HILLCREST HIGH SCHOOL

TECHNOLOGY- LSU

JUNE EXAMINATION - 2018

GRADE 8

TOTAL: 125 TIME: 2 HOURS

EXAMINER: MRS E NAIDOO MODERATOR: MRS J STEYTLER

NAME/SURNAME: _____ **GRADE 8** ____

INSTRUCTIONS

1. Answer all questions on the answer sheet provided.
2. Write your name and grade clearly and neatly in the space provided.
3. All drawings/sketches must be completed using a sharp pencil and drawing instruments unless otherwise instructed.
4. Marks will be deducted for untidy work especially drawings/sketches.

QI	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	TOTAL	%
15	10	28	6	6	10	10	20	20	125	

SECTION A

STRUCTURES

QUESTION 1

Fill in the correct terminology below:

1.1 Frame structures are built by a frame of either _____, steel or reinforced _____. (2)

1.2 Name five types of forces that act upon structures, and can result in structural failure. (5)

_____, _____, _____, _____, _____

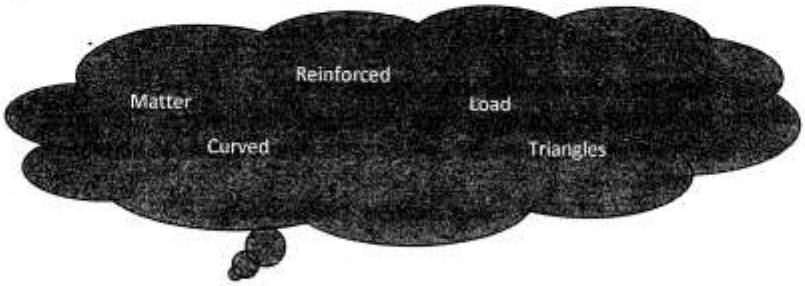
1.3 Structures that span a distance need to have supporting systems. Name two such systems. (2)

_____, _____

1.4 Give one example where cantilevers are used to support part of a design.

_____ (1)

1.5 Complete this paragraph using the words provided:



A shell structure is a _____ hollow structure that can carry a _____. The frame of a bicycle is composed of _____ of cylindrical steel. A solid structure consists almost entirely of _____. In everyday life, all solid concrete structures are _____ with steel rods.

(5)

QUESTION 2

2.1 **Choose the correct answer from the statements below.**

2.1.1 A strut:

A) Has two supporting beams on a tie beam

B) Is a frame structure made up of different bars

C) Holds members of a framework in place by pushing against them

D) All of the above.

2.1.2 A rafter:

A) Holds or pulls two members of a framework together

B) Is a horizontal beam that rests on two opposite columns

C) Is one beam in a series of parallel beams

D) Joins two diagonal sides of a triangular structure.

2.1.3 Arches are found in:

A) Buildings

B) Bridges

C) Dam walls

D) All of the above.

2.1.4 The picture shown is an example of a:

A) Beam and column bridge

B) Suspension bridge

C) Cable-stayed bridge

D) None of the above.

2.1.5 When the two ends of a structure bend away from each other so that the middle section is under tension, the structure is:

A) Bending

B) Buckling

C) Fracturing

D) Flexing.

2.2 Study the pictures below. What forces are shown in these pictures?

	2.2.1_____
	2.2.2_____
	2.2.3_____
	2.2.4_____
	2.2.5_____

(5)

