HILLCREST HIGH SCHOOL

GRADE: 8 MAY 2013

TIME: 2 Hours MARKS: 180

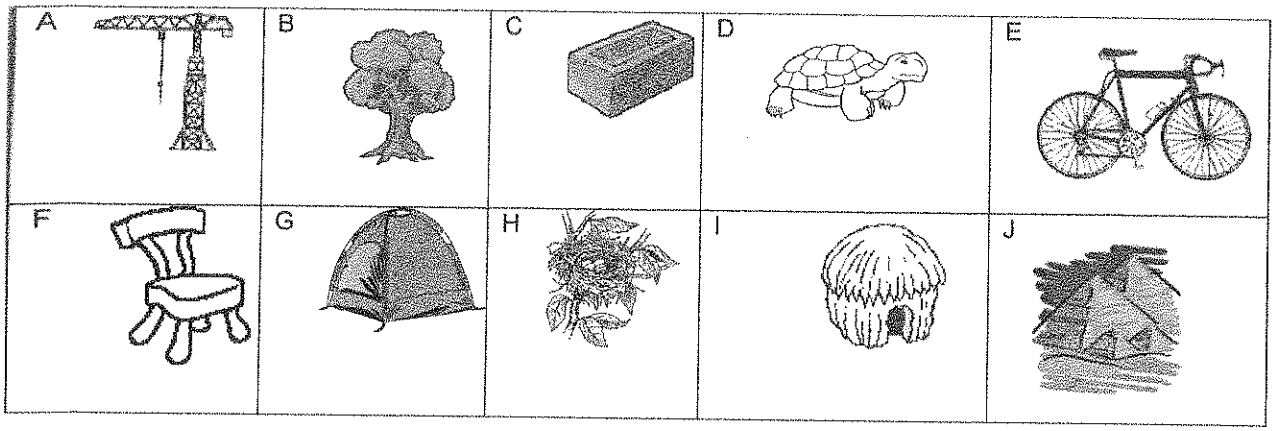
TECHNOLOGY

Instructions:

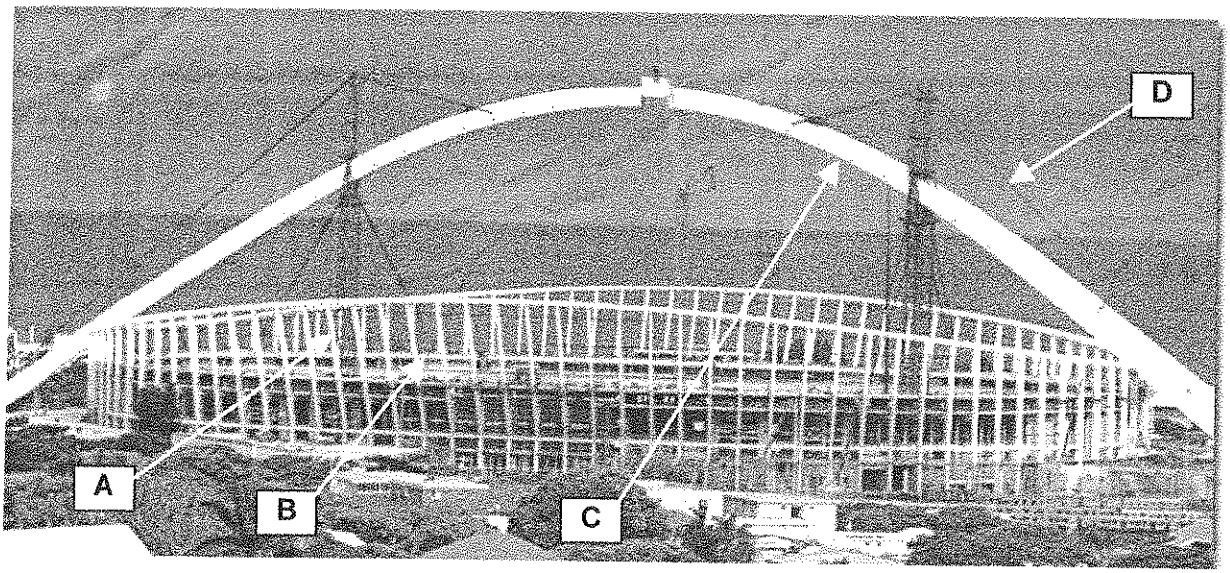
1. Answer all questions.
2. Write your name on the last page of this question paper then tear it off and hand it in with your answer paper.

