NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION

ANALYSIS OF STRUCTURES

PTE2258

First Semester Examination Paper

May 2019

This examination paper consists of 4 pages

Time allowed: 3 hours

Total Marks: 100

Special requirements: None

Examiner's Name: Mrs F. Makwiranzou

INSTRUCTIONS

1) The paper consists of 5 printed pages with 5questions.
2) Each question carries 25 marks.
3) Answer any **4(four)** questions
4) Answer a new question on a fresh page.

MARK ALLOCATION

QUESTION	MARKS
1	25
2.	25
3.	25
4.	25
5.	25
TOTAL	100

QUESTION 1

a) What is a statically indeterminate structure? [3]

b) Under which **two** conditions does instability occur in structures? [4]

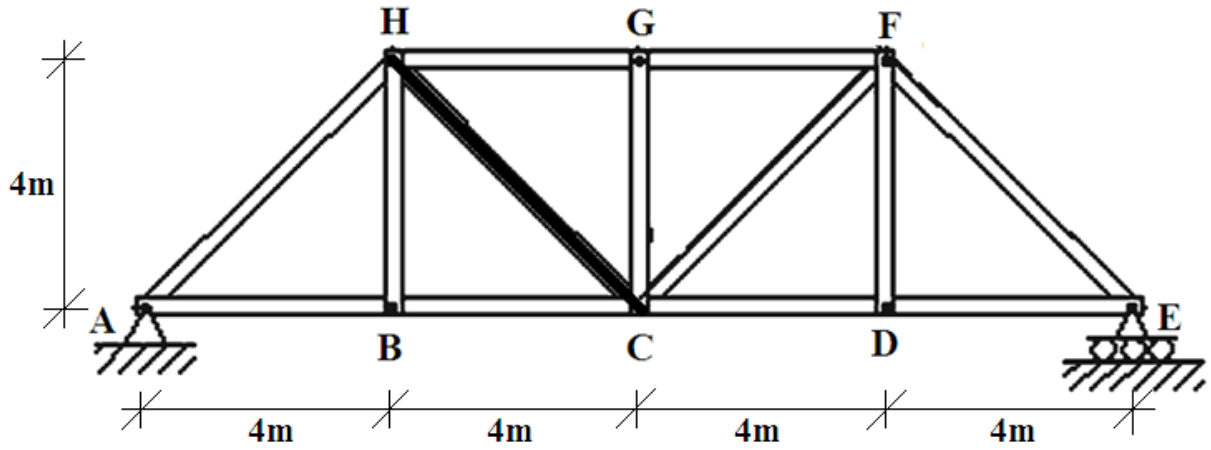
c) List **three** supports and mention the type of restraint offered by each. [6]

d) Trusses can be classified as perfect, deficient and redundant with aid of diagrams describe each class. [6]

e) State, in your own words, the Mueller-Breslau Principle for obtaining the shape of the influence line for the **shear** at a point. [6]

QUESTION 2

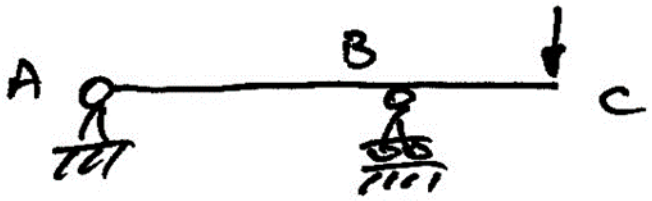
Construct the influence line for truss member CH in the truss of Figure Q1C. (Use the Method of Sections to obtain the truss member forces). [25]



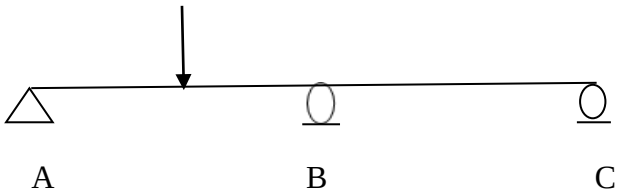
QUESTION 3

a) Analyse the following beams for the **reactions**, **bending moment** and **shear force diagrams**, and draw the **deflected shape**. [18]

(i)

