

Name : _____

Grade 8 _____

Instructions

- Answer all the questions in the spaces provided.
- Write neatly and legibly.
- All sketches or drawings must be done in pencil.
- Read the questions and instructions for each question carefully.

Section A

1.1. This type of bridge is only supported at the one end.

- A. Arch bridge
- B. Suspension bridge
- C. Beam bridge
- D. Cantilever bridge

_____ (2)

1.2. A wheel with teeth is known as a ...

- A. Cam
- B. Lever
- C. Gear
- D. Pulley

_____ (2)

1.3. A brick wall is classified as a ... structure.

- A. Natural
- B. Man-made
- C. Flexible
- D. Frame

_____ (2)

1.4. ... are used to guide a designer to complete a drawing.

- A. Centre lines
- B. Construction lines
- C. Outlines
- D. Dashed lines

_____ (2)

1.5. The main purpose of dimensioning in graphic communication is to make sure that the drawing ...

- A. Is neat
- B. Is accurate
- C. Informs the reader of its size
- D. Is complete

_____ (2)

1.6. A stable structure has ...

- A. Wider base than the top of the structure and a low center of gravity.

- B. A narrow base than the top of the structure and a low center of gravity
- C. A wider base than the top of the structure and a high center of gravity
- D. A narrow base than the top of the structure and a high center of gravity. _____ (2)

1.7. A compass, set square, and tee-square are all ...

- A. Measuring tools
- B. Drilling tools
- C. Drawing tools
- D. Cutting tools _____ (2)

1.8. A gear train

- A. Is a gear that has a minimum of 15 teeth
- B. Consists of a small and a larger gear
- C. Is when two or more gears work together
- D. Always includes an idler gear _____ (2)

1.9. Mechanical advantage ...

- A. Equals force times distance
- B. Is the work done by a machine
- C. Is measured in Newtons
- D. Makes work easier _____ (2)

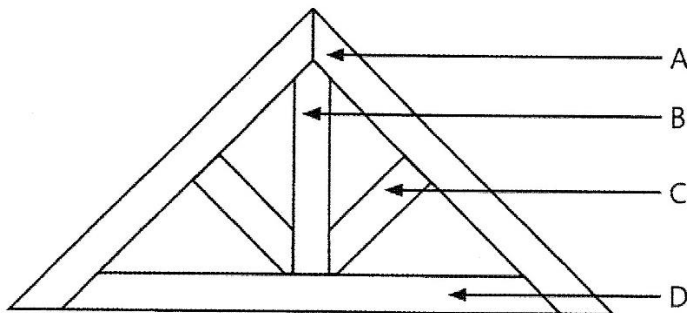
1.10. A guy rope is used...

- A. On a buttress
- B. On a lintel
- C. On a permanent structure
- D. On a temporary structure _____ (2) **(20)**

Section B

2.1. Study the roof truss shown below. Choose the correct labels from the list below. Write down the correct label next to each letter. (4)

Tie beam, king post, rafter, and strut.



2.2. Match the correct explanation in column 2 with the term in column 1. Write the letter only for the correct answer.

| Column 1 | Column 2 | Match |
|--------------------|---|-------|
| Fulcrum | A The desired input that starts the movement in a lever | |
| Load | B The load is placed between the fulcrum and the effort | |
| Third class lever | C The support around which a lever moves | |
| Second class lever | D The desired output of a lever that is moved | |
| Effort | E The fulcrum between the load and the effort | |
| | F The effort is between the fulcrum and the load | |

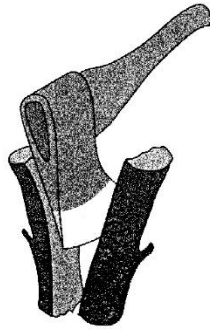
(5)

3. Complete the table. Write the letter and the answer only.

| Type of force | Definition | Additional information such as a structural member that resists this force well or what causes this force |
|---------------|------------------------------|---|
| 1 Tension | Stretching or pulling force | (A) |
| 2 Torsion | (B) | (C) |
| 3 Shear | (D) | If the weight on a coat hook is too heavy, it will break because of this force |
| 4 Compression | A squashing or pushing force | (E) |

(10)

4. Look at the diagram below and use it to answer the questions.



4.1. Redraw the diagram and label the load, effort and fulcrum.

(3)

4.2. Describe the difference between a first class lever and a second class lever.

(4)

4. Use the words in the text box to complete the sentences.

Greater, less, first-class lever, second-class lever, load, mechanical advantage, force, effort, fulcrum

4.3. A crowbar is an example of a _____

4.4. The distance between a load and fulcrum is _____ than the distance between the _____ and the fulcrum.

4.5. This arrangement gives the crowbar a greater _____ (5)

5.1. Explain the meaning of mechanical advantage in a gear system.

(2)

5.2. Calculate the mechanical advantage if an effort of 60N is required to move a 300N load.

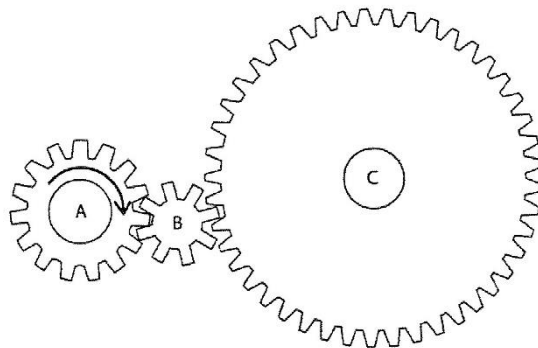
$$\text{Mechanical advantage} = \frac{\text{Load}}{\text{Effort}}$$

(3)

5.3. What is the effort required to lift a 150N load if MA is 6.

(3)

6. Look at the diagram below and answer the questions that follow.



6.1. Explain what happens to the direction of the gears in a gear train as a result of the three gears being meshed together.