SECTION A: STRUCTURES

1. Examine the pictures below and then state whether each one is
   - a natural structure or a man-made structure and
   - a frame, shell, mass or combination structure. (20)



2. Look carefully at the picture below, which shows the final piece of the arch being fitted onto the Moses Mabhida Stadium. Answer the questions that follow.



2.1 Name the structural members labelled:

2.1.1 A

2.1.2 B

2.1.3 D (3)

2.2 What is the main function (or job) of each of the following members of the structure?

2.2.1 A

2.2.2 B (4)

2.3 Which forces are each of the following members under?

2.3.1 A

2.3.2 D (4)

2.4 The arch consists of a 5 metre by 5 metre steel hollow box and weighs 2 600 tonnes. It is 350 metres long and 105 metres high and it holds up the roof of the stadium. A funicular carries visitors from the north side of the stadium to a viewing platform at the top of the arch, offering a view over city and ocean. The south side features a 550-step adventure walk. In 2010 the world's largest swing opened at the stadium. The swing allows people to jump off the 4th ladder rung and fall toward the pitch before being swung out in a 220-metre arc over the pitch.

When would the arch be under:

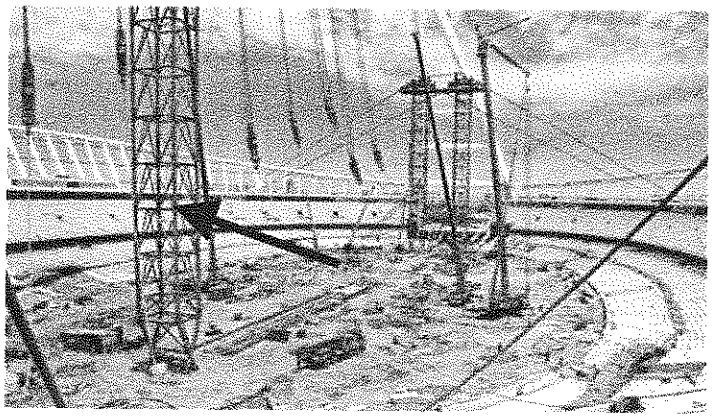
2.4.1 a static force?

2.4.2 a dynamic force? (4)

2.4.3 Give an example of an external force that could be exerted on the arch. (2)

2.4.4 What force would be exerted on the rungs of the ladder as people walk along them? (2)

2.5 The picture on the right was taken inside the new Moses Mabhida Stadium while it was being built. The scaffolding (indicated by the arrow) is used to support the arch during construction.



2.5.1 What type of structure is a scaffold? (2)

2.5.2 What method is being used to give these structures strength and rigidity? (2)

2.5.3 Name the two members that are combined to form this shape. (2)

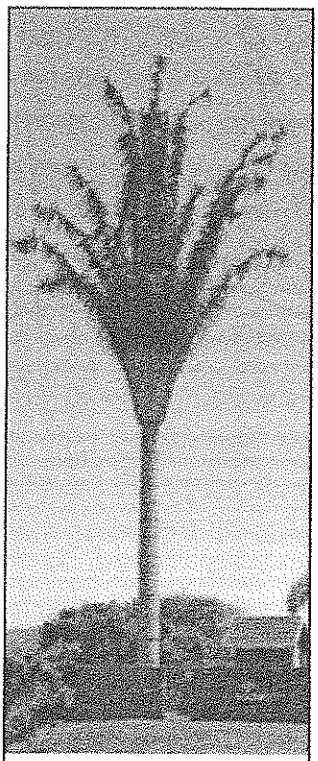
3. Read the following extract from Vodacom SA's website and answer the questions that follow.

Cell phones and cell phone networks cause an impact on the environment at every stage of their lifecycle – when they are made, when they are used and when they are disposed of. Vodacom focuses on reducing these negative effects at the stages where we have direct control. One of the aspects where we have the ability to reduce our environmental impact is the placement of base stations.

Vodacom SA has a policy in place to help us to decide where to place base stations. We use demographic studies, research results and customer requests to determine the most appropriate location for new base stations. Independent environmental impact assessments are conducted for all new site proposals. These help to protect plant and animal species against habitat loss and extinction, and prevent erosion and the destruction of wetlands, which are vital to the preservation of a country's water supply.

