# Hillcrest High School

## Grade 9

# TECHNOLOGY

## JUNE 2023

**MARKS:** 100

**TIME:** 1 Hour

**EXAMINER:** Mrs A. Stols

**MODERATOR:** Mrs T. Tonkin

**NAME: _____ GRADE 9 _____**

SUBJECT EDUCATOR:
D'ALMAINE/ STOLS/ TONKIN

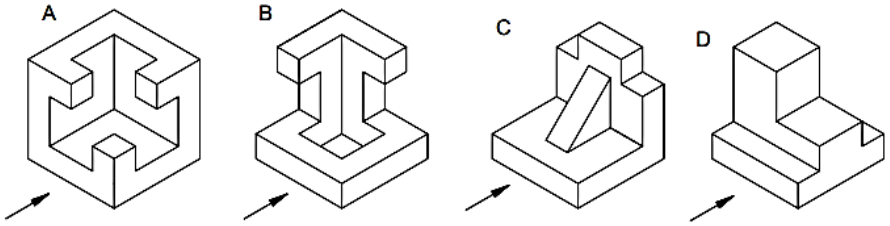
| Q1<br>20 | Q2<br>20 | Q3<br>30 | Q4<br>30 | TOTAL<br>100 |
|---|---|---|---|---|
| | | | | |

