UNIVERSITY OF GHANA

SCHOOL OF ENGINEERING SCIENCES

FIRST SEMESTER (SUPPLEMENTARY) EXAMINATIONS: 2020
LEVEL 100: BACHELOR OF SCIENCE IN ENGINEERING

FAEN 103: BASIC MECHANICS I (3 Credits)

INSTRUCTION: ***ANSWER ALL QUESTIONS IN THE ANSWER BOOKLET***
TIME ALLOWED: TWO (2) HOURS

1. a. For equilibrium of a rigid body, the following conditions must be satisfied;

$$\mathbf{F_R} = \sum \mathbf{F} = 0$$
$$\mathbf{M_R} = \sum \mathbf{M_O} = \sum (\mathbf{r} \times \mathbf{F}) = 0$$

i. Explain each term in the above statements. **(10 marks)**
ii. Represent the above statements using scalar equations. **(10 marks)**

b. Two cables are tied together at *C* and loaded as shown (Figure 1). Knowing that *P* = 360 N, determine:

i. The tension in cable *AC* **(15 marks)**
ii. The tension in cable *BC* **(15 marks)**

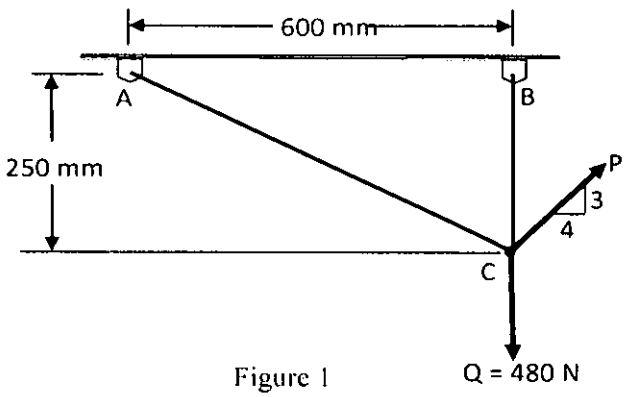

Figure 1

EXAMINER: DR. M. N. JOSIAH

2. The pole *ABC* (Figure 2) is acted upon by a 455 N force. The pole is held by a ball and socket joint at *A* and by two cables *BD* and *BE*. For a = 3m, determine the tension in each cable and the reactions (A_x, A_y and A_z) at *A*. **(50 marks)**

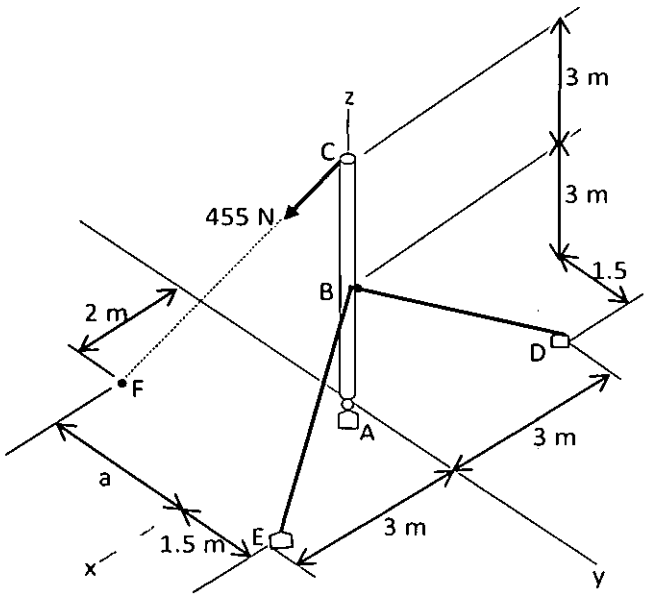

Figure 2