Vodacom SA has devised innovative ways to blend base stations in with the surrounding environment, with 309 of these modified base stations currently in operation. Examples include locating antennae on existing structures, painting them to blend in to the background, or disguising masts as windmills, trees or billboard towers.

(Adapted from Vodacom SA http://www.vodacom.com/sus_contain.php 31 October 2009)



A Vodacom cell phone mast in Pinetown, Durban

The building of large structures such as cell phone towers has both a positive and a negative impact on the community and the environment.

3.1 List <u>two</u> possible negative effects on the environment of the construction of cell phone base station. (4)

3.2 Name <u>one</u> positive effect on a community of the construction of a cell phone base station. (2)

3.3 List <u>two</u> ways in which Vodacom tries to reduce the impact of its base stations on the environment. (4)

[55]

SECTION B: PACKAGING

1.1 List three examples of natural packaging. (3)

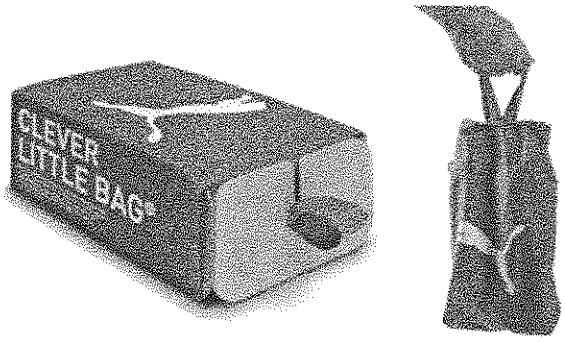
1.2 List three examples of man-made packaging. (3)

1.3 Name the three main functions of packaging. (6)

2. PUMA is a sports gear manufacturing company that has made a plan to reduce the negative impact the company has on the environment. Read the following article about PUMA's packaging carefully and then answer the questions that follow.

PUMA's new eco-friendly packaging

This is our new shoebox. It's smarter than our old shoebox because it takes 65% less paper to make and reduces water, energy and diesel consumption during manufacturing by over 60% a year. It also reduces our carbon emissions by 10 000 tons a year. The idea behind this project was to reduce the environmental footprint of each shoe's packaging, from its source to the shop floor.



Oh, and it's a re-usable bag. So instead of chucking out a cardboard shoebox that increases wastage and CO_2 emissions, you can now strut your stuff with this little red number around your arm. No more shoe clutter as shoes can be stacked and housed in this beautiful storage unit. Now that's CLEVER!

But that's not all. PUMA is also doing away with about 720 tons of polyethylene (plastic) bags, enough to cover 1 000 soccer pitches, by packing clothing in sustainable material.

PUMA T-shirts will be folded one more time to reduce the packaging size, save on CO_2 emissions and reduce transport costs.

Biodegradable bags will replace plastic and paper shopping bags in PUMA stores to save another 192 tons of plastic and 293 tons of paper annually. Just goes to show how simple, clever design ideas can help save our planet.

Adapted from the websites
www.chewthemagazine.com and www.puma.com

2.1 What was the main idea behind PUMA's packaging project? (2)

2.2 What is the slogan that is used to promote the new shoe packaging? (2)

2.3 How does the consumer benefit directly from the new shoe packaging? (2)

2.4 Name one more advantage to the consumer of using the new PUMA shoebox. (2)

2.5 How much less plastic will PUMA be using for packaging their clothing range? (2)

2.6 How are they managing to do this? (2)

2.7 How are PUMA able to reduce the packaging size of their T-shirt range? (2)

2.8 Name three specific benefits for the environment that have resulted from the development of these new packaging designs. (6)

2.9 PUMA has drastically reduced the amount of plastic used in its packaging.

2.9.1 Give three reasons why plastic is such a popular packaging material. (3)

2.9.2 What is the main disadvantage of plastic? (2)

2.10 How else is PUMA making a positive contribution to conserving the environment? (2)

2.11 List three ways that we as consumers can help to reduce the amount of packaging that goes into landfills. (6)

[45]

SECTION C: SYSTEMS AND CONTROL

1. Which two things do mechanisms control to help people to do work? (2)

2. Name two tools that have not changed at all since they were invented long ago. (2)

3. Match the words in column A with their correct definition in column B. Write only the question number and the correct letter.

