UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

STUDENT SECTION					
Name				Class	
Student MOE number		School MOE Number		STUDENT SIGNATURE	
School name					

Creative Design & Innovation

11 Advanced

Sample - Term 3

Date: May 2017

Time: TBC

Duration: 90 minutes

STUDENT INSTRUCTIONS –
For this examination, you must have:

1. An ink pen – blue.
2. A pencil.
3. A ruler.

TEACHER NOTES & INSTRUCTIONS

Please tick ✓ the correct answers in **RED INK** and then write the mark awarded in the marking columns. With multiple mark answers highlight where the mark is awarded by **underlining** or by using an extra tick.

FOR ADMIN ONLY	
MARKING RECORD	
Section	Section TOTALS
Section 1	
Section 2	
Section 3	
Section 4	
MARKER SIGNATURE	TOTAL MARKS
MODERATOR SIGNATURE	

SECTION 1 - Multiple choice questions (2 marks each)

MARKING NOTES

Answer the questions below by circling the correct answer.

1 – A nozzle is a _____.

A: name for waste material.
B: measurement of materials.
C: tool used to control fluid flow.
D: metal cutting tool.

2 – ''CAD'' means _____.

A: Controlled Automatic Drafting
B: Computer Aided Design
C: Computer Automatic Drawing
D: Controlled Aided Drafting

3 – ''Subtractive'' means to _____.

A: remove
B: redesign
C: change
D: replace

4 – _____ means to collect a signal.

A: Process
B: Output
C: Input
D: Receive

5 – A resistor is a _____.

A: group of connected components.
B: component to store power.
C: component that regulates current.
D: variable unit.

6 – The current in a circuit is a flow of _____.

A: protons.
B: atoms.
C: neutrons
D: electrons.

7 – Which of the following is **NOT** a manufacturing process?

A: stereo lithography
B: selective laser sintering
C: fused deposition modelling
D: prototype model

8 – Which value is **NOT** needed to use Ohm's Law?

A: current B: tolerance

C: voltage D: resistance

9 – A _____ uses colour bands to indicate its value.

A: capacitor B: resistor

C: lamp D: battery

10 – The function of an LED is to _____?

A: provide power. B: provide insulation.

C: provide heat. D: provide light.

SECTION 2 – True or False (1 mark each)

Circle the correct answer **True** or **False** for the following statements.

1 – A bulb uses a filament to generate light.	TRUE	FALSE
2 – AC means alternative current.	TRUE	FALSE
3 – CNC means Computer Numeracy Controlled.	TRUE	FALSE
4 – A battery contains a negative terminal.	TRUE	FALSE
5 – An LED has a flat part to indicate polarity.	TRUE	FALSE

MARKING NOTES

SECTION 1 TOTAL

20

SECTION 2 TOTAL

5

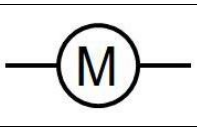
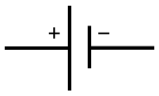
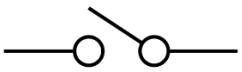
SECTION 3 – Core content questions

MARKING NOTES

1 – Match the symbol, component or description with its name. **(10 marks)**

Write the matching letter in the correct box. The first one has been done for you

COMPONENT	Symbol letter
1. Voltmeter	F
2. Resistor	
3. Motor	
4. Switch	
5. Battery	
6. Transistor	

SYMBOL / COMPONENT	
	A
	B
	C
A component that controls electrical current.	D
	E
	F

2 – Describe **two** advantages of using 3D printing for production. **(4 marks)**