Section A total = 25 marks

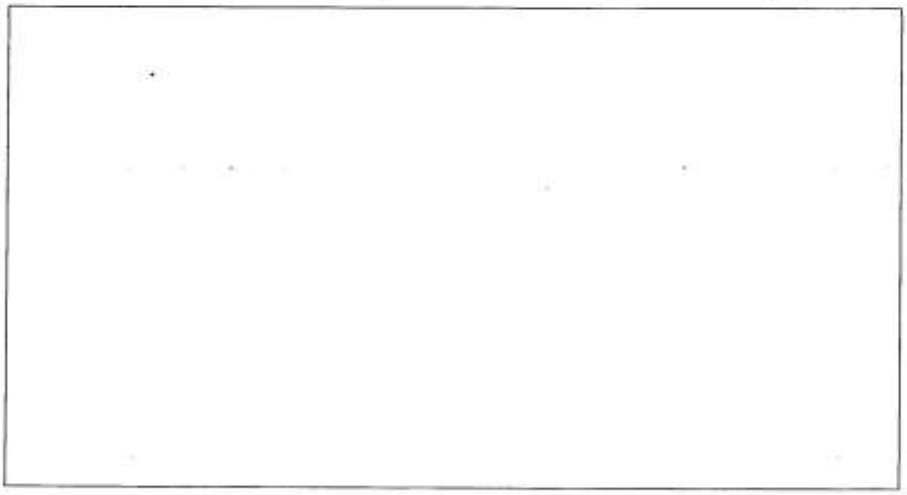
SECTION B

QUESTION 3

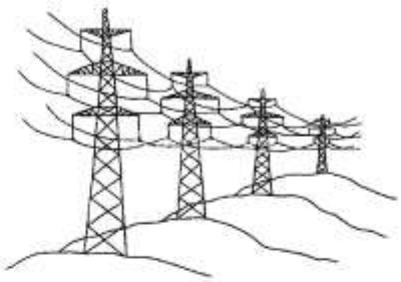
Structures and Structural members

3.1 Draw an example of a King post and provide labels for each structural member. (8)

3.2 Draw an example of a Queen post and provide labels for each structural member. (10)



3.3 Study the picture below and answer the questions to follow.



3.3.1 Name the type of structure from the above picture.

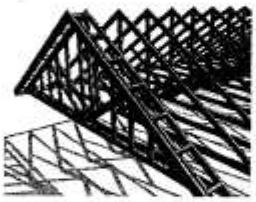
_____ (1)

3.3.2 What makes this structure strong?

_____

_____ (2)

3.4 Study the pictures below and answer the following questions.



3.4.1 A structure is made of trusses and should be made in a certain way. Name 2 ways how structures should be made.

1._____

2._____

(2)

3.5 Study the following pictures and identify if they are **STABLE** or **UNSTABLE**.

3.5.1		
3.5.2		
3.5.3		
3.5.4		
3.5.5		

(5)

Question 4

Case study

After a building collapsed in Kenya last week, killing at least 33 people, experts look at some reasons why such incidents occur in Africa.

The six-storey residence in Kenya's capital Nairobi came down in heavy rain, with more than 80 people still missing.

While investigations are still underway into the cause of this collapse, we look at some common problems.

1. The foundations are too weak

Adequate foundations can be costly.

They can cost up to half the price of a building. Professor of civil engineering Anthony Ede at Covenant University in Ota, Nigeria, says two things should be considered when you are building the foundations - the solidity of the soil and the heaviness of the building and its contents. Even on solid ground, foundations need to be strong enough for the load.

2. The building materials aren't strong enough

Materials that just aren't strong enough to withhold the load are used, says Hermogene Nsengimana from the African Organization for Standardisation, whose organisation met last month in Nairobi to discuss why so many African buildings collapse.

He suggests there is a market for counterfeit materials - going as far as to say that sometimes scrap metal is used instead of steel.

3. Workers make mistakes

Even when workers are given the right materials to make the concrete, they mix them incorrectly, says Mr Ede.

This results in concrete which is not of the sufficient strength to hold the load.

He accuses developers of cutting costs by employing unskilled workers who are cheaper than trained builders.

To those who want to save money on professionals, he advises: "One should not be penny wise and pound foolish".

4. The load is heavier than expected

Mr Ede says a buildings collapse when the load is beyond the strength of the building.

He gives the example of asking a baby to carry a heavy box: "The baby will not be able to withhold the strain."

Even if the foundations and the materials are strong enough for what they were originally built for, that purpose may change.

So, Mr Ede says, if a building was designed to be a home and is then turned into a library where boxes and boxes of books are piled up, the building may strain under the weight.

He says another reason why the load is often heavier than the original design is because extra storeys are added.

5. The strength isn't tested

At all points of construction the strength of the building should be tested, says Mr Ede.

"You have to be strict," he says, about policing building.

"The law says you must test. It's the enforcement of the law which is the problem," he says.

That's a big problem, he says, when at every stage of construction there is someone with a strong motivation to save money or take money.

There are many physical reasons a building can collapse but only one driving motivation for that to happen, says Mr Ede. That's money.

And for him this is the real reason buildings collapse - corruption.

BBC News, 5 May 2016, 5 Reasons why buildings collapse by Clare Spencer. Accessed 25/05/2018.

