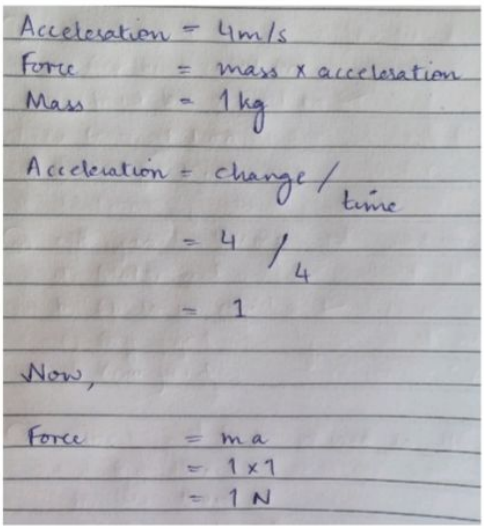
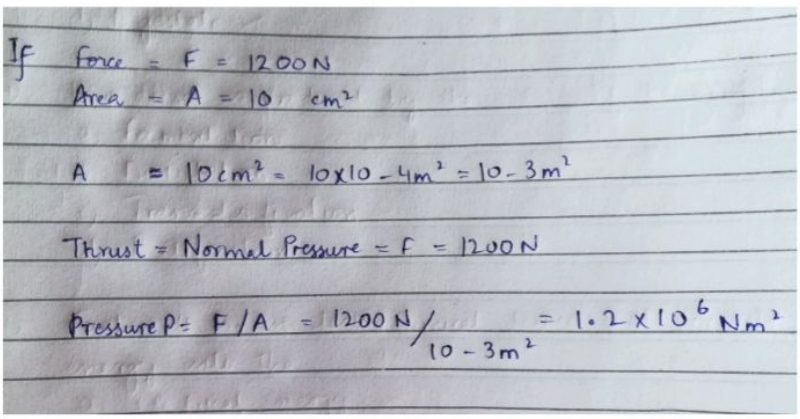
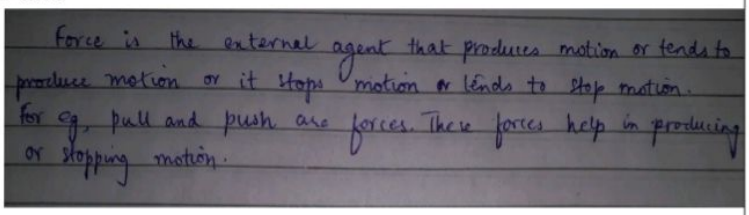
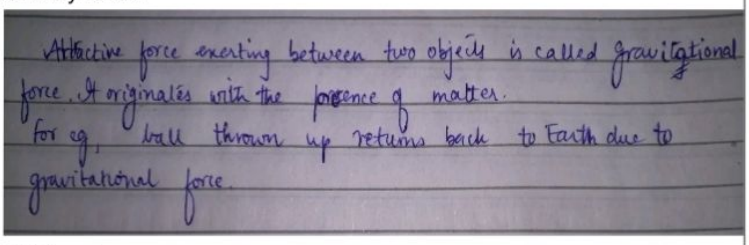
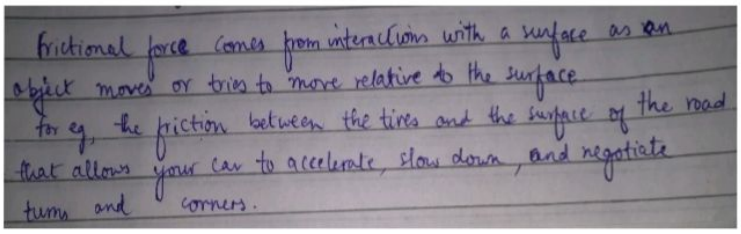
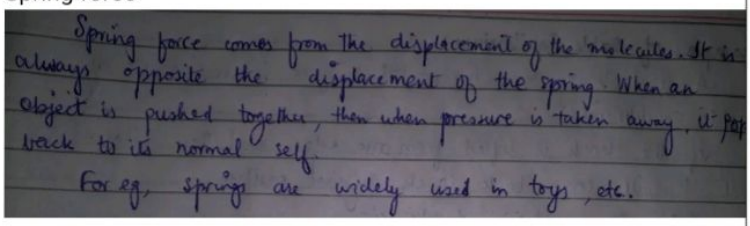
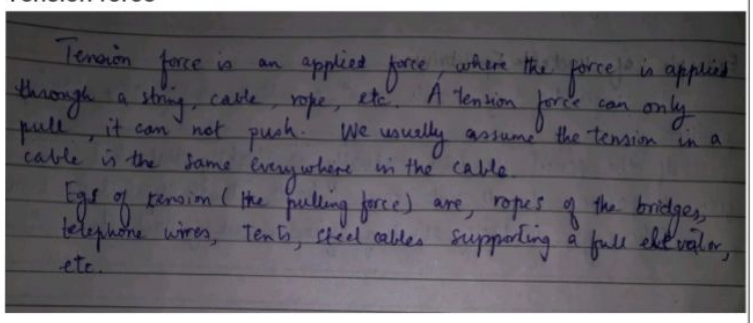
Q1.	(a)	A body of mass 1 kg undergoes a change of velocity of 4m/s, what is the force acting on it? Answer:  Acceleration = 4m/s Force = mass x acceleration Mass = 1kg Acceleration = change / time = 4 / 4 = 1 Now, Force = m a = 1 x 1 = 1 N	(10 marks)

