21C

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2023/2024 ACADEMIC YEAR

FIRST YEAR SEMESTER ONE MAIN EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE IN CIVIL AND STRUCTURAL ENGINEERING/BACHELOR OF SCIENCE IN MECHANICAL AND INDUSTRIAL ENGINEERING/BACHELOR OF SCIENCE IN ELECTRICAL AND COMMUNICATION ENGINEERING

COURSE CODE: ECC 103

COURSE TITLE: INTRODUCTION TO ENGINEERING

DATE: 13TH DECEMBER **TIME:** 12 P.M – 2 P.M

INSTRUCTIONS:

1. This paper contains FOUR questions
2. Attempt a total of THREE questions only.
3. QUESTION ONE IS COMPULSORY
4. Marks for each question are indicated in the parenthesis.
5. Examination duration is 2 Hours
6. Do not write on the question paper.
7. Start each answer on a new page.

MMUST observes ZERO tolerance to examination cheating

Question ONE (40 marks)

(a) List any three engineering marvels, one, in each field of engineering. (6 marks)

(b) Write a short note on each of the following scientists: i. Isaac Newton (DoB: 1643). ii. Galileo Galilei (DoB: 1564). iii. Albert Estein (DoB: 1879). (9 marks)

(c) Using a clear illustration, explain why the profession of Engineering is regarded as both an art and a science. (5 marks)

(d) By use of the weighted decision matrix, select the most appropriate mode of writing by an Engineer from the listed six technological solutions listed in Figure Q1. Base the decision on the ten criteria listed below on a weighting scale of 1-8 and a score of 1-10 for the six writing technologies in Figure Q1. (20 marks)

The 10 Criteria:

a. Cost of item
b. Convenience in use
c. Level of environmental pollution in its disposal
d. User health risks
e. Availability in rural and urban setting
f. Sustainability of technology in field conditions
g. User convenience in extreme climate such as rain or drought
h. Lifespan of the equipment
i. Application of Technology in space by astronauts
j. Capacity to manufacture component parts in Kenya

Question TWO (15 marks)

(a) Compare and contrast your level of engineering knowledge before and after joining university. (5 marks)

(b) List the four traditional fields of engineering and outline the focus of each field. (5 marks)

(c) Explain one engineering disaster in Kenya, in each field of engineering. (5 marks)

Question THREE (15 marks)

(a) By use of suitable examples from your engineering curriculum at MMUST explain what you understand by the following terminologies, giving an example from the programmes at MMUST: (i) engineering programme (ii) engineering course (iii) Unit (iv) Core engineering course (v) mathematical science (5 marks)

(b) What do you understand by IEK and EBK? State the role played by each in the training of engineers in Kenya (5 marks)

(c) Explain the difference between Dimension and Unit by giving two suitable examples in each case to illustrate your answer. (5 marks)

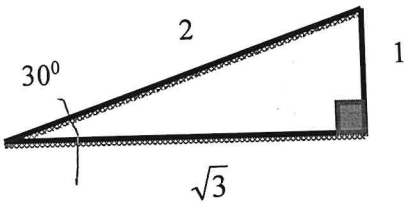
Question FOUR (15 marks)

a) If the resultant moment is to be zero on the system shown in Fig. Q4, find force P in (a) lbs. to 6 s.f. and (b) KN to 6 s.f.

Hint:

For right angled triangle:

$g = 9.81 m/s$ and $1kg = 2.20462$ lb.