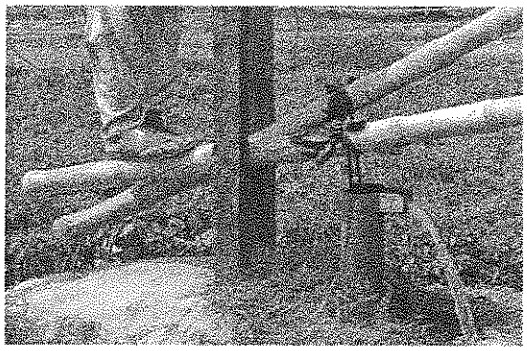
A	B
3.1 linear	a) moving round and round in a circular movement
3.2 reciprocating	b) a straight movement in one direction
3.3 oscillating	c) a straight movement backwards and forwards
	d) a swinging movement backwards and forwards

(3)

4. Look carefully at the article and picture below before answering the questions that follow.

Human-powered water pumps

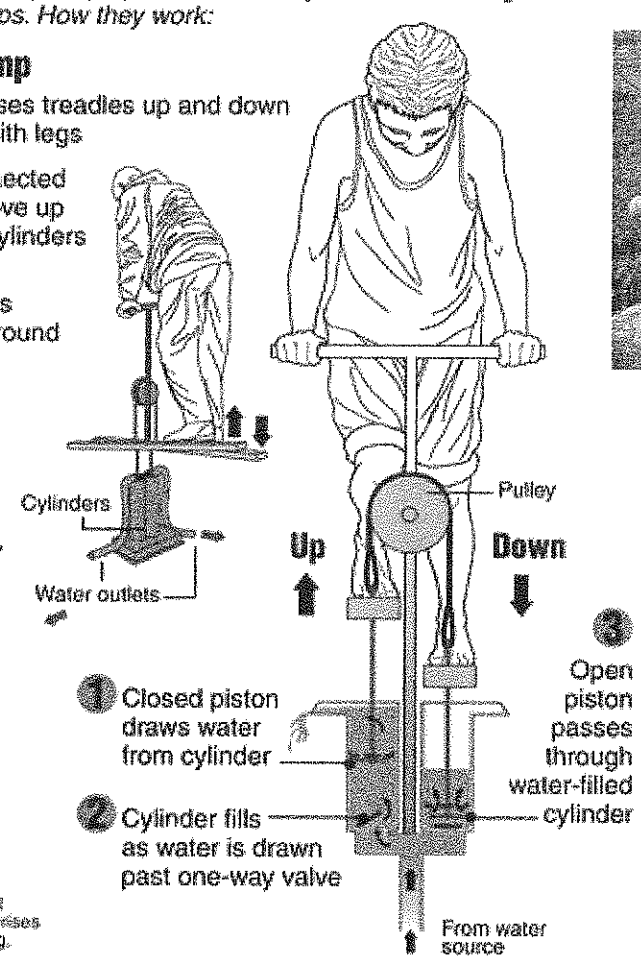
A non-profit group helps poor farmers buy income-boosting treadle irrigation pumps. How they work:



Treadle pump

- Farmer presses treadles up and down rhythmically with legs
- Pistons connected to treadles move up and down in cylinders
- Vacuum in cylinders sucks water out of ground
- Water flows into irrigation pipe or tank

Pump can move 9.5 gal. (36 l) of water per minute



Source: International Development Enterprises
Graphic: Lee Hultberg, Judy Treible

4.1.1 Which group of people had a need for an irrigation pump? (1)

4.1.2 What exactly do you think their need was? (2)

4.1.3 Why do you think this treadle pump is suited to this group of people? (2)

4.2 Look carefully at the diagrams of the treadle pump. Name two simple machines that are used in this mechanism. (2)

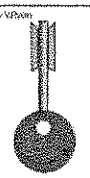
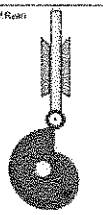
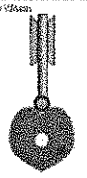
4.3 According to the systems approach, mechanical systems have an input, a process and an output. In the diagrams above, what is

4.3.1 the input?

4.3.2 the process?

4.3.3 the output? (6)

5. Write the name of the cam illustrated in each of the following diagrams. Then match each cam with the correct description of the action of the follower by giving the correct letter. Write only the question number, the name of the cam and the correct letter.

	Action of follower
5.1 	a This cam is used where the drop or 'fall' of the follower must be sudden.
5.2 	b The follower remains motionless for about half of the cycle of the cam and during the second half it rises and falls. This cam is used in car engines.
5.3 	c This cam gives the follower a continuous, uniform motion. It moves smoothly, at a constant speed. The bobbin winding mechanism on a sewing machine uses this cam.
5.4 	d This type of cam gives the follower a smooth, continuous movement.

