**UNIVERSITY OF JOHANNESBURG**
**FACULTY OF EDUCATION**
**JUNE SUPPLEMENTARY EXAMINATION 2016**

**PROGRAMME:** B. Ed. Intermediate Phase

**MODULE:** Natural Science and Technology for the Intermediate Phase

**CODE:** SATINA1

**TIME:** 2 hours

**MARKS:** 100

**EXAMINER:** Mr F Naude and Mr E Libusha

**MODERATOR:** Ms K Fonseca and Mr W Engelbrecht

(This paper consists of 7 pages)

**INSTRUCTIONS**

Read the following instructions carefully before answering the questions.

1. Answer all questions.
2. Read the instructions carefully and answer appropriately.
3. Use the mark allocation of each question as an indication of how much information to provide.
4. Complete section A and section B in separate booklets

## SECTION A

### QUESTION 1

Choose the correct answer and only write down the number of the question (e.g. 1.1) and letter of your choice (e.g. A)

1.1 Which of the following groupings are all vertebrates?

A. snakes, birds and fish
B. ants, crabs, spiders and snails
C. ants, crabs, snakes and bees
D. birds, bees, butterflies and ants

1.2 One type of living organism which is found in a habitat is better known as:

A. population
B. herd
C. community
D. ecosystem

1.3 Which of the following substances are not part of respiration?

A. $CO_2$ B. $H_2$

C. $H_2O$ D. $O_2$

1.4 A shooting star is not a star but .....

A. the light from weather balloons B. space debris entering the atmosphere

C. a black hole D. the interaction of several gasses

1.5 Which of the following is not a terrestrial planet?

A. Venus B. Mars

C. Uranus D. Mercury

1.6 Why do you place your hands over a fire when you are cold instead of underneath the fire?

A. hot air sinks B. wind blows heat upwards

C. hot air rises D. cold air insulates your hands

1.7 Which of the following is a heterogeneous mixture?

A. Coffee B. Sugar stirred into water

C. Fruit salad D. Air in the atmosphere

1.8 Which of the following statements about the moon is not correct?

A. radiates light B. rotates on its own axis

C. orbits the earth D. travels around the sun

**[8]**

## QUESTION 2

2.1 Compare potential energy to kinetic energy. (2)

2.2 You take an elevator up to the top of a skyscraper.

2.2.1 Do you have more potential energy at the top of the skyscraper than you did at the bottom? Explain. (2)

2.2.2 Do you have more, less, or the same amount of energy at the top of the skyscraper than if you were to take the stairs? (Let's assume you did not eat anything on the way up.) Explain. (2)

2.3 A heater is placed on one side of a room and is turned on. It is a cold night. Explain why most people gather close to the heater. What is the term we use for this heat transfer? (3)

2.4 Study the picture below. Answer the questions that follow

2.4.1 List two pieces of clothing that serve as insulators? (2)

2.4.2 The children in the picture tried to make a string of 'fairy lights" for their igloo. They connected these lights in series. Explain what would happen as they add more and more lights to the circuit. (3)

2.4.3 Based on your answer in 2.4.2, what advice would you give the children? Explain your answer by drawing an electric circuit that includes all the necessary components for conventional flow. (7)

2.4.4 Explain why people who touch electric wires may be electrocuted. (3)

2.5 Illustrate using appropriate drawings how a coal-fired power station supplies electricity to appliances in homes. (8)

**[32]**

**QUESTION 3**

3.1 Draw a representation of the inner layers of the Earth. (6)

3.2 The position of the Earth in the solar system is described as the goldilocks zone. Compare the narrative of the fairy tale to the position of the Earth in the solar system. (4)

3.3 Name the three basic types of rocks, and briefly state the process by which each type is formed. (6)

3.4 Explain what influence the moon has on oceans. (2)

3.5 Predict what would happen if the moon was half the distance closer than its current position to the Earth. (2)

**[20]**

**QUESTION 4**

4.1 Illustrate by using an appropriate drawing what is meant with the term "food chain". (6)

4.2 Describe the ecosystem in which your example in 4.1 takes place. (2)

4.3 How does the water cycle influence the organisms in 4.1? (2)

**[10]**

**Section A Total = 70**

## Section B

### QUESTION 1

1.1 What is the difference between a frame structure and a shell structure. (2)

1.2 List two functions of structures. (2)

1.3 What are the two forces that can contribute in the failure of a structure. (2)

1.4 Name two ways that can be used to make a Structure rigid. (2)

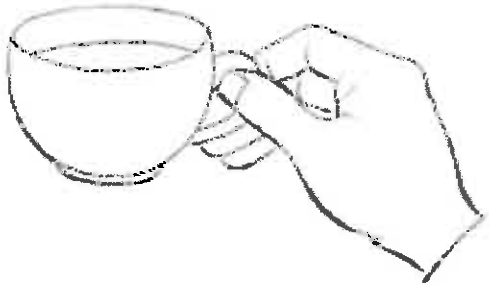
1.5 Give then name of the force acting on the structures below.

1.5.1 Force in the rope with aman walking on top of it (1)

1.5.2 The force acting on the leg of a table when a woman is dancing on top of it. (1)

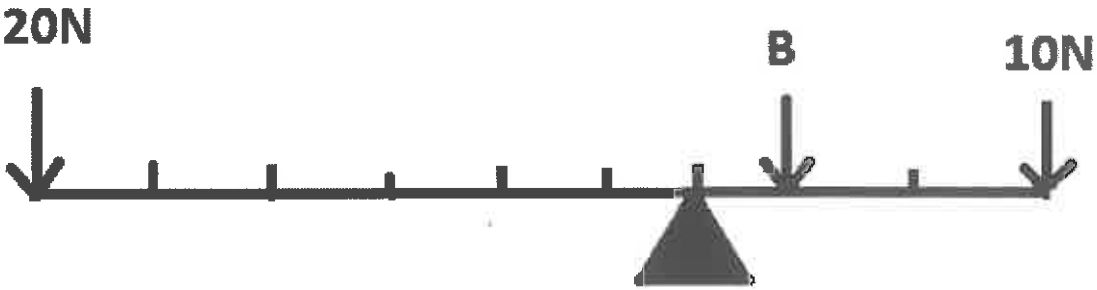
1.5.3 Force on the cloth when hands are wringing water from it (1)

1.5.4 Force acting on a cup and its ear when a Hand is holding a cup. (1)



1.6 Explain the difference between a tie and a Strut and give one example of each. (4)

1.7 What force must be applied to the lever at B, to just balance the load? (5)




**[21]**

**QUESTION 2**

2.1 What must the relationship of the diameters of the pulleys in a belt and pulley system in order to obtain the following speeds on the output pulley?

2.1.1 The driven pulley and the driver are running at the same speed. (1)

2.1.2 The driven pulley is faster than the driver pulley. (1)

2.1.3 The driver pulley is faster than the driven pulley . (1)

2.2 A motor is driving a drilling machine. The driving pulley has a diameter of 8cm and the driven pulley has a diameter of 10cm. If the driver motor runs at 1200rpm, what is the drill speed? (3)

2.3 Name the input motion force, the type of mechanism and the output motion force that can be used when water in a well is hoisted out of the well by the bucket. (3)

**[9]**

**Section B Total: 30**

**Grand Total = 100**