



UNIVERSITY  
OF  
JOHANNESBURG

<b><u>FACULTY</u></b>	: EDUCATION
<b><u>DEPARTMENT</u></b>	: SCIENCE AND TECHNOLOGY EDUCATION
<b><u>CAMPUS</u></b>	: APK
<b><u>MODULE</u></b>	: ENGINEERING GRAPHICS AND TECHNOLOGY EDUCATION 3A (EGD10A3)
<b><u>SEMESTER</u></b>	: First
<b><u>EXAM</u></b>	: May 2019

**ASSESSOR(S)** : MR W ENGELBRECHT

**MODERATOR** : DR W RAUSCHER (UP)

**DURATION** : 2 HOURS                      **MARKS** : 100

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NUMBER OF PAGES: 5 PAGES

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
  2. Number your answers clearly.
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**QUESTION 1**

Design and draw a circuit diagram by using all the components listed below. The total current in the circuit must be **94.7mA**. Show all calculations.

You have the following components at your disposal:

Components	Quantity
AA penlight cells	6
A resistor with the following colour bands: brown, black, brown, red.	1
A resistor with the following colour bands: orange, black, brown, red.	1
A resistor with the following colour bands: red, black, black, red.	1

**[16]****QUESTION 2**

- 2.1 If you had to design a power tool such as a portable circular saw, without an earth connector in the electric plug, briefly explain what kind of switch you would use to safely control the machine as well as the reasons for this decision. **(3)**
- 2.2 Explain how a reed switch works, and give a typical application thereof. **(5)**
- 2.3 You need to change the direction of an electric DC motor's rotation using a switch. Draw the diagram of a circuit that would make this possible, including the battery, the appropriate switch and the motor. **(6)**
- 2.4 Draw the symbol for an **OR** gate with **two** inputs and compile a truth table for it. **(7)**
- 2.5 Briefly describe and discuss a possible practical application for the gate in 2.4. **(3)**

**[24]**

**QUESTION 3**

- 3.1 You have a need for a device that could give you a visible indication when it is necessary to water your pot plant. Design and draw the diagram for the electronic circuit for such a device. You have the following components at your disposal:

Components	Quantity
9V battery	1
Single pole single throw switch	1
BC547 NPN transistor	1
47k $\Omega$ resistor	1
1k $\Omega$ resistor	3
680 $\Omega$ resistor	1
100k $\Omega$ potentiometer	1
Red LED	1
LDR	1
Thermistor	1
Connecting wire	500mm

**(20)**

- 3.2 Briefly describe how the circuit you designed in 3.1 works by referring to the function of the various components you used.

**(10)****[30]**

**QUESTION 4**

Figure 1 shows the floorplan of a house. Complete the worksheet by adding the electrical fittings as listed next to figure 1. Use SABS 0143 electrical symbols and show connections where required.

**Detach the worksheet from the question paper and place it inside your answer book**

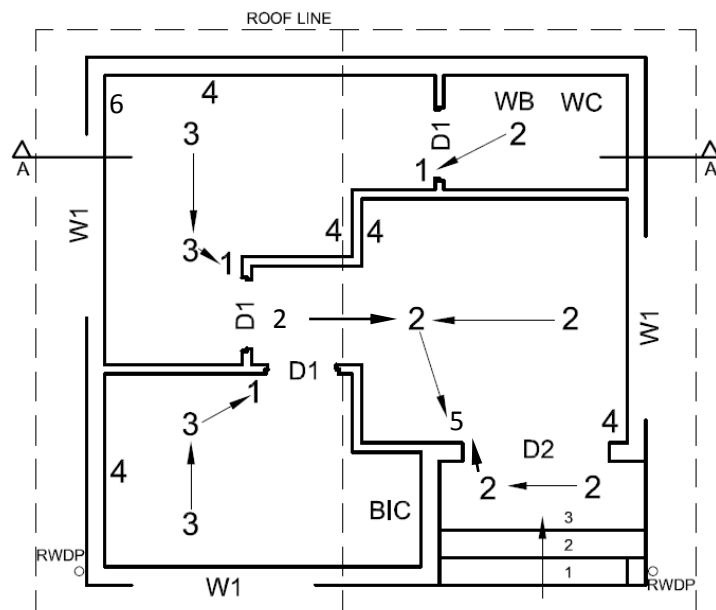


Figure 1

**Electrical fittings:**

1. Single-pole light switch
2. Ceiling light
3. 2 x 40W fluorescent tubes
4. Switch socket outlet
5. Two-pole light switch
6. Distribution board

