



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

Creative Design & Innovation

10 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 – An analog signal using digital means is _____.

A: pulse width modulation

B: mapping

C: duty cycling

D: frequency controlling

2 – _____ cycle is the ratio between the ON time divided by the time period.

A: Read

B: Write

C: Duty

D: Read/write

3 – _____ is measured in Hertz units.

A: Resistance

B: Current

C: Frequency

D: Time

4 – An electrical component to reduce the current flow is a _____.

A: capacitor

B: push button

C: resistor

D: transistor

5 – A(n) _____ is an instrument to measure current in electronics.

A: voltmeter

B: ammeter

C: multimeter

D: thermometer

6 – A _____ is used for building temporary circuit.

A: switch

B: breadboard

C: current

D: led

7 – Resistance value is measured by _____.

A: hertz

B: volts

C: ampere

D: ohms

8 – A film camera uses a(n) _____ format.

A: digital

B: triangular

C: analog

D: saw-tooth

9 – A drawing of an electrical circuit is called a _____ .

A: flow chart

B: schematic diagram

C: blueprint

D: data flow diagram

10 – A processor which controls an external system is a(n) _____ .

A: embedded system

B: microcontroller

C: hard drive

D: memory

MARKING NOTES

Section 1

Subtotal

20

SECTION 2 – True or False (1 mark each)

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

1 – The open state of a potentiometer can let current flow TRUE FALSE

2 – In an Arduino board GND means ground TRUE FALSE

3 – A fixed resistor is a three-terminal component TRUE FALSE

4 – Analog signals with 10 digits have 1024 levels TRUE FALSE

5 – An If-else-if statement handles multiple conditions TRUE FALSE

Section 2

Subtotal

5

SECTION 3 – Core content questions.

A basic circuit can be divided into **three parts**.

Describe the parts with an example for **each part**.

1- Voltage source - _____

(3 marks)

2 - Load - _____

(3 marks)

3 - Conductive path - _____

(3 marks)



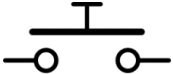

**MARKING
NOTES**

4 - Describe what the **process** would be in an ATM cash machine.

(2 marks)

5 - Match the electronic symbol or description with its name. **(10 marks)**

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

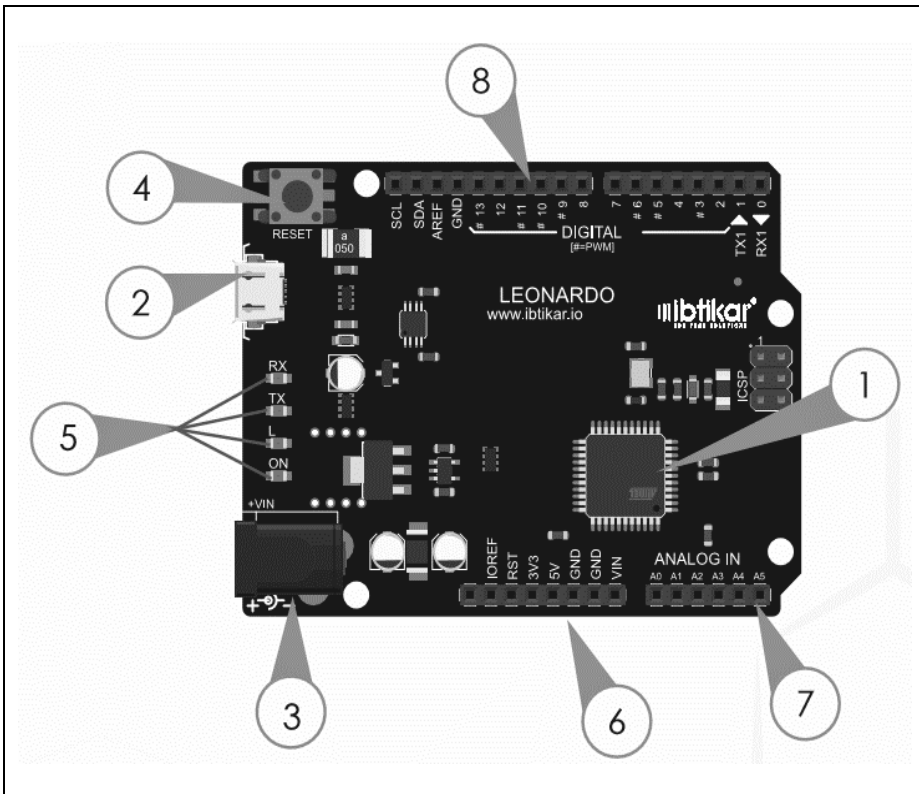
COMPONENT	Symbol letter	SYMBOL	
Voltmeter	F	A component that controls electrical current.	A
Analog signal			B
Push Button		A series of cells that are used as power source.	C
Resistor			D
Battery			E
Load			F

6- Complete the sentences below using one word.
Do not use the same (8 marks)

digital	loop()	three	voltage	integer	Push Button
potentiometer	two	float	setup()	open	tolerance

- The last band in the resistor is the _____
- The values of _____ signals are either HIGH or LOW
- The push button has _____ state and close state.
- A number with decimal point is _____ data
- The formula for level value is _____ / 5 * 1023
- Brightness of an LED can be controlled using _____ component
- RGB consists of _____ LEDs
- Defining the pinMode() as OUTPUT is written in the _____ function

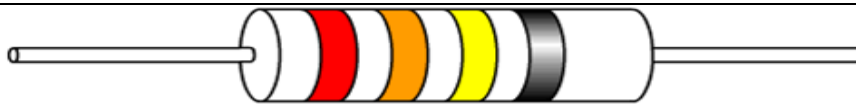
7- Name the missing parts for the Arduino Board shown below. (5 marks)



- 1) CPU (Processor)
- 2) _____
- 3) Power Jack
- 4) _____
- 5) LEDs set
- 6) _____
- 7) _____
- 8) _____

**MARKING
NOTES**

8- Using the color band values shown, fill in the blank cells below. (6 marks)
 You will need to calculate the range of tolerance for each resistor value given.



