

**JUNIOR LYCEUM AND SECONDARY SCHOOL  
ANNUAL EXAMINATIONS 2009**

Directorate for Quality and Standards in Education  
Educational Assessment Unit

**FORM 5**

**DESIGN AND TECHNOLOGY**

**TIME: 2 hours**

**Name:** \_\_\_\_\_ **Class:** \_\_\_\_\_ **Set:** \_\_\_\_\_

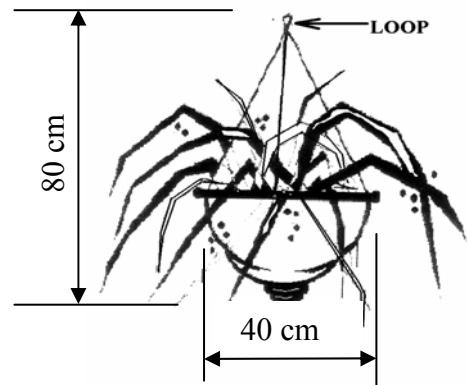
**ANSWER ALL QUESTIONS**

**Questions 1 - 4 relate to the Situation given below.**

**SITUATION**

The local council intends to embellish the village square by decorating the **SIX** existing lamp posts with hanging flower pots. The mayor has asked you to design brackets for the purpose.

The lamp posts have a diameter of 8cm.  
**EVERY** lamp post would have **TWO** hanging pots of size and shape shown in figure 1.



**Figure 1**

1. Below are three methods of production. Underline the most suitable method of production for making the brackets you intend to design.

Mass production

Batch production

One-off production

**1 mark**

2. Give 4 design requirements (specifications) that you consider as essential for the brackets.

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**4 marks**

3. Consider your specifications (in question 2); sketch one design idea of a bracket for hanging the flower pots **in pairs** to the lamp posts. You are free to propose any arrangements.

Any type or combination of materials can be used for manufacturing the brackets.

Label your sketch/es giving an indication of sizes, material, finish and any other important information for clarifying your idea.

**9 marks**

6 marks

4. Use notes and sketches to show how you intend to secure the pot's hanging loop to the brackets to assure safety on windy days.

5. Sketch the following type of mechanisms and give one application of each.

| Mechanism                | Sketch | Application (Where used) |
|--------------------------|--------|--------------------------|
| A rack and pinion system |        |                          |
| A linkage system         |        |                          |

4 marks

6. Name and sketch **one** type of tool for each of the following tasks:

| Task  | Name of measuring tool | Sketch |
|---|------------------------|--------|
| To measure the diameter of a dowel                                |                        |        |
| To make the countersink for a wood screw                          |                        |        |
| To make four MDF wheels of 50mm diameter and 10mm thick for a toy |                        |        |

6 marks

7. Give two properties of acrylic plastic sheets.

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2 marks

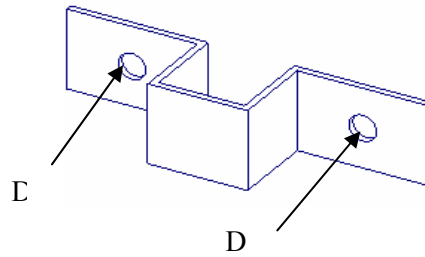
8. State whether the following statements are true or false.

|  | True or False |
|--|---------------|
| Melamine formaldehyde is a thermo-setting plastic.     |               |
| Expanded polystyrene is used for making shopping bags. |               |
| Bottles made from PET can be recycled after use.       |               |
| PVC can be joined by using solvent cement.             |               |

4 marks

9. Figure 2 shows the sketch of a bracket that has to be made from 25 mm x 2 mm flat bar.

Figure 2  
Metal Bracket



- a) List two safety precautions that should be observed when drilling the holes marked D.

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2 marks

- b) Figure 3 shows four pictures each showing a different stage when making the bracket shown in figure 2.

In the boxes provided next to every picture mark the number to show the correct sequence of operations to make the bracket. Stage number 1 is done for you.

