Technology

November 2015

Grade 9

Examiner: Mr S Griffiths

Moderator: Mrs Hamilton

Instructions to candidates:

This paper consists of 10 pages.

Answer all questions on the paper provided.

Write your teachers name on the top of your answer paper.

Number your answers correctly according to the numbers used in this question paper.

Draw double margins.

It is in your best interest to set your work out neatly and legibly.

Total: 140 marks

Question 1Multiple choice questions

Answer these questions in the spaces provided in your answer booklet.

1.1 Hydraulic systems make use of....

a Levers
b Air
c Liquid
d Belts or chains (1)

1.2 Current flow in a circuit is measured in ...

a Coulombs
b Amperes
c Joules
d Ohms (1)

1.3 The meter used to measure resistance is called

a Wattmeter
b Ammeter
c Ohmmeter
d Flowmeter (1)

1.4 Which is not an alloy

a Brass
b Steel
c Silver
d Solder (1)

1.5 The golden Gate bridge in San Francisco is which type of bridge?

a Suspension Bridge
b Cable stayed bridge
c Arch bridge
d Compound bridge (1)

1.6 If a drawing shows a plan view, what type of drawing is it?

a Isometric
b Orthographic
c Perspective
d Oblique (1)

1.7 What do the letters LED stand for?

a Light entering design
b Light emitting diac
c Light emitting diode
d Light entering diode (1)

1.8 A transistor has 3 legs. These legs are called ...

a Base, connector and emitter
b Base, collector and electrode
c Base, collector and emitter
d Base, cathode and emitter (1)

1.9 Recyclable plastics are called...

a Thermoset plastics
b Thermoplastics
c Pterapthalates
d Resins (1)

1.10 A diode is called a semi conductor because

a It only allows some current to pass through
b It always allows current to pass through
c It only allows current to pass through in one direction.
d It is half the size of a conductor

[10]

Question 2

Match the word in column A with the statement in column B. Write your answer in the space provided in the answer booklet. Only write the appropriate letter.

Column A		Column B	
2.1	Stainless steel	A	Also known as Iron Oxide
2.2	Ferrous metals	B	A material that is made by combining 2 or more other materials to use the strengths of each material
2.3	rust	C	A method of manufacturing using heat and pressure
2.4	Fibreglass	D	Combination of iron, chrome and nickel, used for cutlery
2.5	Composite material	E	Made by combining different chemicals with a particular metal to create new properties.
2.6	alloy	F	iron that has been melted and poured into a mould
2.7	forging	G	Mixing rubber with sulphur to make it harder.
2.8	Cast iron	H	Good insulator that doesn't corrode.
2.9	galvanizing	I	Metals that contain iron
2.10	vulcanizing	J	Dipping metal into molten zinc to preserve it.

[10]

Question 3

State whether the following statements are true or false. Put a cross (X) in the correct block in your answer booklet.

3.1 A resistor limits current flow in a circuit.

3.2 Pneumatic systems use oil to transfer movement from the input to the output.

3.3 The road deck on a cable stayed bridge is held up only by cables.

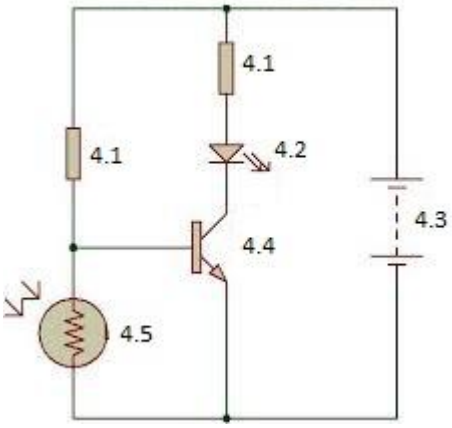
3.4 The negative pole of a diode is called the cathode.

3.5 We can preserve metals by covering it with paint

[5]

Question 4

Look at the following picture and then label the parts numbered 4.1 to 4.5



[5]

Question 5

Write the names of the following electronics components in the space provided in your answer book.

