May - June - 2011

[3961] – 114

F.E. (Semester – II) Examination, 2011
ENGINEERING MECHANICS
(For Students Admitted during the Academic Year 2009-2010 and Onwards)
(2008 Pattern)

Time : 2 Hours | Max. Marks : 50

Instructions : *1) **Attempt** Q.1 or Q.2, Q.3 or Q.4 and Q.5 or Q.6.*
*2) Answer should be written in **one** answer book.*
*3) **Neat** diagram must be drawn **wherever** necessary.*
*4) Figure to the **right** indicates **full** marks.*
*5) **Assume** suitable data, **if necessary** and clearly state.*
*6) **Use** of cell phone is **prohibited** in the examination hall.*
*7) **Use** of electronic pocket calculator is **allowed**.*

1. a) Two forces are shown in Fig. 1a. Knowing that the magnitude of P is 600 N, determine (a) the required angle θ if the resultant R of the two forces is to be vertical, (b) the corresponding value of R. **6**

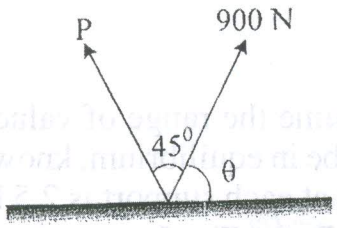

Fig. 1 a

b) A base ball is thrown downward from a 15 m tower with an initial speed of 5 m/s. Determine the speed at which it hits the ground and the time of travel. **6**

OR

P.T.O.

2. a) Determine the position of centroid of the shaded area as shown in Fig. 2 a with respect to origin O. **6**

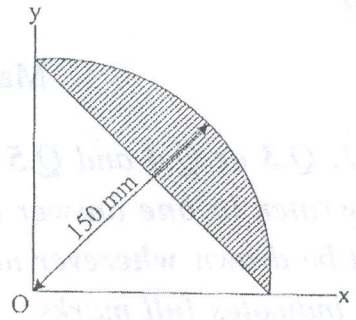

Fig. 2 a

b) The conveyor belt is designed to transport packages of various weights. Each 10 kg package has a coefficient of kinetic friction $\mu_k = 0.15$. If the speed of the conveyor is 5 m/s, and then it suddenly stop, determine the distance the package will slide on the belt before coming to rest. Refer Fig. 2 b. **6**

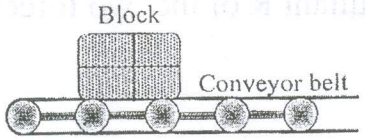

Fig. 2 b

3. a) For the given loading of the beam AB, determine the range of values of the mass 'm' of the crate for which the system will be in equilibrium, knowing that the maximum allowable value of the reactions at each support is 2.5 kN and the reaction at E must be directed downward. Refer Fig. 3 a. **6**

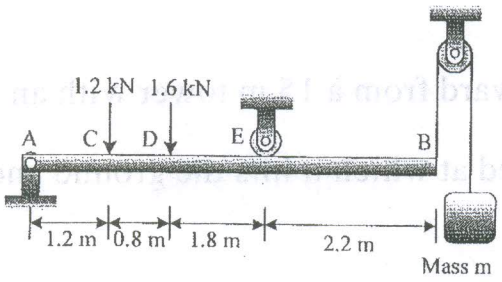

Fig. 3 a