	1st Digit	2nd Digit	Multiplier	Tolerance
Black	0	0	x1	
Brown	1	1	x10	
Red	2	2	x100	
Orange	3	3	x1,000	
Yellow	4	4	x10,000	
Green	5	5	x100,000	
Blue	6	6	x1,000,000	
Violet	7	7	x10,000,000	
Gray	8	8	x100,000,000	
White	9	9	-	

Gold=5%
 Silver=10%
 None=20%

Value	Band 1 (1 st digit)	Band 2 (2 nd digit)	Band 3 (Multiplier)	Tolerance	Range of value (Minimum - maximum)
100 Ω	Brown	Black	Black	Gold (±5%)	100 Ω (+ or - 5%) 100 - 5 = 95 Ω 100 + 5 = 105 Ω Range = 95 Ω - 105 Ω
580 Ω	Green	Gray	Black	Silver (±10%)	580 Ω (+ or - 10%) 580 - 58 = 528 Ω 580 + 58 = 638 Ω Range = 528 - 638 Ω
220 Ω				Gold (±5%)	Range =
370 Ω				Silver (±10%)	Range =

MARKING NOTES

Section 3
Subtotal

40

SECTION 4

MARKING NOTES

1. Draw a flow chart where a pushbutton is the INPUT, an LED & a buzzer is the OUTPUT. The **DECISION** is if a pushbutton is pressed, the LED is OFF & the Buzzer is ON. **(10 marks)**

- 2 - Find the **five** errors in the code below. Write the line number **AND** the correct code in the spaces underneath the code. **(10 marks)**

```
Line 1 void Brightness;  
Line 2 void loop()  
Line 3 {  
Line 4 pinMode(9, INPUT); // Define the pin #9 as an output pin.  
Line 5 }  
Line 6 void setup()  
Line 7 {  
Line 8 analogread(9, Brightness); // Generate the PWM signal at pin #9  
Line 9 delay(5000); // apply a delay of 100 milliseconds  
Line 10 Brightness = Brightness + 10; // increase the Brightness value by 10  
Line 11 }
```

Example in Line 4 – **ERROR** is pinMode(9, INPUT). **CORRECT** is pinMode(9, OUTPUT);

Line _____

Line _____

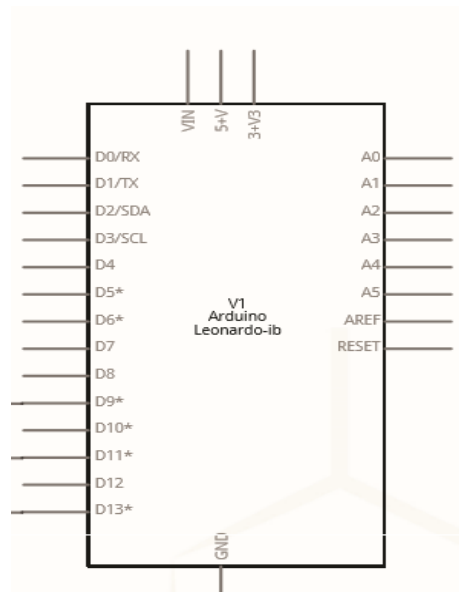
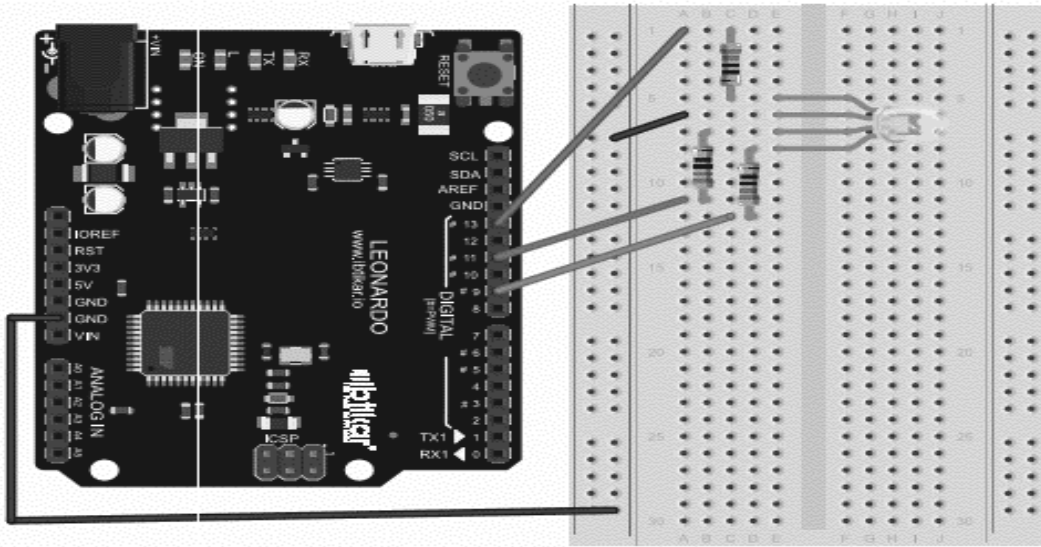
Line _____

Line _____

Line _____

3 - Complete the schematic diagram for the circuit shown below. (15 marks)

- Draw and label the components.
- Choose the correct pins for the connections.



MARKING NOTES

**Section 4
Subtotal**

35

**EXAM
TOTAL**

100