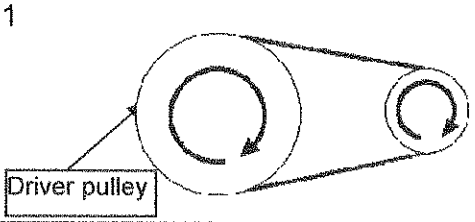
(8)

6. Look at the following examples of pulleys.

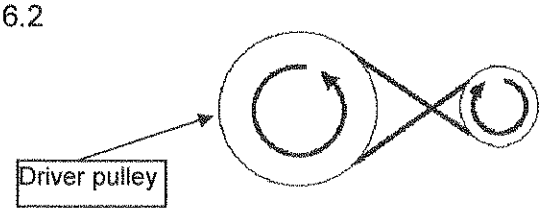
a) Give the direction of the driven pulley (clockwise or anti-clockwise).

b) Say whether it would be moving faster or slower than the driver pulley. (4)

6.1



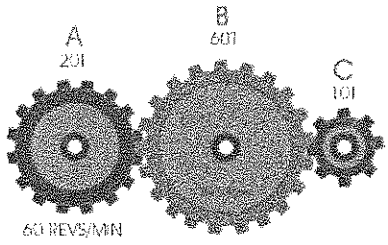
6.2



7. In the set of gears shown below, gear A is the driver gear, turning in a clockwise direction. In which direction is:

7.1 gear B turning?

7.2 gear C turning?



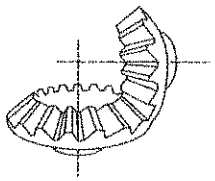
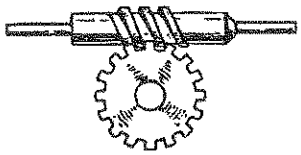
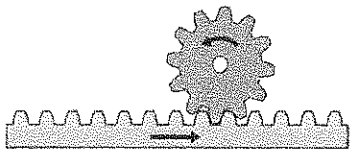
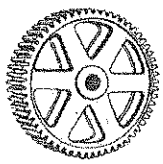
(2)

8. Complete the following passage by filling in the missing words. For your answer, write only the number and the missing word.

Gears rotate on a central axis and work with other gears to transmit a __8.1__ force. The input gear is known as the __8.2__ gear and the output gear is called the __8.3__ gear. When the teeth of two gears are meshed together, each gear rotates in the __8.4__ direction. In order to change the direction of the output gear, a/an __8.5__ gear is inserted between the input and output gears. This is set of gears is known as a/an __8.6__ .

(6)

9. For each of the pictures of gears in the table below, give the name of the gear and match with the correct description of their purpose. Write the question number, the name of the gear and the letter of the correct description.

9.1 	a) Used to change the speed and direction of movement.
9.2 	b) Change movements from horizontal to vertical and vice-versa.
9.3 	c) Used to transmit motion between shafts that are right angles to one another.
9.4 	d) Used to convert between rotary and linear motion.

(8)

9.5 Which of the gears pictured above is used in a rotary whisk? (Give either the name of the gear or the number.) (2)

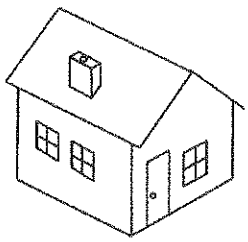
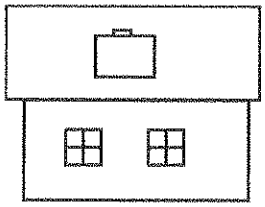
[50]

Name: _____ **Class:** _____

NB: Once you have completed this section, tear it off and hand it in with your answer paper.

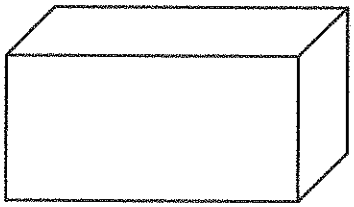
SECTION D: DRAWING

1. There are two main types of drawing. Look at the two examples given below, then write which type of drawing each example is in the space provided.