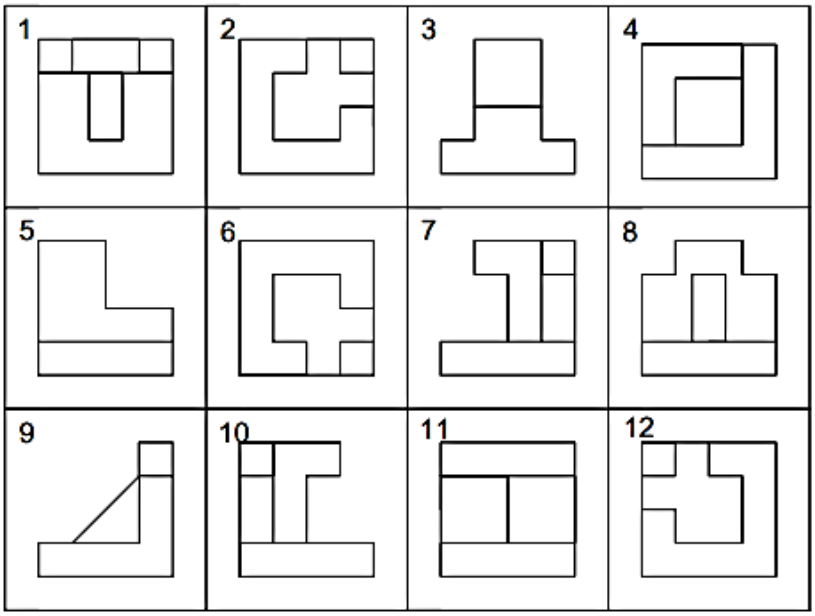
**INSTRUCTIONS**

1. The question paper consists of 4 questions and 8 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**.**

**QUESTION 1** **[20]**

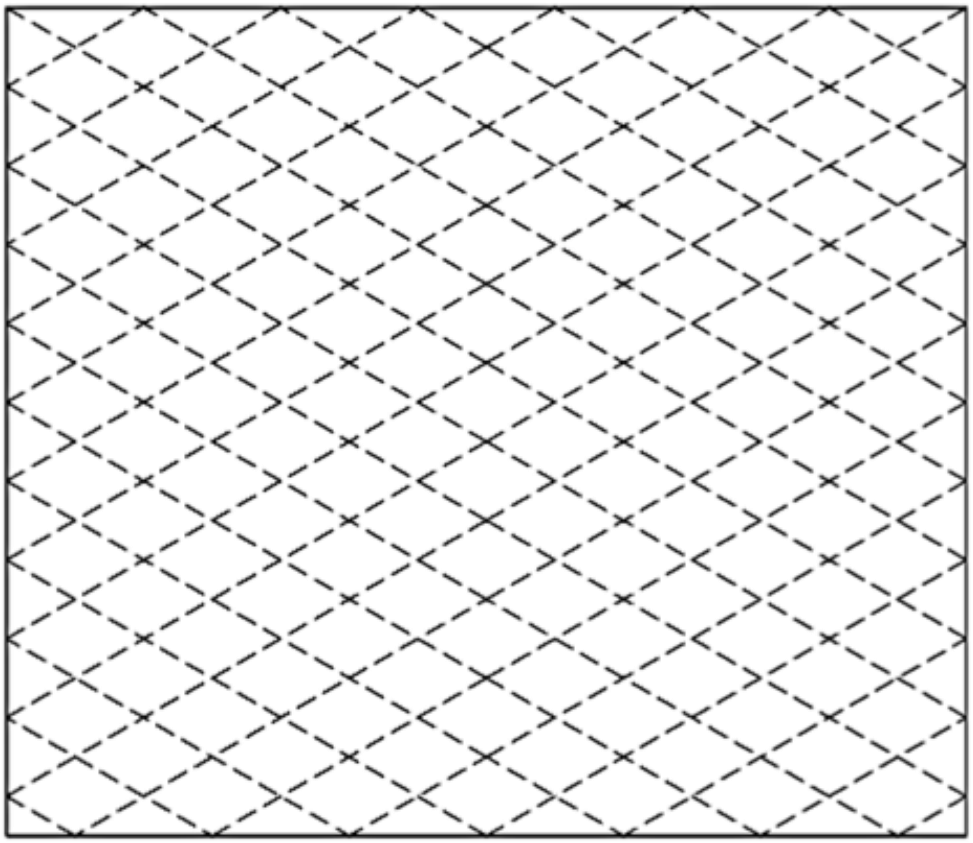
1.1. Complete the table below by selecting the correct number that matches the FRONT, TOP and RIGHT views of the isometric views given. The arrow indicates the front view. (12)

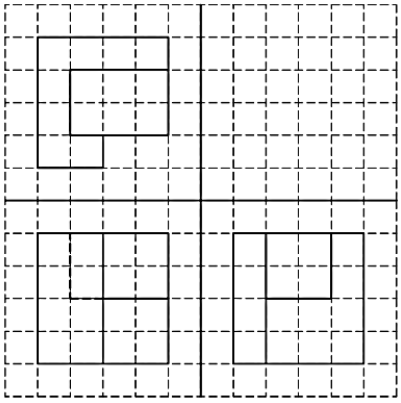



| Drawing | Front | Top | Right |
|---|---|---|---|
| A | | | |
| B | | | |
| C | | | |
| D | | | |

1.2. The given figure shows the front, top and right view of a model in third angle orthographic projection. Draw an isometric view of the model. Colour in each view in a different colour. Darken the edges with pen or make the edges thicker. (8)





**QUESTION 2** **[20]**

2.1. Look at the diagrams below and answer the questions that follow. In the drawing, the weight of the truck is 24 000N and the weight of the bridge 40 000N. (6)

