HILLCREST HIGH SCHOOL

TECHNOLOGY

JUNE EXAMINATION 2022

GRADE 9

TOTAL: 100 MARKS **TIME: 1 HOUR**

EXAMINER: MRS S STOLS **MODERATOR: MRS T TONKIN**

NAME: _____ GRADE 9 _____

SUBJECT EDUCATOR: BEGA/STOLS/TONKIN

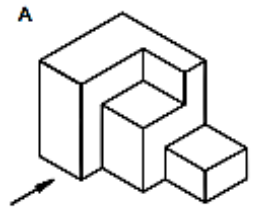
INSTRUCTIONS

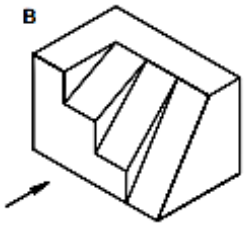
1. **The question paper consists of 3 questions and 6 pages including the cover page.**
2. **Answer all questions in the spaces provided.**
3. **Write your name and grade clearly and neatly in the space provided.**
4. **Highlight your Technology teacher's name above.**
5. **Technological based answers must be written.**
6. **All drawings/sketches must be completed using a sharp pencil and drawing instruments unless otherwise instructed.**
7. **Marks will be deducted for untidy work especially drawings/sketches.**

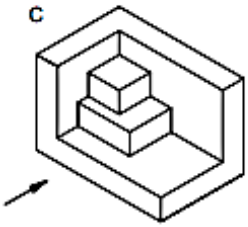
Q1 20	Q2 30	Q3 50	TOTAL 100	PERCENTAGE %

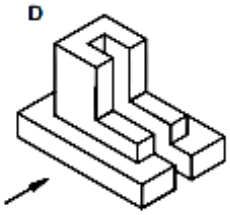
Question 1 Drawing **[20]**

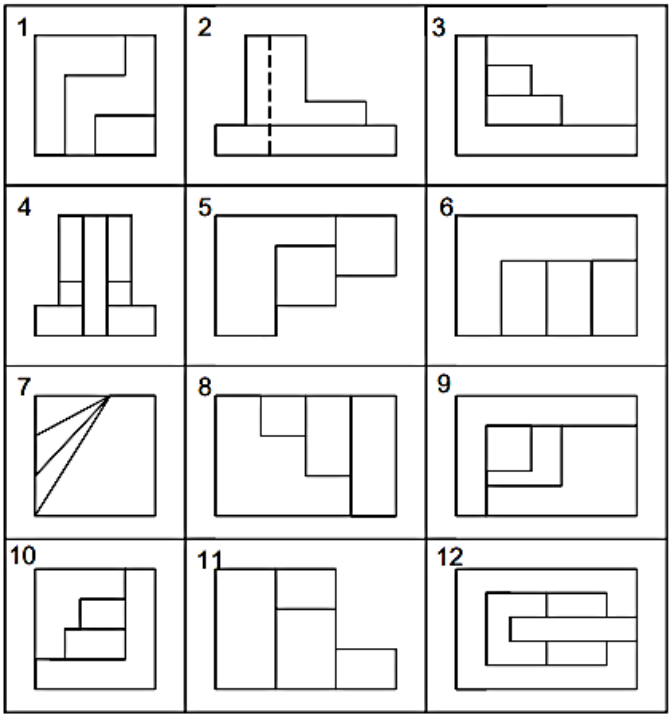
1.1) Complete the table below by selecting the correct number that matches the FRONT, TOP and RIGHT views of the isometric views given. The arrow indicates the front view. (12)