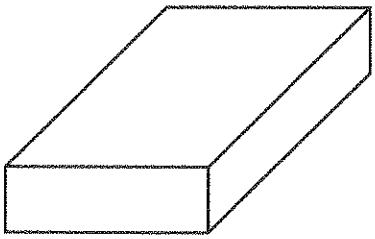
1.1	1.2
	

(2)

2. Rendering refers to the methods used to make simple drawings look more realistic. Render the two shapes below to show what materials they are made of.



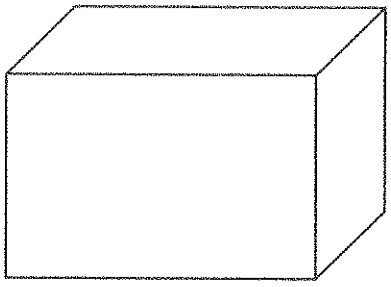
Metal

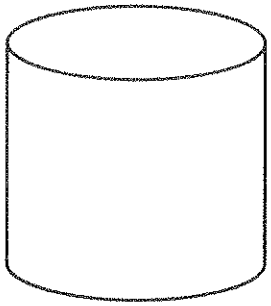


Wood

(8)

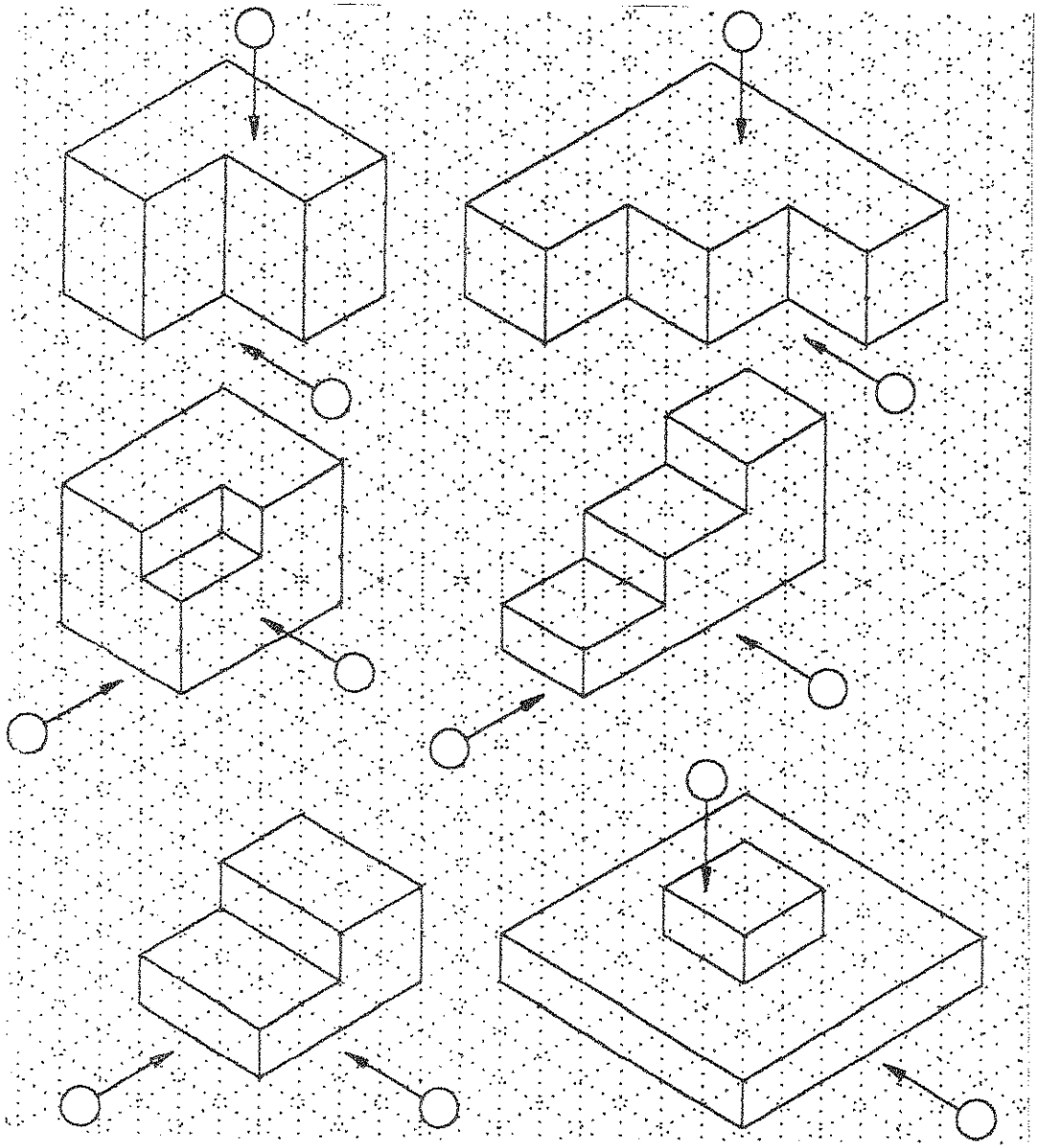
4 Dimensioning is an important part of the information given in a design. Using the correct conventions, dimension the drawings below. The scale is 1:1.

