FACULTY OF HEALTH AND APPLIED SCIENCES
DEPARTMENT OF NATURAL AND APPLIED SCIENCES
BSC PROGRAMME

NAME………………………………………………………………………………………………………
ST. #: ……………………………………………………………………………………………………
QUALIFICATION(S):………………………………………………………CENTRE:………………
MODE OF STUDY:   FM :  PM :  DM :
CLASS VENUE: ……………………………………………… (FHAS Aud., or Mining Aud.)

COURSE NAME:  BASIC SCIENCE
COURSE CODE:  BSC410S
DATE:  01 MARCH 2019
DURATION:  2 HOURS
MARKS:  90

BASIC SCIENCE TEST 1, SEMESTER 1
EXAMINER(S):  Mr V Indongo, Mr T Nanghonga, Mr P Paulus, Ms. M. Amuanyena, Ms M Mutwa

INSTRUCTIONS:
1. Answer all the questions in this questions paper.
2. For Multiple Choice questions, CYCLE the correct answer with a blue/black INK pen.
3. No books, notes and other additional aids are allowed.
4. A Periodic Table is attached at the back of this question paper.

PERMISSIBLE MATERIALS
• Only a scientific calculator is allowed

This paper consists of 4 pages including this cover page
QUESTION 1: Circle the letter corresponding to the correct/right answer (20)

1.1 Which is the correct order for increasing complexity? (2)
(a) cells → tissues → organs → organ systems → organism
(b) organs → organism → tissues → cells → organ systems
(c) tissues → cells → organ systems → organs → organism
(d) cells → organs → tissues → organ systems → organism
(e) cells → biosphere → tissues → organ systems → organism

1.2 Which of the following is a correct sequence of levels of classification? (2)
(a) genus, species, family, order, class, phylum, kingdom
(b) genus, species, order, phylum, family, class, kingdom
(c) genus, species, order, family, class, phylum, kingdom
(d) species, genus, family, order, class, phylum, kingdom
(e) species, genus, order, family, class, phylum, kingdom

1.3 The father of taxonomy is? (2)
(a) Aristotle
(b) Linnaeus
(c) Whittaker
(d) Darwin
(e) Pasteur

1.4 In the six-kingdom system, the kingdom that includes the protozoa is (2)
(a) plantae
(b) protista
(c) archaea
(d) eukarya
(e) fungi
1.5 Which is the scientific name of an organism? 

(a) **Rosa rugosa**

(b) *Rosa*

(c) *rugosa*

(d) Rugosa rugosa

(e) Both a and d are correct.

1.6 Which statement is not true about viruses? 

(a) they can reproduce independently without a host

(b) they are not included in the six kingdoms of living organism

(c) viruses are smaller than bacteria

(d) they cannot be strictly be considered as living organism

(e) each contain either DNA or RNA

1.7 Which of these is an incorrect contrast between monocots (stated first) and dicots (stated second)?

(a) one cotyledon --- two cotyledons

(b) leaf vein parallel --- net veined

(c) **vascular bundles in a ring --- vascular bundles scattered**

(d) flower parts in threes --- flower parts in fours or fives

(e) All these are a correct contrast

1.8 Prokaryotes differs from Eukaryotes in that they? 

(a) **don’t have a membrane bound nucleus**

(b) have a membrane bound nucleus

(c) are non-living

(d) microscopic organisms

(e) None of the above
1.9 Life comes from life. Bacteria, protists and other unicellular organisms simply splits into two. Which type of reproduction is this? (2)
(a) Multiplication
(b) Sexual
(c) Asexual
(d) biological
(e) Microbial growth

1.10 Monoecious are? (2)
(a) plants that have separate male and female flowers on the same plant.
(b) plants that have the male flowers on one plant and female flowers on another plant.
(c) non-flowing plants
(d) naked seed producing plants
(e) unicellular plants.

QUESTION 2: Structured Questions (10)

2.1 Why is it necessary to give organisms scientific name? (2)
A common name will vary from country to country just because different countries use different languages. The scientific name is universal, (the same worldwide).

