Sem-II May-June-2009 [FE-2008 Sem-II course]

Total No. of Questions : 12] [Total No. of Printed Pages : 7

[3561]-203

F. E. (Semester - II) Examination - 2009

ENGINEERING MECHANICS

(June 2008 Course)

Time : 3 Hours] **[Max. Marks : 100**

Instructions :

(1) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 from section I. Answer Q. 7 or Q.8, Q.9 or Q. 10, Q. 11 or Q.12 from Section II.

*(2) Answer to the **two sections** should be written in **separate answer-books.***

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

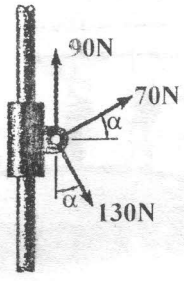
(5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and stream tables is allowed.

(6) Assume suitable data, if necessary.

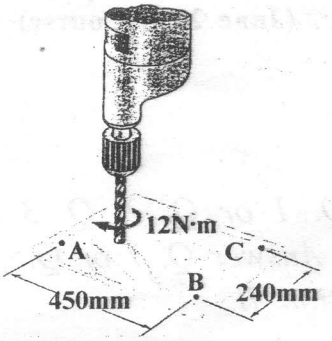
SECTION - I

Q.1) (A) State and prove Varignon's Theorem. **[06]**

(B) A collar that can slide on a vertical rod is subjected to the three forces shown. Determine (a) the value of the angle α for which the resultant of the three forces is horizontal, (b) the corresponding magnitude of the resultant. **[06]**



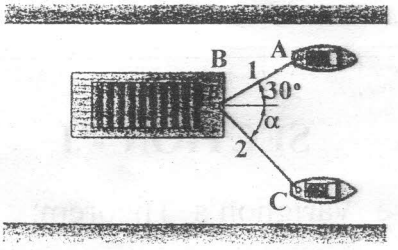
(C) A piece of plywood in which several holes are being drilled successively has been secured to a workbench by means of two nails. Knowing that the drill exerts a 12 Nm couple on the piece of plywood, determine the magnitude of the resulting forces applied to the nails if they are located (a) at A and B, (b) at B and C, (c) at A and C. **[06]**



OR

Q.2) (A) State and explain 'Properties of Couple'. **[06]**

(B) A barge is pulled by two tugboats. If the resultant of the forces exerted by the tugboats is a 5000N force directed along the axis of the barge, determine the value of α for which the tension in rope 2 is minimum. **[06]**



(C) Three hikers are shown crossing a footbridge. Knowing that the weights of the hikers at points C, D and E are 200N, 175N and 135N, respectively, determine the horizontal distance from A to the line of action of the resultant of the three weights when a = 3.3 m. **[06]**