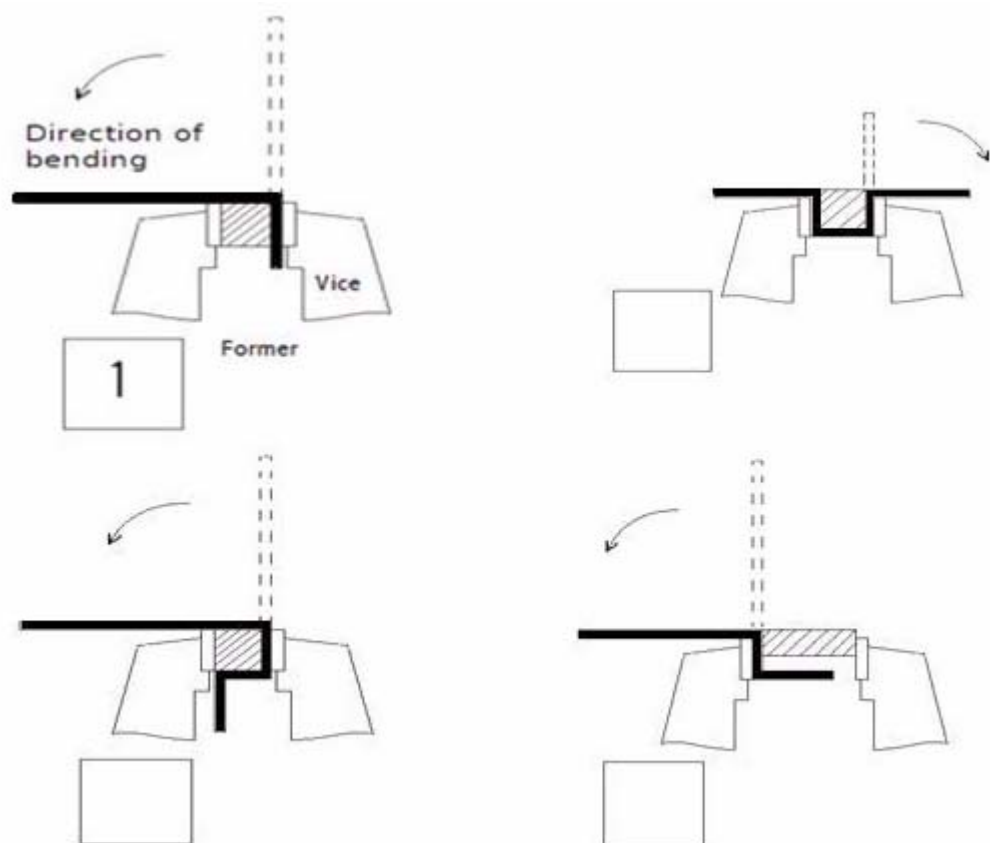
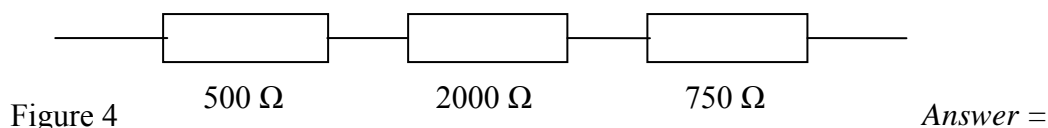


Figure 3

Stages in the making of bracket shown in figure 2

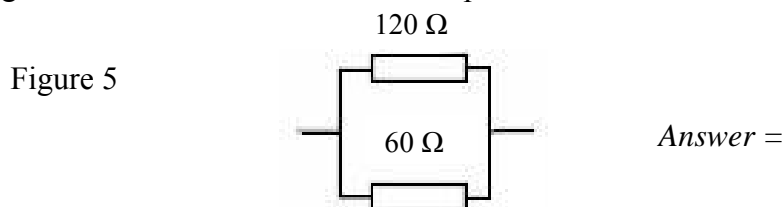
2 marks

10. Figure 4 shows resistors connected in series. Calculate the total resistance in  $\Omega$ .



1 mark

11. Figure 5 shows resistors connected in parallel. Calculate the total resistance in ohms.



3 marks

12. By means of a circuit diagram show how a double pole double throw switch is used to change the rotation of a d.c. motor.

