JUNIOR LYCEUM AND SECONDARY SCHOOL
ANNUAL EXAMINATIONS 2010

Directorate for Quality and Standards in Education
Educational Assessment Unit

FORM 4 **DESIGN AND TECHNOLOGY** **TIME: 2 hours**

Name: _____ Class: _____ Set: _____

---------- Note to student: ----------
You are required to answer all questions

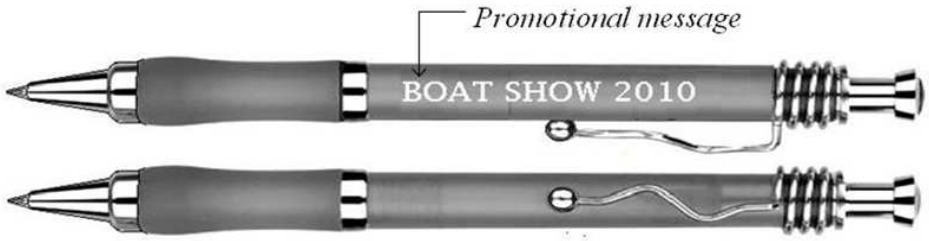
FOR TEACHERS' USE ONLY DISTRIBUTION OF MARKS

	Areas corrected					Marks for Written Exam.	Marks for Design Folio	TOTAL	**FINAL MARK**
	D	**RM**	**E**	**T**	**F**				
Max. Marks	20	20	20	20	20	100	100	200	**%**
Student's mark									

Enter student's mark obtained in every area of study in the above table.
D for Design, **RM** for Resistant Materials, **E** for Electronics, **T** for Textiles technology and **F** for Food technology.

SECTION A: **DESIGN**

1. Before designers begin to design a new product, they usually study similar products so that they can improve upon them. Designers call this study "Product Analysis".



The above picture shows two views of a ball-point pen with a retractable writing tip.
Retractable means: can be pushed in and out.

Answer questions 'a' to 'g' to analyse the ball-point pen pictured above.

a) What is the primary function or use of this ball-point pen? _____

b) What is the secondary function or use of this ball-point pen? _____

c) What materials is it made from? _____

d) When does the pen become unusable? _____

e) How will it be disposed of? _____

f) Why is its shape thicker towards the tip? _____

g) When not in use, the writing tip of the ball-point pen can be retracted inside its body. Give ONE example of why this characteristic can be regarded as a safety feature.

_____

(a to f) 1 mark each; (g) 2 marks - **total 8 marks**

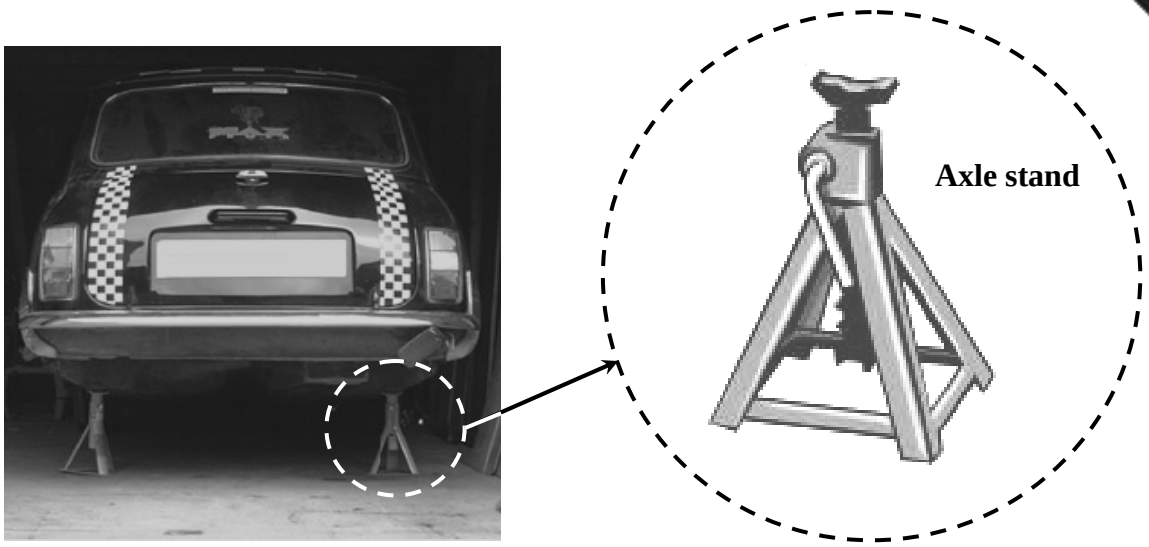
2. List TWO aspects where the making of a model may help the development of a Design and Technology project.