5.1 

5.2 

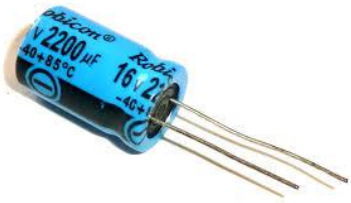
5.3 

5.4 

5.5 

5.6 

5.7 

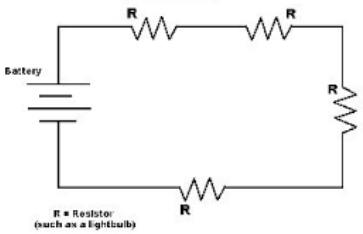
5.8 

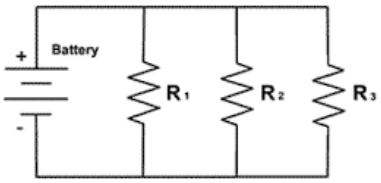
5.9 

5.10 

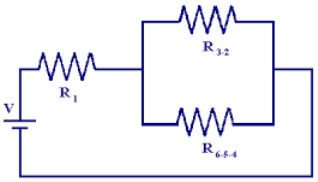
(10 x 1)

5.11 Write the names the following types of circuits in the space provided in your answer book.

a 

b 

(2x2)

c 

(3)
[17]

Question 6

6.1 Using the resistor colour coding table that you learned about this year, answer the following questions

a What is the resistance of a resistor with a colour code of :
Red, yellow, blue, gold Ignore the tolerance. (4)

b What is the colour code of a 147 ohm resistor with a tolerance of 10% (4)

6.2 Complete Ohms law by filling in the missing words:

In any closed circuit, the applied ___5.2.1___ is directly proportional to the ___5.2.2___ if the resistance remains ___5.2.3___ (3)

6.3 If a potential difference of 12v is applied to a circuit containing a resistor with a resistance of 60Ω, calculate the current flowing in the circuit (3)

6.4 A circuit has a current of 1.2A flowing through it when 18v is applied, calculate the resistance of the circuit (3)

6.5 If a current of 0.95A flows through a circuit with resistance of 150Ω, calculate the applied voltage. (3)

6.6 Draw the circuit diagram of a circuit which consists of one switch, two resistors in series and a 6v battery. (5)

6.7 Draw the circuit diagram of a circuit which consists of two switches to allow 2 way switching, 2 resistors in parallel and a 12v battery. (5)
[30]

Question 7

Read the following passage carefully and answer the questions that follow.

National security company, SAFE WITH US, needs dog kennels for 2 500 guard dogs' We need a design for a standard dog kennel for all our German Shepherd and Rottweiler dogs. The kennel must keep our dogs warm and dry and must be easy to maintain and keep clean. The kennel must be completely weatherproof and cheap to make. Entries must be in by 25 November. When responding to a need or opportunity, the first thing you must do is to identify the task to be done. You also need to identify specifications and constraints.

7.1 Write a design brief for this problem. (2)

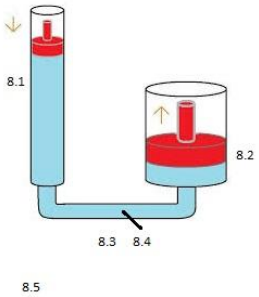
7.2 Write down 2 specifications for the kennel design. (2)

7.3 Identify 2 constraints for the kennel design. (2)

7.4 Suggest materials suitable for making this kennel that meet with the specifications required. Explain your choice. (4)
[10]

Question 8

Look at the following drawing and answer the questions that follow.



8.1 Name the cylinder labelled 8.1. (1)
8.2 Name the cylinder labelled 8.2. (1)
8.3 Name the part that connects 8.1 to 8.2. (1)
8.4 What fluid is usually found at 8.4? (1)
8.5 What system is shown in the picture? (1)
[5]

Question 9

Read the following case study on the development of the bicycle and answer the questions which follow