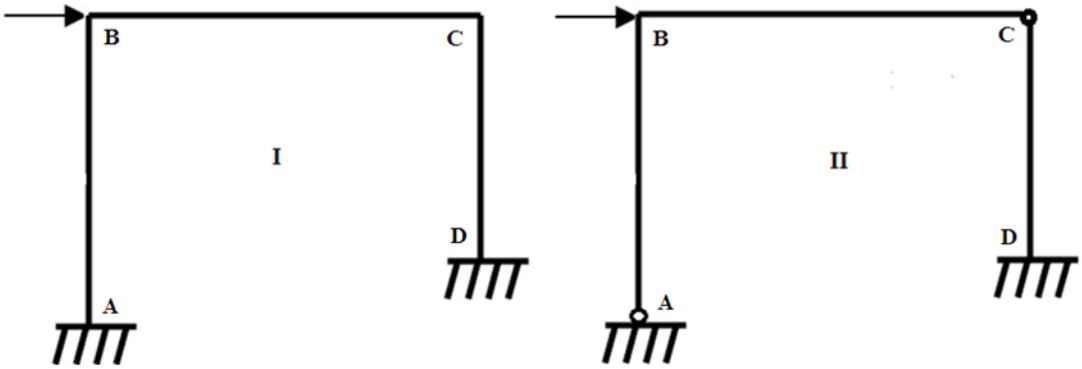


(ii)



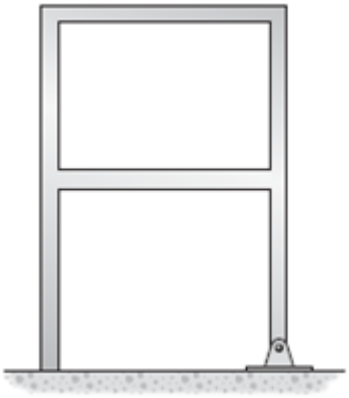
b) Figure below shows two frames. Sketch the deflected shape of each and explain the differences observed. [7]

(i) (ii)

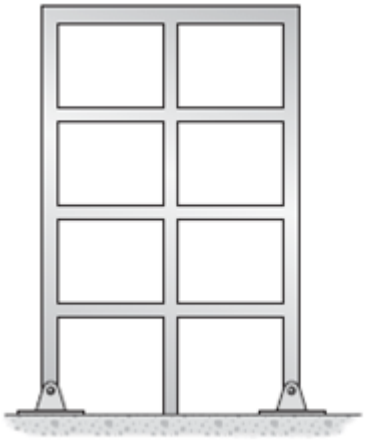


QUESTION 4

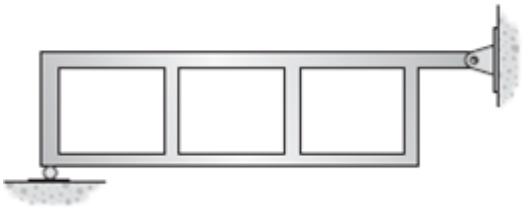
a) Classify each of the following structures as statically determinate or indeterminate. If indeterminate state the degree of indeterminacy. [25]



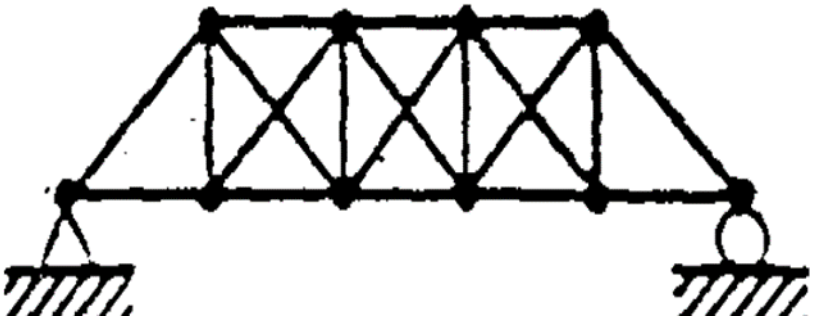
b)



c)



d)



QUESTION 5

a) Define the term ***'primary member'***. [3]

b) State, in your own words, the Mueller-Breslau Principle for obtaining the shape of the influence line for the **moment** and **reactions** at a point. [10]

c) Use the Muller-Breslau Principle to construct the influence line for
   (i) Shear at ***c*** [6]
   (ii) Moment at ***c*** [6]

d)