_____

_____

2 marks

3. The picture shows an axle stand used by motor mechanics for jacking up cars.
List TWO specifications that the designer had to consider when designing the axle

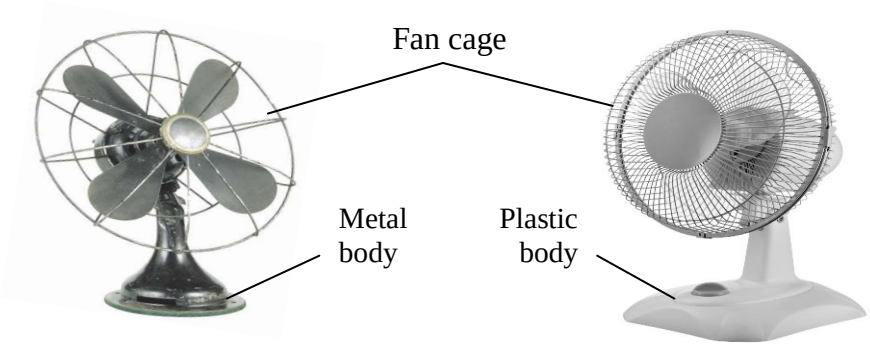


(i) _____

(ii) _____

4 marks

4. Two domestic electric fans are shown below. One is an old product and the other is modern.
Explain TWO details why the modern design is so much safer.



(i) _____

(ii) _____

4 marks

5. Give ONE reason why we should take care to make economical use of materials and ingredients when designing or manufacturing a product.

_____

2 marks

SECTION B: **RESISTANT MATERIALS**

6. Give ONE application for each of the following permanent joining methods for metals.

Permanent Joining method	**Example**
By Pop-riveting	
By Arc-welding	
By Brazing	

3 marks

7. Draw arrows to match the following metal heat treatments to their correct description.

Heat treatment	**Description**
HARDENING	A process which makes steel very hard but brittle
TEMPERING	A process by which a metal can be softened
ANNEALING	A process which makes steel very strong and tough

3 marks

8. List THREE safety precautions that should be observed when heating plastics.

(i) _____

(ii) _____

(iii) _____

3 marks

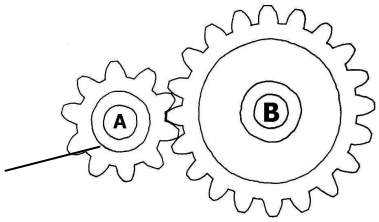
9. By means of simple line sketches show the following mechanisms. Label your diagrams indicating the main parts**.**

(a) A Pulley system	**(b)** A Cam and Follower system

6 marks

10. The picture shows two gear wheels. If gear wheel **A** is the DRIVER and is revol
(turning) at 100 r.p.m., how many times will gear **B** revolve in one minute? (r.p.m.
revs. per minute)

Driver: 100 r.p.m.



Answer: _____ r.p.m.

2 marks

11. Give THREE advantages of manufactured boards over natural timber.

(i) _____

(ii) _____

(iii) _____

3 marks

SECTION C: **ELECTRONICS**

12. List THREE precautions that should be observed when connecting a supply to an electronic circuit.

(i) _____

(ii) _____

(iii) _____

3 marks

13. A double pole double throw (D.P.D.T.) switch is connected to a battery to run a motor. Draw the circuit diagram showing how these should be connected so that the motor can rotate both in a clockwise and anti-clockwise direction.

6 marks

14. Draw a potential divider to sense light, consisting of a variable resistor R_1 and a
with a supply voltage of 9 volts.
On your diagram indicate the output voltage V_0, the supply voltage V_S, and ground.

6 marks

15. Draw the symbol of a NAND gate and continue its truth table.

		A	B	Q
NAND GATE				

(1 mark for the symbol and 4 marks for the truth table) **Total: 5 marks**

SECTION D: **FOOD**

16. Give ONE reason why the following symbol is printed on food packaging.

_____

1 mark

17. The following are steps for making a Sponge Cake, but they are not in the correct order.
Give each step a number to show the correct sequence for making the cake.
Step 1 has been done for you.

Step number:	Description of steps
	Pour the mixture into a prepared pan.
	Slice cake in half and fill with strawberries and whipped cream.
	Add egg yolks and sugar together and beat until very light.
	Fold into batter.
1	Prepare all ingredients and equipment.
	Cool on a wire tray.
	Sift together flour and baking powder.
	Beat egg whites with an electric beater until stiff.
	Bake at 180ºC.

4 marks

18. Give TWO methods of destroying micro-organisms in food.

(i) _____

(ii) _____

2 marks

19. Certain processes change the working properties of food ingredients.
What is the effect of AERATION on food ingredients?

_____

2 marks

20. Why do we preserve food?

_____

2 marks

21. Match each preservation process with the method it involves. The first one has been done for you.

	Preservation process		Method involved
a	Chilling		Involves the removal of air
b	Salting		Involves heating
c	Sun-drying and spray drying	**a**	Involves a reduction in temperature
d	Sterilisation		Involve dehydration
e	Vacuum packing		Involves the addition of a chemical

4 marks

22. Fill in the sentences using the words given below.

▪ fermentation ▪ warmth ▪ constipation ▪ ingredients ▪ cross-contamina

a. One common cause of food poisoning is _____.

b. People suffering from _____ should eat a high fibre diet.

c. Bacteria needs time, _____, moisture and food to grow.

d. _____ is a form of biotechnology used to produce wine, beer and bread.

e. According to law, packed food should have a list of _____ written in descending order of weight.

5 marks

SECTION E: **TEXTILES**

23. The symbols below are sometimes found on a care label attached to a garment. Complete the table to state what each symbol means.

10 marks

24. Describe TWO ways of recycling textile products.

(i) _____

(ii) _____

4 marks

25. Name and describe briefly, TWO ways of shaping fabrics.

Name	Description

4 marks

26. Buttons and button holes are often used as fastenings on cushions. List TWO alternative fastenings that could be used.

(i) _____ (ii) _____ **2 marks**