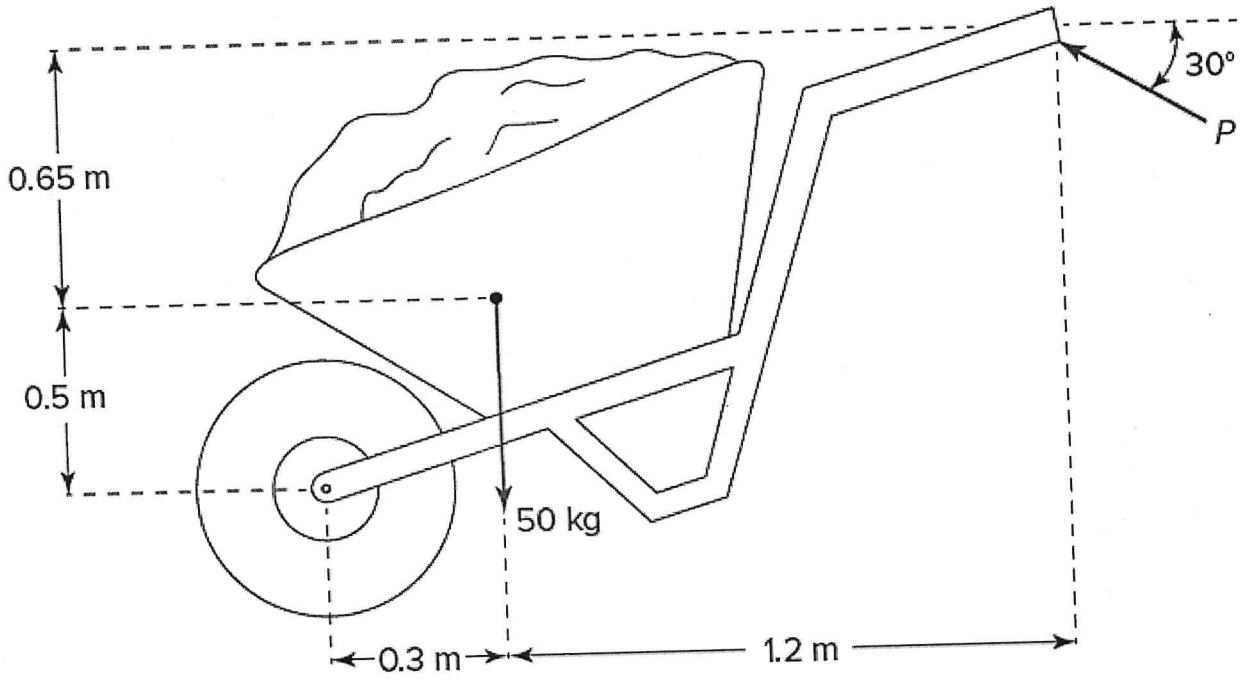
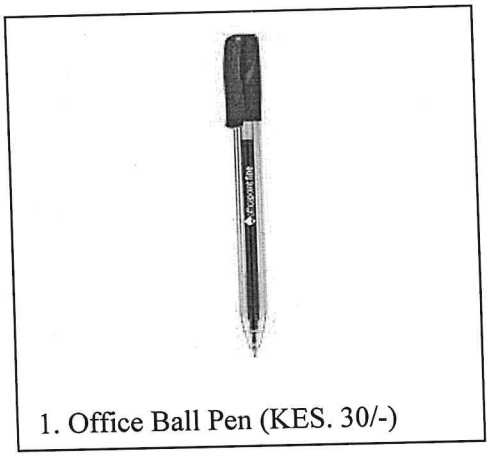
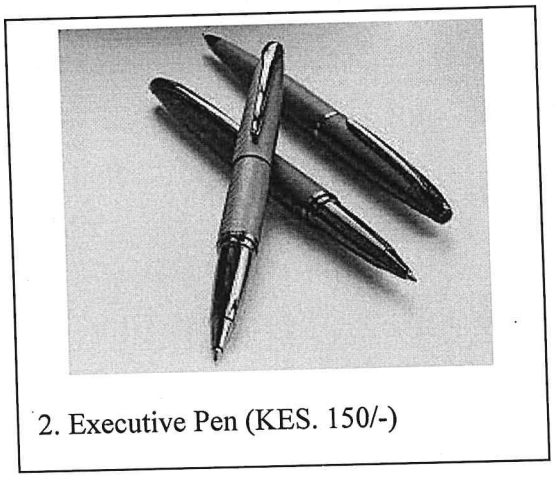


Figure Q4 System of Forces (9 marks)

b) Explain the following terminologies in the engineering profession, outlining the requirements for one to acquire the status: (i) Student Engineer (ii) Graduate Engineer (iii) Professional Engineer. (6 marks)



1. Office Ball Pen (KES. 30/-)

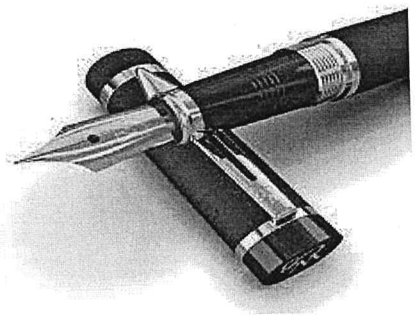


2. Executive Pen (KES. 150/-)

3. Staedler Marker (KES. 80/-)

4.Weasel Brush (KES. 50/-)

5. Staedler Pencil (KES. 20/-)



6. Primori Fountain Pen (KES. 120/-)

Figure Q1: Selected Writing Equipment