(2)

6.2. Identify the names of each of these gears A, B, and C in the gear system.

(3)

6.3. Explain why gear B must be made of a much stronger material than gear A and Gear B.

(3)

7. Gear ratio = $\frac{\text{number of teeth on the driven gear}}{\text{number of teeth on the driver gear}}$

7.1. Calculate the gear ratio if the driver gear has 24 teeth and the driven gear has 8 teeth.

(3)

7.2. What is the velocity ratio if the driver gear has 12 teeth and the driven gear has 36 teeth.

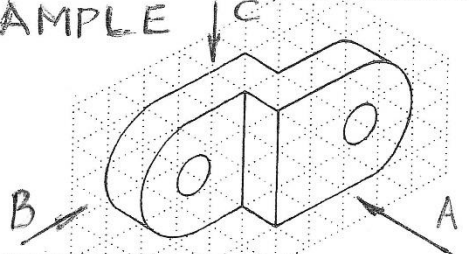
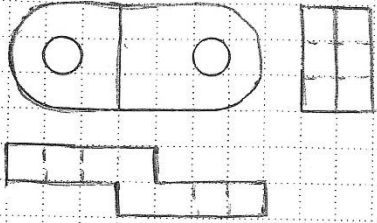
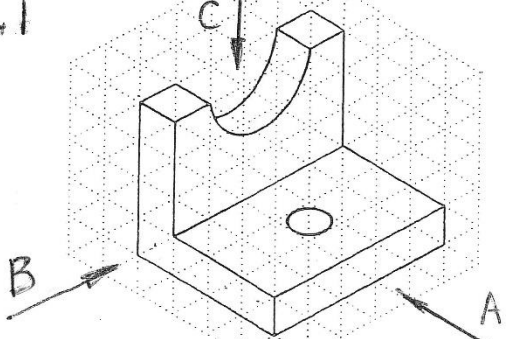
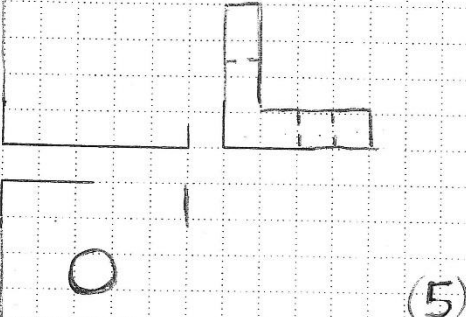
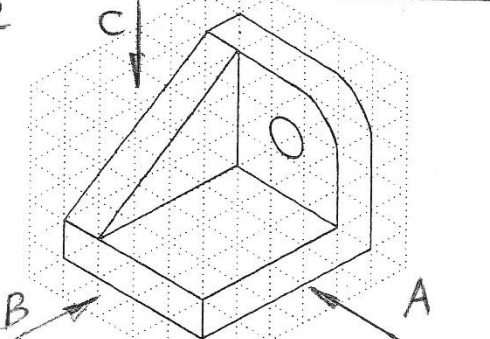
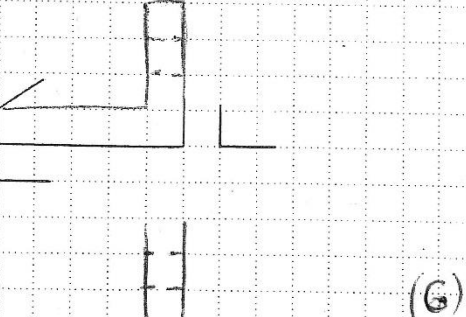
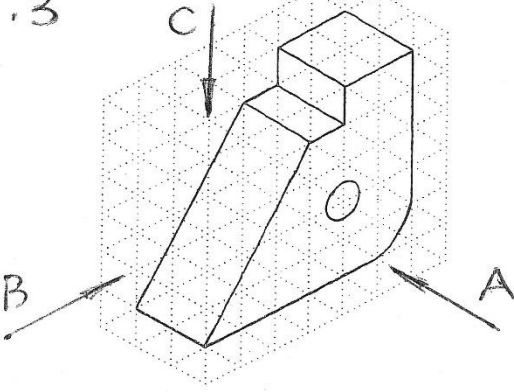
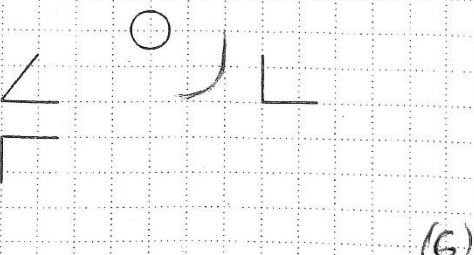
(3)

Section C

Question 8 : Graphic Communication

Peruse and study the given example and complete the (2-D) orthographic views neatly with a sharp pencil.

NOTE : **Arrow A** for the front view, **Arrow B** for the left view and **Arrow C** for the top view. (17)

| | |
|---|---|
| <p>EXAMPLE</p>  |  |
| <p>8.1</p>  |  <p>(5)</p> |
| <p>8.2</p>  |  <p>(6)</p> |
| <p>8.3</p>  |  <p>(6)</p> |