2.2 State the three types of shapes used in classifying prokaryotes such as bacteria (3)
- Rod (bacillus)
- Round (spherical, cocci)
- Spiral (Spirillum)

2.2 Discuss how microorganism like bacteria exhibit the movement? (2)
Flagella – whips around to propel the bacteria
Cilia – helps the bacteria to swim

2.3 State any three economic importance of the Gymnosperms (3)
Any correct three
- Ecologically, conifers contribute food and shelter to animals and other organisms, and their roots hold the soil in place and help prevent soil erosion.
- Used for wood, paper, furniture, etc.
- Ornamental plants (trees, landscaping, Certain conifers provide Christmas trees)
- Food – pine nuts (pesto, etc.)
- In South Africa pine are planted for timber.

SECTION B: CHEMISTRY

QUESTION 3: Circle the letter corresponding to the right/correct answer.

3.1 How many significant figures are in 100,890 m?  
A. 2  
B. 4  
C. 5  
D. 6  

3.2 How many significant figures are in 100.50 m?  
A. 3  
B. 4  
C. 5  
D. 1  

3.3 The factor $10^{-6}$ corresponds to which prefix?  
A. mega  
B. micro  
C. milli  
D. nano  

3.4 SI unit for temperature is:  
A. °C  
B. °F  
C. °K  
D. K
3.5 If the temperature is 212 °F, what is the temperature in degrees Celsius? 
   (2) 
   A. 0 °C  
   B. **100 °C**  
   C. 10°C  
   D. 85.7 °C  
3.6 The weather forecast for Friday was estimated to be 28.4°C. What reading would this temperature give in degree Fahrenheit? 
   (2) 
   A. 543.2 °F  
   B. 83.12°F  
   C. **83.1 °F**  
   D. 543°F  
3.7 Round the following number to four significant figures and express the result in scientific notation: 379.65 
   (2) 
   A. 3.797 x 10^2  
   B. 379.7  
   C. 3. 796 x 10^-2  
   D. **3.796 x 10^2**  
3.8 Determine the mass of an object that has a volume of 18.8 mL and a density of 2.34 g/mL and give your answer to the correct number of significant figures. 
   (2) 
   A. 43.992 g  
   B.43.9 g  
   C. **44.0 g**  
   D. 43.10 g  
3.9 Perform the following calculations and report the answer to the correct number of significant figures and in scientific notation. 
   1) (9.45 x 10^6m) x (5.60 x 10^-8m) / (8.96 x 10^-9 m) 
   (2) 
   a) **5.91 x 10^7 m**  
   b) 5.91 x 10^-7 m  
   c) 5.91 x 10^7 m^2  
   d) 5.91 x 10^7 m^3
2) \(0.00888 \text{ km} + 0.00045 \text{ km}\)  
   
   a) \(9.33 \times 10^{-3} \text{ km}^2\)  
   
   b) \(933 \times 10^{-5} \text{ km}\)  
   
   c) \(9.33 \times 10^{-5} \text{ km}\)  
   
   d) \(9.33 \times 10^{-3} \text{ km}\)

**QUESTION 4: Structured questions**

4.1 Briefly define the terms error.  
**Is a difference between the accepted/true value and experimental value.**

4.2 Briefly differentiate between weight and mass.  
**Weight is a force that measures the pull by gravity whereas Mass is a measure of the quantity or amount of matter present in an object.**

4.3 Carry out the following calculation and give the answer with the correct number of significant figure:  
\[
(527.112 + 13)/63.498 = 8.5
\]

4.4 Use the dimensional analysis method to carry out the following conversion:  
(a) \(28.0 \text{ m to km} = 0.028 \text{ Km or } 2.8 \times 10^{-2} \text{Km}\)  
**NB: 1 km = 10^3 m,**