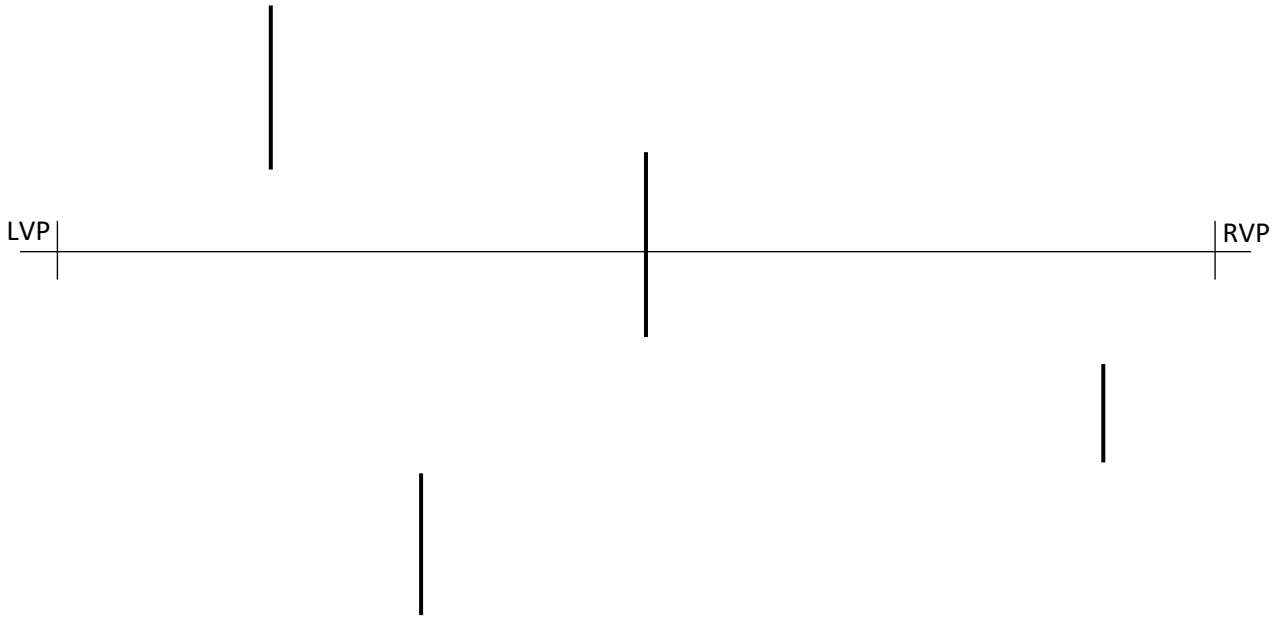






Drawing	FRONT	TOP	RIGHT
A	11	5	1
B	8	6	7
C	3	9	10
D	2	12	4

1.2) Draw Perspective boxes. With a pencil, eraser and ruler draw perspective boxes. Each line represents it's own box. 2 marks each. (8)



Question 2 Structures [30]

2.1) Match Column A to Column B (10)

	Column A	Column B		Your answer	
2.1.1	Corrosion	A	Measured by comparing mass to its volume	2.1.1	
2.1.2	Flexibility	B	Where the output pressure/ movement occurs.	2.1.2	
2.1.3	Stiffness	C	The piston that starts the work in a hydraulic system	2.1.3	
2.1.4	Density	D	Uses a reservoir and handle, making it easier to lift a load	2.1.4	
2.1.5	Master cylinder	E	This means that it can be compressed to take up less space.	2.1.5	
2.1.6	Hydraulic jack	F	Will stop a structure from bending and the forces that act on it	2.1.6	
2.1.7	One-way valve	G	That means it cannot be compressed to take up less space.	2.1.7	
2.1.8	Compressible	H	Another word for rust	2.1.8	
2.1.9	Incompressible	I	Needs to resist forces by bending and not breaking	2.1.9	
2.1.10	Slave cylinder	J	Prevents liquid from flowing back into the input cylinder	2.1.10	

2.2) Scenario: (17)

> People from rural areas sometimes risk drowning each time they cross the river to the city. In some areas the rivers have dangerous crocodiles which also attack the people crossing. There are times when the villagers cross in groups and help each other.

2.2.1) Identify the problem in the scenario above? (2)

_____

_____

2.2.2) Write a design brief to solve the identified problem? (2)

_____

_____

2.2.3) Which TWO external forces are expected to act in your proposed solution? (2)

_____

_____

2.2.4) Choose TWO types of construction materials that you would use in solving the problem. Give an example of each material that you chose. (4)

_____

_____

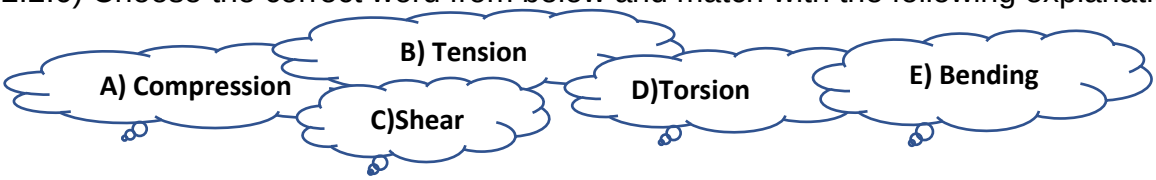
_____

2.2.5) In improving the safety of your solution, what additional features would you consider adding? (2)

_____

_____

2.2.6) Choose the correct word from below and match with the following explanations. (5)



	Explanations	Answer (Letter only)
2.2.6.1	A combination of tension and compression	
2.2.6.2	Stretch the material by pulling its ends apart.	
2.2.6.3	Twist a material by turning the ends in opposite directions.	
2.2.6.4	Crush a material by squeezing it together.	
2.2.6.5	Tear material by pushing it in opposite directions.	