4.1 Explain in your own words what is meant by *structural failure*.

_____

_____

_____

_____ (2)

4.2 In structural failure, the foundation could be the source of the problem. Explain 2 reasons why this is the problem.

_____

_____

_____

_____

_____(2)

4.3 Other than the foundation not being correctly built. Name 2 other reasons how building could collapse.

_____

_____

_____

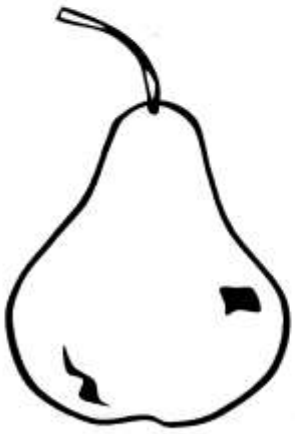
_____(2)

Section B total = 34 marks

SECTION C

Question 5

Shade the following object with a pencil. Remember to check the direct of the source of light.



(6)

Question 6

Study the following sign's, symbols and logos below and provide labels for them.

6.1

A. 	B. 	C. 	D. 
E. 	F. 	G. 	H. 
I. 	J. 		

Write your answers in the following table provided.

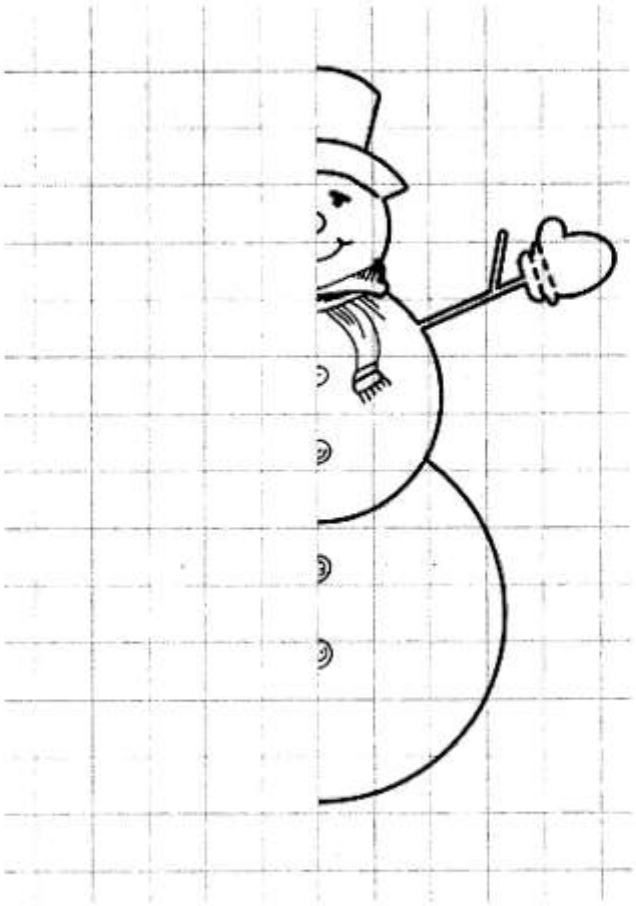
A.
B.
C.
D.
E.
F.
G.
H.
I.
J.

(10)

GRAPHIC COMMUNICATION

Question 7

Complete the Picture of Snowman using the Grid Lines as a Guide Puzzle.



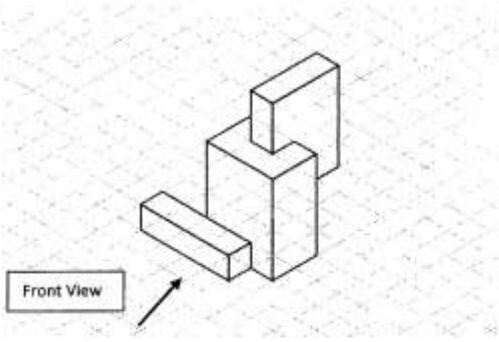
(10)

Question 8

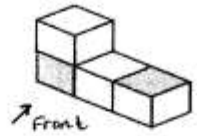
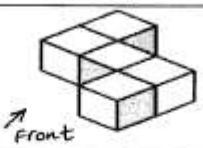
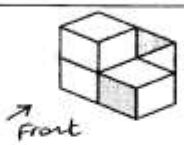
Orthographic drawing

8.1

Using the 3D drawing on the side, Complete the orthographic drawing on the graph paper below. Please draw to scale 1:1.