The development of the bicycle


Unicycle

A bicycle is a cycle with two wheels - unlike a unicycle, which has only one wheel, and a tricycle, which has three. In 1817, a German named Baron von Drais designed a machine called the Hobby Horse. In about 1840, a Scotsman added cranks on the axle of the rear wheel, and pedals in the front. In 1865, a Frenchman attached cranks and pedals to the front wheel with wire spokes and solid rubber tires for the first time. The Penny-Farthing bicycle had a very big front wheel, and a small rear wheel. It was originally called the High wheel, and this only changed when it was nearly outdated to the penny farthing to be called after the British coins since it looked like a penny (large) coin leading a farthing (small) coin. This allowed the bicycle to travel a longer distance with one turn of the front wheel, which was driven by pedalling cranks fixed to the centre of the front wheel. . Finally, in 1885, the modern bicycle was developed. It had a chain driven rear wheel and air-filled tyres. Today, bicycles still offer many advantages as a means of personal transport. They are relatively inexpensive, make little demand on material or energy sources, do not pollute the air and help people to stay fit.


Hobby Horse


Penny Farthing


Tricycle

9.1 Who invented the hobby horse? (1)

9.2 How did a person make the Hobby Horse go forward? (1)

9.3 What is a unicycle? (1)

9.4 What was the original name of the penny farthing bicycle? (1)

9.5 Why did the Penny-Farthing bicycle have such a big front wheel? (1)

9.6 What is the advantage of using solid rubber tyres? (1)

9.7 In what year was the modern bicycle developed? (1)

9.8 When were cranks, pedals and solid rubber tyres first added to the wheels of bicycle tyres? (1)

9.9 Give two advantages of using a bicycle as a means of personal transport. (2)

[10]

Question 10

10.1	What do we call plastics that use heat as they harden?	(1)
10.2	What do we call plastics that melt when they are heated?	(1)
10.3	What is the abbreviation, and what is the recycling number for Polyvinylchloride?	(2)
10.4	What is the abbreviation, and what is the recycling number for Polypropylene?	(2)
10.5	What material are Coke bottles made from?	(1)
10.6	What material are the lids of Coke bottles made from?	(1)
10.7	High density Polyethylene is used to make Shopping carriers, what is the recycling number for High density Polyethylene?	(1)
10.8	What is the recycling number for Polystyrene?	(1)
		[10]

Question 11

Read the following article on rubbish pickers in Morocco and then answer the questions that follow

Pulling carts piled high with plastic bottles or rummaging through unofficial dumpsites, informal trash collectors abound on the streets of Morocco. Dubbed "Mikhala" in the local Arabic dialect, the thousands of rubbish pickers are often looked down on as they trudge through the capital Rabat and other Moroccan cities.

But a project to hire the Mikhala to work officially is starting to change that image, and even help as Morocco looks to reach an ambitious goal of reducing greenhouse gas emissions by 13 percent by 2020. In their own modest way, the waste pickers could be a model for countries where, like in Morocco, consumers often do not sort through and recycle their own rubbish. As the host of next year's UN climate conference, Morocco will be under scrutiny for its own efforts to reduce emissions. And tackling household waste - which the environment ministry says causes up to 18 percent of greenhouse gas emissions in Morocco - will be key.

Unlike in many Western countries where recycling is long established, in Morocco there is little legal framework for waste sorting. Morocco only recycles about eight percent of its municipal waste, but has targeted to increase the amount to 20 percent by 2020, according to a report presented at the European Union last year.

"Informal waste processing is generally done by poor social groups with a low level of education as a daily means of survival," says Mustapha Azaaitraoui, a researcher specialised in environmental issues.

Set up in 2011 with support from the World Bank, the Attawafoq cooperative at the Oum Azza industrial landfill south of Rabat is a first attempt at changing that. It employs about 150 people -- mainly ex-pickers -- to sort trash for recycling on-site instead of on the streets. Among them is Yassin Mazout, 31, a history graduate who heads the cooperative after becoming a trash picker to pay for his studies when his father died. "We are all equal, we all have the same monthly salary of 2,500 dirham (about 230 Euros/$260)," he says. "Before, at the old dumpsite, the strong would crush the weak."