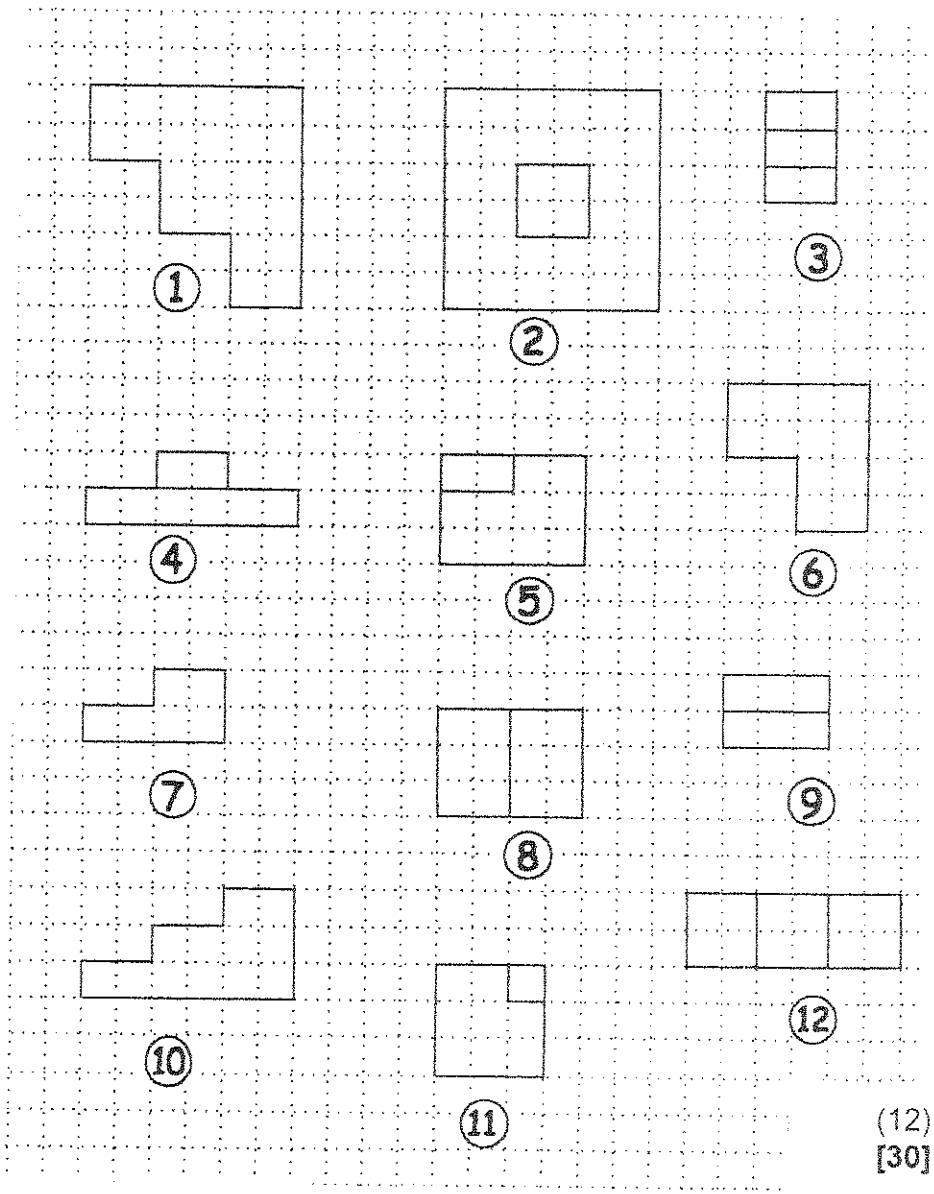




(8)

5. Match each of the numbered views indicated by an arrow on the drawings below. Write your answers clearly in the circles provided.





(12)
[30]