2 marks

13. By means of a circuit diagram show a DPDT relay switch connected to a battery and a push to make switch to energize the relay switch.

2 marks

14. Re-draw the circuit diagram you did in question 13. Continue the diagram by drawing the latching wires required to keep the relay on when the coil is energized.

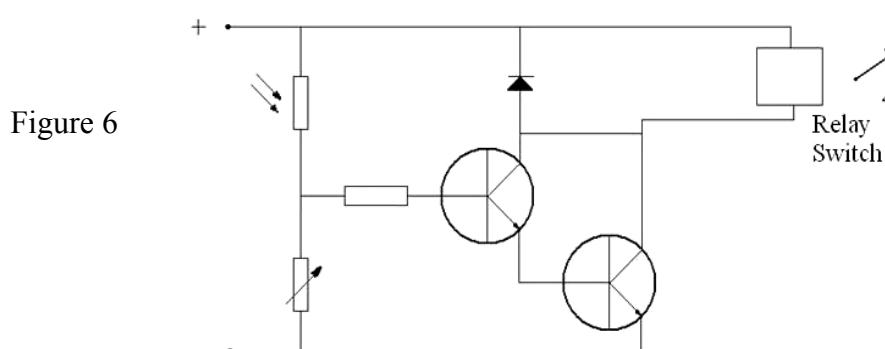
3 marks

15. Draw the symbol of an AND gate and continue its truth table. One state is given.

| Symbol of AND gate | Truth Table |   |        |
|--------------------|-------------|---|--------|
|                    | A           | B | Output |
|                    | 0           | 0 | 0      |
|                    |             |   |        |
|                    |             |   |        |
|                    |             |   |        |

4 marks

16. The circuit diagram in figure 6 shows a potential divider, triggering a Darlington pair to operate a relay switch.



- a) On figure 6, draw a dotted line around the potential divider.

2 marks

- b) On figure 6, name the legs forming the connections of the Darlington pair.

3 marks

17. Which of the following fibres is the most difficult to dye? Why?
- Cotton
  - Nylon
  - Viscose rayon

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4 marks

18. Cotton Poplin is a fabric used for school summer shirts and other school wear. Give those THREE properties that make this fabric ideal for these shirts.

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3 marks

19. Fabrics are often given chemical treatments to improve their properties. List two very important properties which fabrics used in theatre seats and curtains must be treated for.

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2 marks

20. a) What technique is suitable for manufacturing a badge for a blazer?

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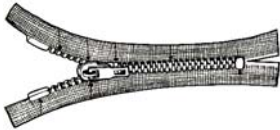

2 marks

- b) Give a reason for your answer.

\_\_\_\_\_

2 marks

21. a) Give the name of the fasteners shown in the table below.

| Fastener  | Name |
|---|------|
|    |      |
|   |      |
|  |      |
|  |      |

4 marks

- b) Which of the above fasteners is most suitable and safest for small children's wear? Why?

\_\_\_\_\_  
\_\_\_\_\_

3 marks

22. From the list given below underline those food items that have a vegetable origin.

▪ Peanuts ▪ Apple ▪ Ham fillet ▪ Pear ▪ Bacon ▪ Lamb leg ▪ Cabbage

2 marks



23. In industry, food products can be manufactured by several production methods. Give one example of a food product for each of the following production methods.

Batch Production: (example) \_\_\_\_\_

One-off production: (example) \_\_\_\_\_

4 marks

24. Say whether the following statements are true or false.

|   | True or false |
|---|---------------|
| Skimmed milk contains a high amount of fat.                           |               |
| Kitchen personnel should cover their hair to look smarter.            |               |
| Jam tarts are recommended for people suffering from diabetes.         |               |
| Chopping boards come in different colours to match kitchen furniture. |               |
| Rennet is used in the making of cheeselets.                           |               |

5 marks

25. Which of these should be avoided by people suffering from high blood pressure?

▪ Salami ▪ Salted nuts ▪ Tomatoes ▪ Olives in brine ▪ Mineral water ▪ Instant soups

4 marks

26. Give five information headings that a food product label must have by law.

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5 marks