	(b)	A force of 1200 N acts on the surface of area 10 cm^2 normally. What would be the thrust and pressure on the surface. Answer:  If Force = F = 1200N Area = A = 10 cm^2 A = 10 cm^2 = 10x10-4 m^2 = 10-3 m^2 Thrust = Normal Pressure = F = 1200N Pressure P = F/A = 1200N / 10-3 m^2 = 1.2x10^6 Nm^2	

Q2.	(a)	Define Equilibrium and its conditions. Answer: When a number of forces acting on a body produces no change in its state of rest or of motion, the body is said to be in "Equilibrium". **CONDITIONS:** There are two conditions of equilibrium, first condition of equilibrium and second condition of equilibrium. **1st Condition of Equilibrium:** According to the first condition of equilibrium, sum of forces acting on a body is zero. ($\Sigma F = 0$), eg, a book lying on a table. **2nd Condition of Equilibrium:** According to the second condition of Equilibrium, sum of torque acting on a body is zero. ($\Sigma \tau = 0$), eg, children playing on seesaw.	(10 marks)

	(b)	Differentiate between stable and unstable Equilibrium and give proper examples you will Observe in daily life. Answer: A body is said to be in stable equilibrium, if after a slight tilt it returns to its previous position. If a body does not return to its previous position when set free after the slightest tilt is said to be in unstable equilibrium. When a body is in stable equilibrium, its center of gravity is at the lowest position. When it is tilted, its center of gravity rises. It returns to its stable equilibrium as long as the center of gravity acts through the base of the body. Whereas in unstable equilibrium, the center of gravity of the body is at its highest position. As the body topples over about its base (tip), its center of gravity moves towards its lower position and does not return to its previous position. **Example of Stable Equilibrium:** A book lying on a horizontal surface is an example of stable equilibrium. If the book is lifted from one edge and then allowed to fall, it will come back to its original position. Other egs, chair, table, etc. **Example of unstable Equilibrium:** A pencil standing on its point or a stick in vertically standing position. If the pencil standing vertically is slightly disturbed from its position, it will not come back to its original position. Other egs, vertically standing cylinder and funnel, etc.	

Q3.	(a)	Define the following terms and give daily life example. • Force  Force is the external agent that produces motion or tends to produce motion or it stops motion or tends to stop motion. For eg, pull and push are forces. These forces help in producing or stopping motion. • Gravity force  Attractive force exerting between two objects is called gravitational force. It originates with the presence of matter. For eg, ball thrown up returns back to Earth due to gravitational force. • Friction force  Frictional force comes from interactions with a surface as an object moves or tries to move relative to the surface. For eg, the friction between the tires and the surface of the road that allows your car to accelerate, slow down, and negotiate turns and corners. • Spring force  Spring force comes from the displacement of the molecules. It is always opposite the displacement of the spring. When an object is pushed together, then when pressure is taken away, it pop back to its normal self. For eg, springs are widely used in toys, etc.	(10 marks)

		• Tension force  Tension force is an applied force where the force is applied through a string, cable, rope, etc. A tension force can only pull, it can not push. We usually assume the tension in a cable is the same everywhere in the cable. Eg of tension (the pulling force) are, ropes of the bridges, telephone wires, Tents, steel cables supporting a full elevator, etc.	