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COURSE: BASIC SCIENCE	COURSE CODE: BSC410S
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DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY / SUPPLEMENTARY: EXAMINATION QUESTION PAPER

(FM+PM+DI)

EXAMINER: *MRS LEONORITHA NAOMAS, MS MIRJAM HATUTALE, DR MUNYARADZI ZIVUKU*

MODERATOR: *PROF EDOSA OMOREGIE*

INSTRUCTIONS:

1. Answer all questions on the separate answer sheet.
2. Please write neatly and legibly.
3. Do not use the left side margin of the exam paper. This must be allowed for the examiner.
4. No books, notes and other additional aids are allowed.
5. Mark all answers clearly with their respective question numbers.

PERMISSIBLE MATERIAL:

Non-Programmable Calculator

ATTACHEMENT:

Periodic Table

This paper consists of 17 pages including this front page and a Periodic Table.

QUESTION 1 (20)

Question Type: Multiple Choice Questions. Choose and write the letter corresponding to the correct answer.

1.1 Bacteria uses _____ and _____ to move. (1)

    A. cilia and flagella

    B. cilia and legs

    C. cilia and tails

    D. None of the above

1.2 Bacteria are single-celled microorganisms that belongs to the following type of organisms; (1)

    A. Prokaryotes

    B. Eukaryotes

    C. Yeast

    D. Fungi

1.3 What is the smallest possible unit that exhibits all the characteristics of life? (1)

    A. Monosaccharide

    B. Virus

    C. Cell

    D. Cell membrane

1.4 What are the seven characteristics of living things? (1)

    A. movement, respiration, sensitivity, nutrition, excretion, reproduction, growth

    B. movement, respiration, sensitivity, nutrition, excretion, reproduction, death

    C. movement, respiration, sensibility, nutrition, excretion, reproduction, growth

    D. movement, respiration, sensitivity, nutrition, excitement, reproduction, growth

1.5 Which of the following levels of organization is arranged in the correct sequence from least to most inclusive? (1)

    A. community, ecosystem, individual, population

    B. ecosystem, community, population, individual

    C. community, population, ecosystem, individual

    D. individual, population, community, ecosystem

1.6 The following is an example of a biotic factor; (1)

A. water

B. sunlight

C. plants

D. air

1.7 Plants get their energy from _____. (1)

A. decomposers

B. sunlight

C. consumers

D. soil

1.8 Autotrophs are also known as _____. (1)

A. consumers

B. herbivores

C. producers

D. omnivores

1.9 Food webs have the following characteristics; (1)

A. They have more organisms involved.

B. They are more complex and involve lots of organisms.

C. It is a more complex of interconnected food chains in an ecosystem.

D. All of the above.

1.10 Which carbohydrate among the following is used during intense exercising? (1)

A. starch

B. sucrose

C. fructose

D. glycogen

1.11 Which of the following is correct? (1)

A. Sucrose is made of galactose and glucose.

B. Lactose is made up of glucose and fructose.

C. Lactose is made up of galactose and fructose.

D. Sucrose is made up of glucose and fructose.

1.12 Which of the following is a function of insoluble fiber only? (1)

    A. Regulating blood sugar.

    B. Regulating the pH of the body.

    C. Adding bulk to stool.

    D. Lowering cholesterol.

1.13 Which of the following is false? (1)

    A. Fats provide insulation.

    B. Fats maintain healthy skin and hair.

    C. Vitamin A, D, E and K are fat soluble only.

    D. Fats provide instant energy.

1.14 The following are the reasons why partially hydrogenated oils are used in the food industry. Which one is untrue? (1)

    A. Long shelf life

    B. Less refrigeration required

    C. Inexpensive

    D. Healthy

1.15 How many water molecules are needed to hydrolyse a monomer with 20 monomers long? (1)

    A. 10

    B. 40

    C. 5

    D. 2

1.16 The yeast used for the production of Ale is; (1)

    A. *Saccharomyces carlsbergensis*

    B. *Saccharomyces cerevisiae*

    C. *Saccharomyces uvarum*

    D. *Streptococcus thermophilus*

1.17 Yeast is used to provide enzymes to convert; (1)

A. maltose to glucose

B. lactose to galactose

C. sucrose to fructose

D. lactose to glucose

1.18 In order to produce sweet wine; (1)

A. all the sugar must be converted to alcohol.

B. all the glucose must be consumed.

C. the fermentation process should be extended.

D. the fermentation process should be stopped before all sugar is used up.

1.19 Why do pastry chefs knead dough? (1)

A. to increase the production of carbon dioxide

B. to give it shape

C. to exercise

D. to stop fermentation

1.20 Alcoholic beverages can be divided into different classes. Which one of the following is not a class in alcoholic beverages? (1)

A. beer

B. wine

C. yoghurt

D. spirits

QUESTION 2 (10)

2.1 Explain why vitamin K is also known as the clot master. (2)

2.2 Contrast how fungi digest and absorb their food with your own digestion. (2)

2.3 Name and explain the two reproductive mechanisms in gymnosperms. (4)

2.4 State the 10 % Law and how does it explain why energy is referred to as an energy flow and not an energy cycle. (2)

QUESTION 3 (20)

Question Type: Multiple Choice Questions. Choose and write the letter corresponding to the correct answer.

