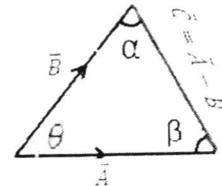




Answer Four Question only

Q1/ A-A tennis ball has a weight of 50 N and is thrown up during a serve with an applied force of 180 N .if the wind exerts a force of 35 N towards east . and the player's racket hit the ball towards the north with a force of 700 N ,what is the resultant force on the ball.

B-Derive the law of cosines ($C^2=A^2+B^2-2ABCOS \theta$) using the scalar product .



(25 Mark)

Q2/ A ball is thrown at 150 above the horizontal from a roof 14m high lands at a point 46m from the base of the building. Find (a)the initial speed (b) the time taken to land..

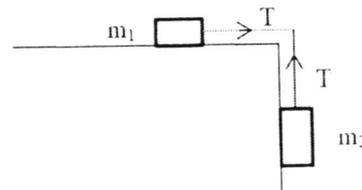
(25Mark)

Q3/ A- A person compresses a spring a distance of 5.0 cm ,which requires a force of 100 N. a-How much work does the person do ? b- How much work is done if the person instead stretches the spring by 7.0 cm.

B- A 2.5 g bullet traveling at 350m/s hits a tree and slows uniformly to a stop while penetrating a distance of 12 cm into the tree's trunk. What force was exerted on the bullet in bringing it to rest .

(25 Mark)

Q4/ Consider two masses, m_1 and m_2 , connected by a light in extensible string. Suppose that the first mass slides over a smooth, frictionless, horizontal table, whilst the second is suspended over the edge of the table by means of a light frictionless pulley, as in figure below. We can assume that the tension T of the string is the same on both sides of the pulley, then the first mass subject to downward force m_1g (due to gravity) and this force canceled out by the upward reaction force due to the table, and T from tension, find the acceleration of the system.



(25Mark)

Q5/A -Two satellites (satellite A with mass M and satellite B with mass $2M$) orbit about the Earth with the same radius R .What is the ratio of the periods of the two satellites ?

B- Calculate the force needed to shear a pin 8 mm diameter given that the ultimate shear stress is 60 N/mm^2



Good Luck
 Kanaan.M.M.AL-jubory

(25Mark)