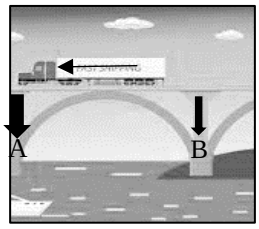


Diagram 1

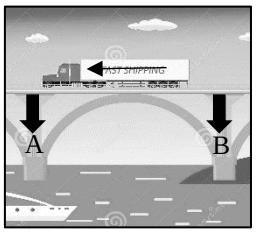


Diagram 2

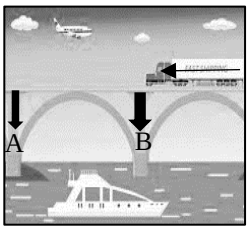


Diagram 3

2.1.1. What is the total load?

_____

2.1.2. What is the total load on each support, in the first diagram?

A = _____ B = _____

2.1.3. What is the total load on each support, in the second diagram?

A = _____ B = _____

2.1.4. What is the total load on each support, in the third diagram?

A = _____ B = _____

2.1.5. In which picture is the bridge supporting an even load?

_____

2.1.6. In which picture is the bridge supporting a moving load?

_____

2.2. Indicate if the following are true or false. Write your answer in the space provided. (7)

| Term | Definition | Answers |
|---|---|---|
| Flexibility | Property of a material to bend and return to its original shape. | |
| Even Load | A load that is balanced and exerts an equal force over the whole structure that supports it. | |
| Dynamic force | The force acts on an object when it is not moving. | |
| Toughness | Ability of a material to stand up to sudden blows or shocks without being damaged. | |
| Torsion | Occurs when equal and opposite forces are applied to the ends of an object to increase the length of the object. | |
| Static force | The force acting on an object when it is moving | |
| Uneven Load | Mainly exerts a force on one part of the structure that supports it. | |