2.3 Multiple choice questions **(3)**

2.3.1) Choose the correct answer from the ones given below. Write the letter of the correct answer next to the question number. **Example: 2.3.1.1) B**

2.3.1.1) Under which category can corrosion of metals be grouped? (1)
A physical
B mechanical
C electrical
D chemical

2.3.1.2) Which statement best describe a pneumatic system? (1)
A It is a sealed or closed system that uses water.
B It is a closed system that uses air.
C It is an open system that uses compressed air.
D It is an open system that uses oil.

2.3.1.3) The property of a material that enables it to resist being scratches is... (1)
A Ductility
B Flexibility
C Stiffness
D Hardness

Question 3 Mechanical Systems **[50]**

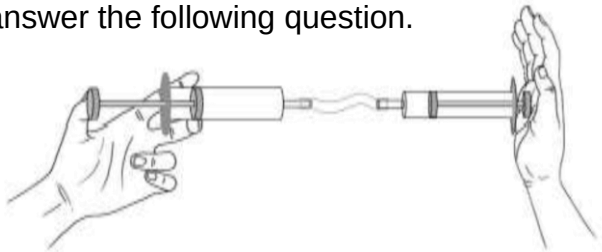
3.1) What is the main difference between hydraulics and pneumatics? (2)

_____

_____

_____

3.2) Use the diagram below to answer the following question.



3.2.1) When the plunger on the left is pressed in, the plunger on the right presses against the hand. Will the pressure on the hand be the same with a pneumatic system as with a hydraulic system? Explain your answer? (3)

_____
_____
_____

3.2.2) Why is hydraulic oil used in a hydraulic system? (2)

_____
_____

3.3) Explain Pascal's Principle. (3)

_____
_____
_____

3.4) Match the description of the gear in Column B to the correct gear in Column A. Write the letter of the description. (5)

COLUMN A	**COLUMN B**	**Your answer**
3.4.1) Spur gear	A It has a straight teethed bar that moves in a straight line, when moved by a pinion gear.	
3.4.2) Bevel gear	B It is found between two gears and usually smaller than the two and rotates in opposite directions to the two gears.	
3.4.3) Idler gear	C It has one tooth which travels around the gear in the form of a screw.	
3.4.4) Worm gear	D It is shaped like a wheel. The teeth are cut into the rim and change rotary movement from gear to gear.	
3.4.5) Rack and pinion gear	E They are in the shape of a cone. They van transfer movement through 90^{o}	

3.5) For a mechanical system to work, there must be an INPUT that undergoes a PROCESS to produce an OUTPUT.

3.5.1) Draw a system diagram that describes the way a hydraulic jack works. (5)

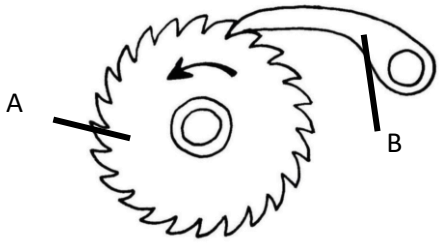
HYDRAULIC JACK

INPUT	**PROCESS**	**OUTPUT**

3.6.1) Label the diagram on your right. (2)

A: _____

B: _____



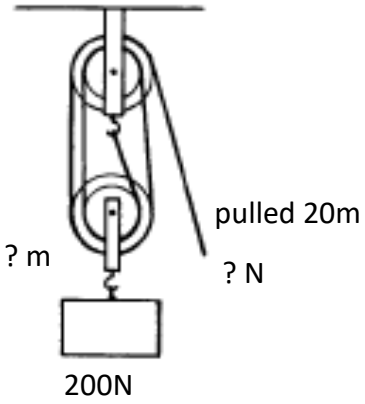
3.6.2) What is the function of this mechanism? (2)

_____
_____

3.7) Pulley calculations

3.7.1) What is the number of falls? (1)

3.7.2) What is the effort and load? (3)



3.7.3) What is the mechanical advantage? (3)

3.7.4) How far was the effort rope pulled?
How far will the load move up? (2)

3.8.1) What is a cleat? (2)

_____

_____

3.8.2) Name the three different cleats and give one example as to where you would use that cleat. (6)

_____

_____

_____

3.9) Draw a simple flow diagram explaining how a disc brake system works in a car. (10)