Advantage 1_____

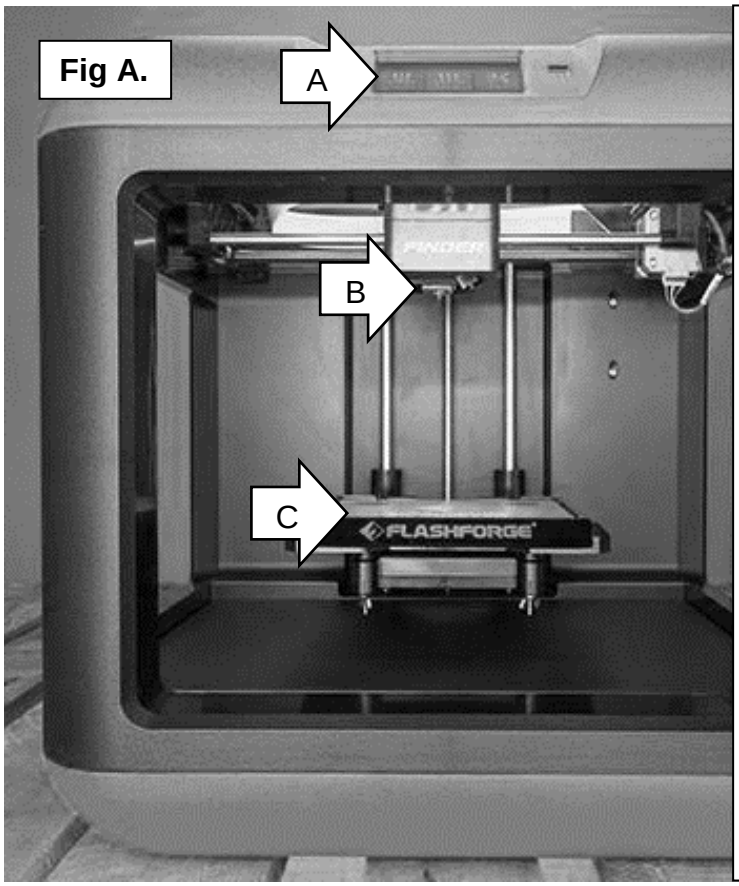
_____

Advantage 2_____

_____

3 - State what **category** of plastic can be used in 3D printing. **(1 mark)**

_____



4 – Using this key - label the parts shown in **Fig. A** and describe what they do. **(6 marks)**

Part A is _____

_____

_____

_____

Part B is _____

_____

_____

_____

Part C is _____

_____

_____

_____

MARKING NOTES

5 – Complete the paragraph below using **<u>one</u>** word per space.

Do not use the same word for more than one answer.

<u>Four</u> words will **<u>NOT</u>** be used. **(8 marks)**

~~***electricity***~~	switch	charge
conductors	current	copper
insulated	particles	electrons
voltage	resistance	wires

<u>Electricity</u> is the movement of electrons. Electrons create _____ which you can harness to do work. Electric _____is the rate of flow of electric charge. An electric circuit will not work if it is broken or the _____ is open. Metals are good _____ of electricity and allow electrical current to flow. Materials need to have free _____ so electricity can be carried. Electricity is often carried in _____ made from _____ or other metals. Electric products must be _____ so that users are not given electric shocks.

6 – Calculation using Ohm's law.

Marks will be awarded for using correct values **(V, I, R)**

a. Write the **equation** to calculate voltage using Ohm's Law. **(1 mark)**

_____

b. Calculate the **voltage** in a circuit if the current is equal to **12A** and the resistance value is **80Ω**. **(2 marks)**

c. Write the **equation** to calculate resistance using Ohm's Law. **(1 mark)**

_____

d. Calculate the **resistance** in a circuit if the voltage is **45v** and the current is **3A**. **(2 marks)**

7 – What does **IDE** mean? Write each word clearly. **(3 marks)**

_____

_____

_____

8 – What does the term **baud rate** mean? **(2 marks)**

_____

_____

_____

MARKING NOTES

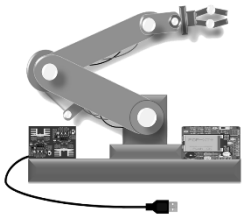
SECTION 3 TOTAL

40

SECTION 4 – Motors / Coding / Schematic drawing.

MARKING NOTES

1 – Write under each product which motor (DC or Servo) is used. **(4 marks)**



Power drill	Printer	Robotic arm	Metro doors

2 – How do you change the direction / motion of a DC motor?