2.3. List the four types of construction materials (4)

_____ _____

_____ _____

2.4. Define a non-contact force and give two examples. (3)

_____

_____

_____

**QUESTION 3** **[30]**

3.1. Using your knowledge on Mechanical Systems, answer the crossword puzzle below:

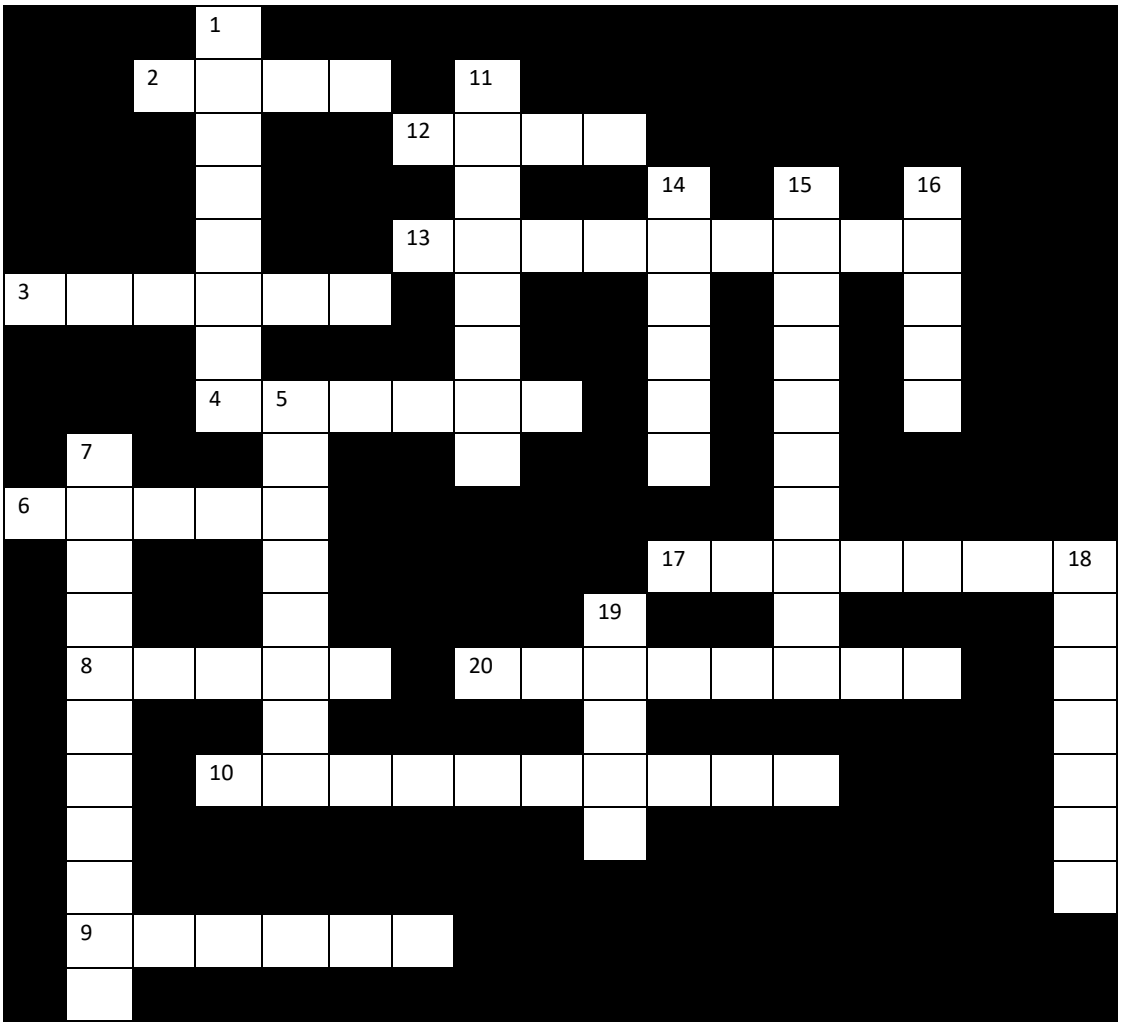
ACROSS

2. A hydraulic system used to lift cars.
3. A cleat is a simple _____ device used to clamp and hold a rope.
4. When a one-way valve is put under pressure the _____ will compress.
6. _____ is measured in Newton's.
8. The _____ and output forces are directly proportional to the area of the cylinders.
9. A _____ valve prevents the liquid from flowing back into the input cylinder.
10. MA is the abbreviation for _____ advantage.
12. The output piston is used to lift a _.
13. A _____ helps to lift a load higher without moving the input piston a long distance.
17. In the cylinders there are tightly fitted discs called _____.
20. Pneumatic and hydraulic systems all have pistons,_____ and tubes.

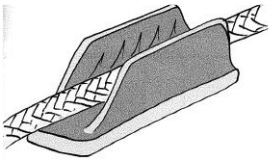
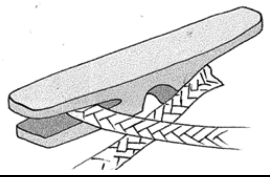
DOWN

1. When the _____ pull together the brake blocked apply pressure against the rim of the wheel.
5. A disadvantage of hydraulic systems is that the high _____ is dangerous to work with.
7. A compound pulley, is a _____ of single fixed pulley/s and single moveable pulley/s.
11. A ratchet and pawl mechanism only allows _____ in one direction.
14. A pulley is a wheel with a ___ in which the rope or cable moves.
15. Pneumatic systems are filled with _____air.
16. A _____ system is used to slow a car down.
18. The ratchet is a wheel with _____ teeth, while the pawl is a tooth-shaped lever.
19. Hydraulic systems are filled with _____.

(20)



3.2. Complete the spaces below: (6)

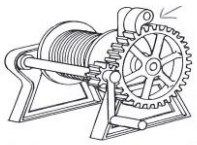
| Type of cleat | Picture | Example of where it is used |
|---|---|---|
| |  | |
| |  | |
| |  | |

3.3. Explain how a cleat works (2)

3.4. Which is the simplest cleat? Explain how it works. (2)

**QUESTION 4** **[30]**

4.1. Look at the mechanism alongside and answer the following questions: (3)



4.1.1. Identify the mechanism

4.1.2. What is the purpose of this mechanism?

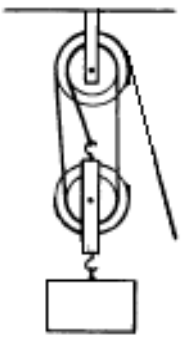
4.1.3. Where could a mechanism like this be used?

4.2.

**Elevator issues at the library**

The Worcester Public Library has purchased many new books to be displayed on the second floor. There are 600kgs of books to move. The elevator only has the capacity to lift with 50kg.

See a sketch of the pulley system used in the elevator alongside.



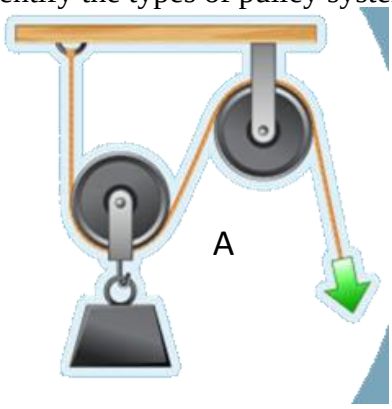
4.2.1. What is the number of falls? (1)