After working outside for years, Mazout and his colleagues now work under a roof manually sorting through half of the average 2,000 tonnes of solid waste that arrive each day at the landfill. "We're much better off," agrees Najat, who before joining Attawafoq spent 18 of her 51 years as an informal trash picker. "We have social security and our earnings help us support our families." This year for the first time the cooperative made a profit that will be divided up between members and used to increase its capital. Mazout wants trash pickers to finally receive the "respect" they deserve as "they play an important role in our lives -- both environmentally and economically."
"The workers are very well organised," says Gerard Prenant, director of the Pizzorno Environnement group that operates and has invested 650,000 euros in the landfill. "They're very professional in sorting and we're delighted to have them working at our site," he says. At the landfill outside the capital, Attawafoq's workers are giving back value to waste. The cooperative provides an important environmental service at zero cost to the community, Mazout says.
Recycling not only reduces waste in landfills, but also helps to lower greenhouse gas emissions by saving energy from producing or importing products like cardboard and plastic. Mazout says he hopes the project will inspire others around a country that still counts 220 unauthorised dumpsites. Morocco aims to close all these informal dumping grounds by 2020, environment ministry official Lubna al-Abed says, and has already funded 16 waste sorting centres like Attawafoq in partnership with municipalities.

11.1	What is the name given to the waste pickers?	(1)
11.2	What Greenhouse gas is created by garbage?	(1)
11.3	By how many percent does Morocco want to reduce their Greenhouse gasses by before 2020?	(1)
11.4	List 3 ways this initiative is helping Morocco save their environment.	(3)
11.5	How many illegal dumps are there currently in Morocco?	(1)
11.6	How many waste sorting centres are there in Morocco?	(1)
11.7	What is the average daily weight of waste that is sorted through at Attawafoq waste sorting centre?	(1)
11.8	How many dollars are there in 2,500 dirham?	(1)
		[10]

Question 12

Read the following extract from the website of NewLife Plastics and answer the questions that follow.

Buying cheap garden furniture and outdoor products is not always a saving. Wood needs regular maintenance and will eventually need to be replaced. At NewLife Plastics, we pride ourselves on manufacturing eco-friendly outdoor furniture, decking, pallets and other products from **100% recycled packaging**. Our products are maintenance free, durable and long lasting, stronger and denser than wood and are available in a variety of colours. In simple terms – we are using your bottle caps, milk bottles, cosmetic tubes, jars, etc. to recycle up into a product that will last a lifetime. Not only are you doing something constructive for the environment but you are investing in furniture that looks as good as traditional wooden products, without the maintenance. Our feedstock is made up entirely of this recycled packaging. From this, we extrude poles and planks to create a sustainable plastic wood alternative that can be used in a number of different applications including outdoor decking, balustrades, walkways and jetties, garden furniture and industrial pallets.
More importantly, by purchasing our products, you are mitigating your personal or company's consumption of plastic packaging waste.

12.1	Why does wood need regular maintenance?	(2)
12.2	What does it mean to extrude poles and planks?	(3)
12.3	List 3 items that NewLife manufactures out of plastic wood.	(3)
12.4	We are continually encouraged to Reduce, Reuse, and Recycle. Is this a sustainable method of reducing, reusing and recycling? Explain.	(2)
		[10]

Question 13

Read the following about the competition to create the 2018 Commonwealth Games mascot, and answer the questions that follow.

Get ready to design the mascot for the 2018 Commonwealth Games on the Gold Coast.

Commonwealth Games Minister Kate Jones has invited people to begin sketching the new Matilda. Matilda was the winking kangaroo mascot for Brisbane's 1982 Commonwealth Games and captured the imagination of the world. "We're looking for a fun, energetic and friendly character that will inspire people from all over the world to come to the Gold Coast for the Games," Ms Jones said.
Animals have been popular Games mascots, so it will be interesting to see if an animal – perhaps a dolphin, maybe a bikini-clad koala – will be chosen for the Gold Coast's Games. Masots for the Commonwealth Games were introduced by the Canadians in 1978 when they introduced the first Commonwealth Games mascot Keyano, a grizzly bear.

13.1 You are required to design and make a mascot for the 2022 Commonwealth Games which will be held in Durban. Your mascot should be something that shows the world what Durban is all about.
-Your design should include colour and should be an animal.
-Draw your design and label the materials that you will use.
-Use the allocated space in your answer booklet. (10)

13.2 Write down the steps that you will use to construct the mascot. (5)

13.3 Give 3 possible names for your mascot. (3)

[13]

Total: 140 marks