_____

_____

_____

_____ **(2 marks)**

3 – Describe what PWM means and how it works.

_____

_____

_____

_____ **(2 marks)**

4 – What is the difference in torque values between DC motor & servomotors?

_____

_____

_____

_____ **(2 marks)**

5 - Refer to the program below and answer questions a – d.

```
Line 1  int ledPin = 10;
Line 2  int buzzer = 11;
Line 3 // the setup function runs once when you press reset or power the board
Line 4 void setup()
Line 5  {
Line 6     pinMode(ledPin, OUTPUT);
Line 7     pinMode(buzzer, OUTPUT);
Line 8     pinmode(12, OUTPUT);//set pin 12 as input for button
Line 9   Serial.begin(8650);
Line 10   while(!Serial);
Line 11 )
Line 12 // the loop function runs repeatedly forever
Line 13  void loop()
Line 14 {
Line 15    if(analogRead(12)==HIGH)
Line 16    {
Line 17      digitalWrite(ledPin, HIGH);
Line 18      delay(5000);
Line 19
Line 20
Line 21
Line 22
Line 23    }
Line 24
```

a. Analyze the above program and find the errors in each line. **(4 marks)**
Example in Line 8 – **ERROR** is pinmode(12, OUTPUT). **CORRECT** is pinmode(12, INPUT)

Line _____

Line _____

Line _____

Line _____

b. Complete the line if-code for turning the buzzer OFF for 0.3 sec. **(2 marks)**

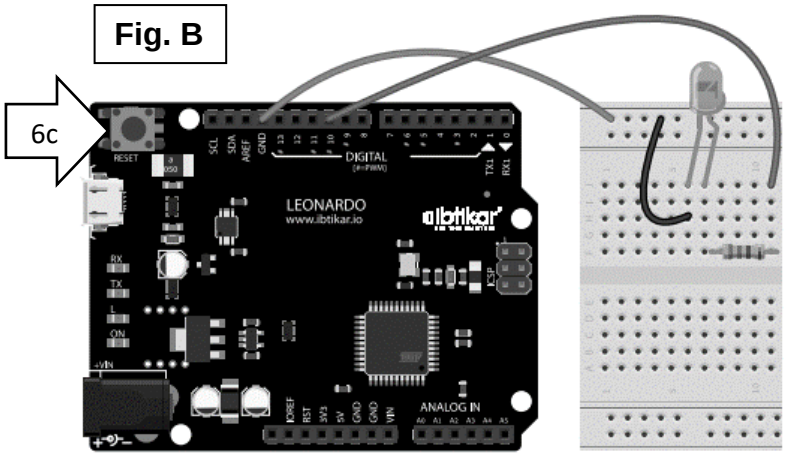
c. Write the command to print the status of the LED and buzzer in a line. **(2 marks)**

d. Predict and write the output of this program. **(2 marks)**

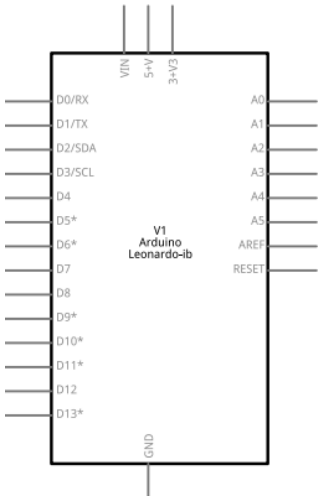
MARKING NOTES

6 – Study the circuit shown in **Fig B.** then complete the schematic diagram and answer the related questions about the circuit.

Fig. B



a - Complete the schematic diagram for the circuit shown. **(8 marks)**



6b – Which leg of the LED should be connected to the GND pin?

_____ **(2 marks)**

6c – Name the component indicated by the arrow **6c** on the diagram above.

_____ **(2 marks)**

6d – List three parts on the Arduino board you have used.

_____

_____ **(3 marks)**

You have now finished the examination.

MARKING NOTES

SECTION 4 TOTAL

35

TOTAL MARKS

100