8.2 complete the front view, side, and top view in the following table

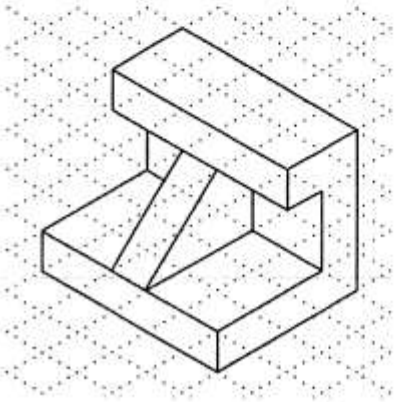
3D Object	Front Elevation	Side Elevation
		
		
		

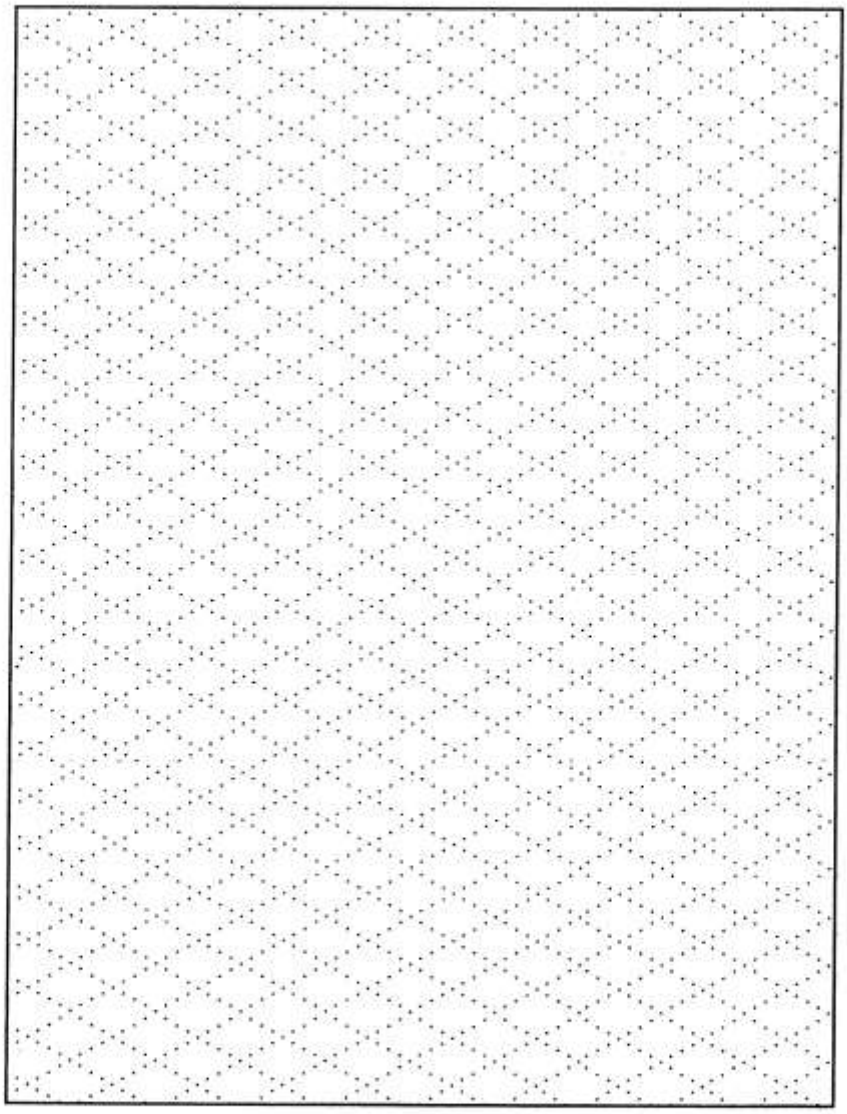
QUESTION 9 (20)

Look at the isometric drawing below and redraw it in Isometric Projection on the isometric grid paper provided. Include all hidden detail.

Pay attention to the following:

- 1 mark will be awarded for every correct line.
- ½ a mark will be deducted for every neatness issue.
- ½ the marks will be deducted if the drawing is drawn the wrong way.
- One block on this drawing is two blocks on the isometric grid (Scale2:1).
- Position your answer sheet in landscape format to complete this question.
- Print the title and scale in capital letters using guidelines of 5mm in height.





Isometric grid

Section C total = 66 marks