The Open University of Sri Lanka

Foundation Course in Science – Level 02

Open Book Test (OBT) 2004/2005

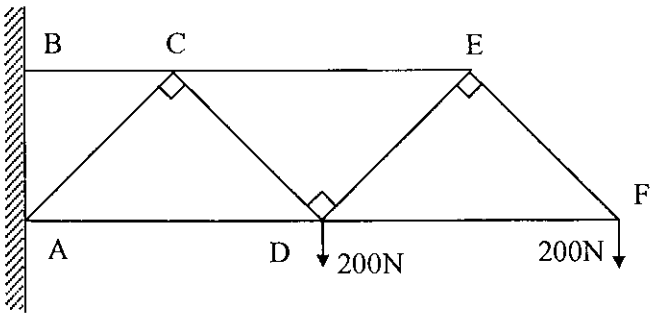
MAF 2302/MAE 2302 - Applied Mathematics

Duration :- One and Half Hours.

Date :- 16-01-2006. **Time:- 1.30 p.m. – 3.00 p.m.**

Answer All Questions.

01. Figure presents a loaded framework of light rods, attached to a vertical wall at A and B with ADF, BCE horizontal. The angles are 45° or 90°. Assuming that the reaction at B is along BC find the magnitude and direction of the reaction at A and find the stresses in all the rods, indicating which are in a state of thrust and which are in a state of tension.



02. Solve the following differential equations

(i) $\frac{dy}{dx} = \frac{x^2 - y^2}{2xy}$. (ii) $\frac{dy}{dx} = \frac{x + y + 1}{x + y - 1}$. (iii) $\frac{dy}{dx} = \frac{(1 + y^2)}{(1 + x^2)}$.

03. A particle of mass m is projected with speed u vertically upwards from a point on horizontal ground. Its subsequent motion is subject to gravity and to a resistance mkv where v is speed and k is a constant. Show that the greatest height attained is $\frac{u}{k} - \frac{g}{k^2}\log\left(1 + \frac{ku^2}{g}\right)$.