**NOTE:**

The arrow shows the light connection to the switch

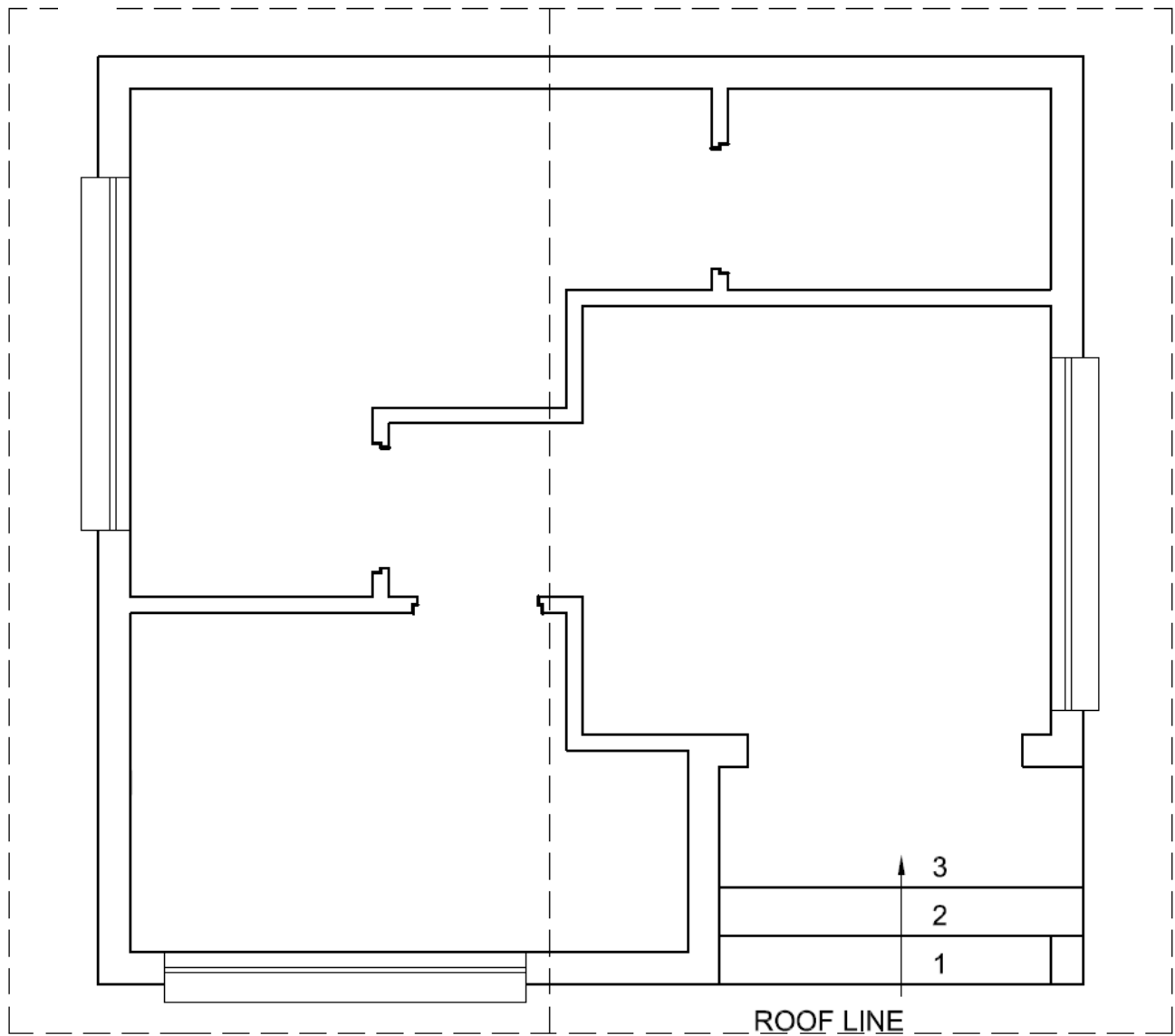
**[30]**

**TOTAL: 100**  
5/...

**Question 4: Worksheet**

Name: \_\_\_\_\_

Student Number: \_\_\_\_\_



FLOOR PLAN