4.5 Given the following measurements obtained by three students for the length of an object (in cm):

<table>
<thead>
<tr>
<th>Student</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Trial 4</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11.2</td>
<td>11.1</td>
<td>11.1</td>
<td>11.2</td>
<td>11.2</td>
</tr>
<tr>
<td>2</td>
<td>11.1</td>
<td>11.8</td>
<td>11.9</td>
<td>11.2</td>
<td>11.5</td>
</tr>
<tr>
<td>3</td>
<td>11.4</td>
<td>11.6</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
</tbody>
</table>

If the length of the object is known to be 11.54 cm,  
(a) Which student is accurate and precise? = 3  
(b) Which student is not accurate, but precise? = 1
(c) Which student is accurate, but not precise? = 2

4.6 Give the SI units of the following physical quantities:

a) Amount of substance = mol
b) Volume = m³

SECTION C: PHYSICS

QUESTION 5: Circle the letter corresponding to the right/correct answer.

5.1 The dependent and independent variables are being plotted on ...... and ......., respectively

(a) Horizontal and vertical axis.
(b) Vertical and y axis.
(c) Vertical and horizontal.
(d) X and horizontal axis.

5.2 Which statement is FALSE for line graphs?

(a) A slope may be an indication of how fast the line raises.
(b) A slope may be an indication of how fast the line falls.
(c) A slope of a straight line is not constant.
(d) A slope is another name for gradient.

5.3 Suppose there is a graph obeying the equation Y = MX + C. C represents the ......

(a) The line graph
(b) The y-axis intercept
(c) The x-axis intercept
(d) The origin of a graph
5.4 Usually it is best to fit a straight line that goes as near as possible to…….. plotted on a graph.

(a) as many points
(b) one point
(c) two points
(d) three points

5.5 Consider the following acronym T.A.I.L.S. Which one is NOT correct? (2)

(a) **When drawing a graph, an interval is not needed.**
(b) A title for a graph should be considered.
(c) Know which graph you required to draw.
(d) The graph should at least be 2/3 the size of the graph page.

Use the following information and graph to answer 5.6 – 5.10.

A study or exercise to investigate the rate of displacement of two makes of selected cars in Tsumkwe was tabulated and a graph was drawn according the data.
5.6 The title for the graph could be …………. (2)

(A) Second vs time graph.
(B) Time vs velocity graph
(C) Velocity vs time graph.
(D) Velocity vs line graph

5.7 Which car has higher acceleration? (2)

(A) Car 1
(B) **Car 2**
(C) Both cars
(D) None of the cars

5.8 What would be the velocity of car 2 when time t = 12 s. (2)

(A) 11 m/s
(B) **100 m/s**
(C) 120 m/s
(D) -56 m/s

5.9 The gradient of a line graph for car 1 is ……………………… (2)

(A) 11.25
(B) – 11.25
(C) **3.40**
(D) 17.22

5.10 At what time is the velocity for car 1 equal to 20 m/s? (2)

(A) **2.8 s**
(B) 3.5 s
(C) 2.2 s
(D) 8.2 s
**QUESTION 6:** Structured questions.

An experiment carried out in the Physics laboratory to determine the rate of change of velocity has the following results presented in graphical form below. Using the diagram answer the following question:

![Speed (m/s) -Time (s) graph](image)

A. From the graph above, identify the independent variable and the dependent variable.

Independent variable is ..........**time/x-axis/horizontal axis**........ (2)
Dependent variable is ..........**speed/velocity/y-axis/vertical axis**........

B. The equation of a straight line is given by;

\[ Y = MX + C \]

i) Form the equation above, what does the letters “M” and “C” mean?

M meaning: ..........**Gradient/slope**................................. (3)
C meaning: ..........**y-intercept/vertical axis intercept**.................

According to graph is M (decreasing, increasing, negative, positive): ....**decreasing and negative**....
ii) What quantity of measurements does M represent? State the SI units for this quantity of measurements.

Quantity is ..........acceleration.........

SI units is ..........m/s² ...or...ms²........

iii) From the graph above, what is the value of C?

Value of C is ..................8....................

iv) At what time is the velocity:

V = 2? ..........3 s............

V = 0? ..........4 s............