



UNIVERSITY
OF
JOHANNESBURG

FACULTY : Education

DEPARTMENT : Science and Technology Education

CAMPUS : APK

MODULE : EGD10A3
ENGINEERING GRAPHICS AND TECHNOLOGY EDUCATION 3A

SEMESTER : First

EXAM : June 2018

DATE : 5 June 2018

SESSION: 12:30-14:30

ASSESSOR(S) : MR W ENGELBRECHT

MODERATOR : DR W RAUSCHER (UP)

DURATION : 2 HOURS

MARKS: 100

NUMBER OF PAGES: 4 PAGES

INSTRUCTIONS:

1. Answer ALL the questions.
 2. Number your answers clearly.
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QUESTION 1

- 1.1 Draw a circuit to demonstrate an **AND** gate with **two** inputs using two single pole switches, a battery and a light bulb and compile a truth table for the circuit. (10)
- 1.2 Briefly describe and discuss a possible practical application for the gate in 1.1. (2)
- 1.3 In a stairwell it is necessary to be able to switch the light on at the top of the stairs, and to switch the same light off from the bottom of the stairs. Sketch the diagram of such a circuit using two single pole double throw switches. (8)

[20]**QUESTION 2**

- 2.1 A client has a need for a device that would automatically switch on a fan powered by mains electricity when the ambient temperature rises to a pre-set level (when it gets hot). 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 Ω resistor	1
2.2k Ω resistor	3
680 Ω resistor	1
10k Ω potentiometer	1
White LED	1
LDR	1
9V buzzer	1
Thermistor	1
9V relay	1
Connecting wire	500mm
Mains powered fan	1

(20)

- 2.2 Briefly describe how the circuit you designed in 2.1 works by referring to the function of the various components you used. (10)

[30]

QUESTION 3

You need a simple DC power supply to test the circuits you build. Design and sketch the diagram of a simple 9V DC power supply utilizing a transformer, a full wave rectifier and a capacitor. Draw the wave form of the output after each stage below the diagram. (15)

QUESTION 4

Figure 1 on the worksheet shows the floorplan of a house. Complete the worksheet by adding the electrical fittings as listed in the electrical specification below. Use SABS 0143 electrical symbols and show connections where required. Detach the worksheet from the question paper and place it inside your answer book.

Electrical specifications:

Lounge:

- One wall mounted light at the entrance connected to a double-pole switch that also has two inside ceiling lights connected to it. (7)
- Two switched socket outlets. (2)

Bedroom 1 and 2:

- A ceiling light connected to a single-pole switch in each room. (6)
- One switched socket outlet in each room. (2)

Bathroom and toilet:

- A ceiling light in each room connected to a double-pole switch which must be placed outside the rooms. (5)

Dining room

- One ceiling light connected to a single-pole switch. (3)
- One switched socket outlet. (1)

Kitchen

- One fluorescent ceiling light with two 40 watt tubes and one wall mounted light outside the back door connected to a double-pole switch. (5)
- Three switched socket outlets. (3)
- Distribution board. (1)

[35]

TOTAL: 100

4/...

QUESTION 4 Worksheet

Name: _____ Student Number: _____

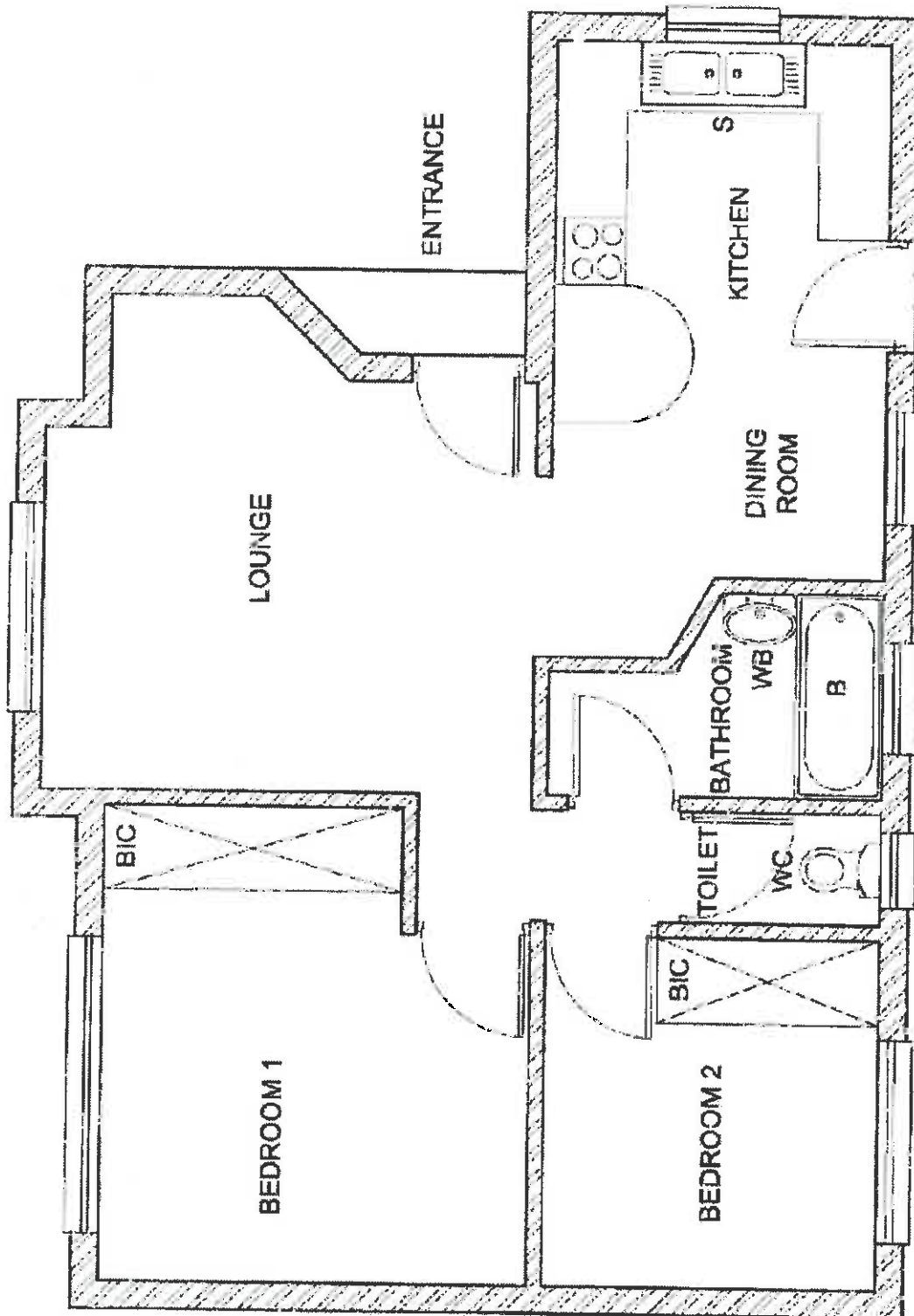


Figure 1