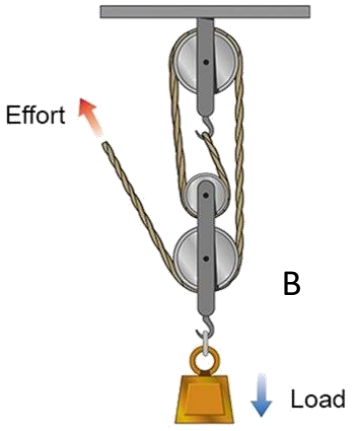
4.2.2. What load can the elevator lift at one time? (Show your calculations) (2)

4.2.3. What is the Mechanical advantage of the elevator? (Show your calculations) (2)

4.2.4. How many trips does the elevator have to do to get all the books to the second Floor? (Show your calculations) (2)

4.3. Identify the types of pulley systems: (2)




A –

B –

4.4. Look at the different examples below and indicate if the example is using a hydraulic or a pneumatic system? (3)

| Example | Your answer |
|---|---|
| Tipper truck | |
| Jack hammer | |
| Paint sprayer | |
| Forklift truck | |
| Nail gun | |
| TLB | |

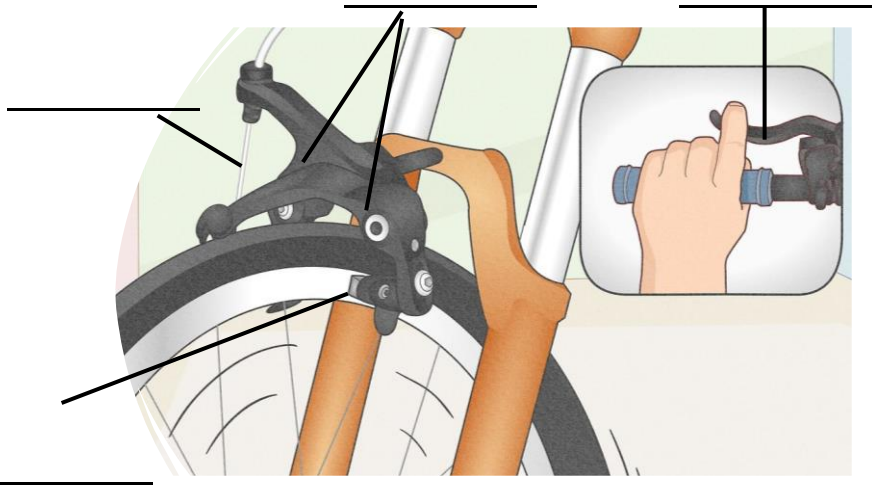
4.5. Define Pascal's Principle: (2)

4.6. A hydraulic lift system has an input piston of $5m^2$ and an output piston which has an area of $20m^2$. The load being lifted is 1000N

4.6.1. Calculate the pressure of the system? (2)

4.6.2. What Input force is needed to lift the load? (2)

4.7. Label the parts of a bicycle brake system (4)



4.8. Answer the following multiple-choice questions. Write all your answers in the space provided at the bottom. (5)

4.8.1. What does the following short-cut key do: Win + I?

A. Open the Windows Internet Explorer charm
B. Switch Input language and keyboard layout
C. Display properties for the selected item
D. Open the Windows Settings charm

4.8.2. What does the following short-cut key do in a Dialog box: CTRL + SHIFT + TAB?

A. Move forward through the tabs
B. Move backward through the tabs
C. Move through options
D. Move back through options

4.8.3. What does the following general short-cut key do: F6?

A. Cycle through screen elements in a windows or on the desktop
B. Search for file or folder
C. Rename the selected item
D. Refresh the active window

4.8.4. What does the following $ symbol refer to in: a formula in Excel spreadsheets?

A. Absolute cell reference, where the reference is not changed using auto-fill
B. The percentage of a value used in a calculation
C. The reference of a worksheet in a workbook (Excel document)
D. The American Dollar (as a currency)

4.8.5. Which short-cut key is used to: Temporary peek at the desktop?

A. Win + E
B. Win + B
C. Win + F
D. Win + ,

| | Answers |
|---|---|
| 4.8.1. | |
| 4.8.2. | |
| 4.8.3. | |
| 4.8.4. | |
| 4.8.5. | |