3.1 Which of the following represents a value? (1)

    A. Length of 50

    B. 50 degrees Celsius

    C. Volume of 50

    D. Temperature of 50

3.2 Which one of the units is SI unit? (1)

    A. Mol

    B. Hour

    C. g/cm^3

    D. N

3.3 The error in a measurement can be calculated. Which of the following expression is used to calculate the error in the measurement? (1)

    A. The sum of accepted value and experimental value

    B. The quotient of accepted value and experimental value

    C. The product of accepted value and experimental value

    D. The difference of accepted value and experimental value

3.4 Which one of the measurements have same significant figures? (1)

    A. 1.43 and 0.04

    B. 45 and 0.0739

    C. 0.00506 and 2.00

    D. 2.05 and 9

3.5 Which of the instruments is used to measure weight? (1)

    A. Balance scale

    B. Spring balance

    C. Thermometer

    D. Metric tape

3.6 All matter is composed of; (1)

    A. an atom

    B. density

    C. mass

    D. volume

3.7 Which of the physical properties of the substance depends on the amount of matter in the sample? (1)

    A. Hardness of the sample

    B. Melting point of the sample

    C. Length of the sample

    D. The color of the sample

3.8 Decomposition of wood is classified as an example of; (1)

    A. Physical property

    B. Chemical Property

    C. Reactive Property

    D. none of the above

3.9 Which of the statements describe a reverse sublimation? (1)

    A. Solid to liquid

    B. Solid to gas

    C. Gas to Solid

    D. Gas to liquid

3.10 Which the following is a compound? (1)

    A. Na

    B. Cl

    C. NaCl

    D. All the above

3.11 The technique used to separate a mixture of substances based on their solubility within a given solvent is; (1)

    A. Evaporation

    B. Simple distillation

    C. Chromatography

    D. Fractional distillation

3.12 What is the name of the scientist who proposed that the electrons are arranged in orbits around the nucleus of the atom and electrons move in a particular path have fixed energy? (1)

A. Ernest Rutherford

B. J J Thomson

C. Neils Bohr

D. John Dalton

3.13 Which of the statements describes the nature of a neutral atom of all elements in the periodic table? (1)

A. The number of protons is equal to the number of neutrons

B. The number of protons is equal to the number of electrons

C. The number of protons is different to the number of electrons

D. None of the above

3.14 What is the charge and the location of the neutron of an atom? (1)

A. Positive and electron cloud

B. Positive and nucleus

C. zero and electron cloud

D. neutral and nucleus

3.15 What is the name of the group in which atom of the elements gain one electron when they form ion? (1)

A. halogens

B. alkali metals

C. alkaline earth metals

D. noble gases

3.16 Which of the electronic configurations is for the element in group 8? (1)

A. 2, 8, 6

B. 2, 8, 1

C. 2, 8, 3

D. 2, 8, 8

3.17 Acid is defined as a substance that produces...........when dissolved in aqueous

   solution. Which option completes the statement? (1)

   A. H_2O

   B. OH^-

   C. H^+

   D. Na^+

3.18 What is the chemical name for Baking soda? (1)

   A. Sodium chloride

   B. Sodium hydrogencarbonate

   C. Sodium carbonate decahydrate

   D. Sodium carbonate

3.19 A reaction between an acid and base is known as? (1)

   A. Acidification

   B. Neutralization

   C. Alkalinity

   D. None of the above

3.20 What is the color of phenolphthalein when added to the basic solution? (1)

   A. pink

   B. yellow

   C. blue

   D. colorless
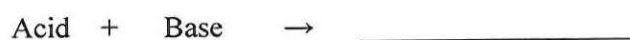
QUESTION 4: Structured questions (15)

4.1 Apply the rule(s) of significant figures to calculate the following;

   (i) 6.45 x 2.3, (2)

   (ii) 12.7899 – 2.27 (2)

4.2 Define the term Synthesis. (1)

4.3 Copy and complete e the equation below; (2)

   Acid   +   Base   →   _____

4.4 (i) Answer the question by filling the missing information in the table.

Element	Number of protons	Number of Neutrons	Number of electrons	Overall charge
Element B	19	20	_____	+1
Element C	_____	16	15	0
Element D	8	8	6	_____

(3)

    (ii) State the element in the table which is a metal. (1)

    (iii) write the electronic configuration of element C. (1)

4.5 State the difference between strong acid and weak acid. (2)

4.6 State one common alkali/base. (1)

SECTION C: PHYICS   (35)

QUESTION 5   (20)

Question Type: Multiple Choice Questions. Choose and write the letter corresponding to the correct answer.

5.1 Which statement is **FALSE** for line graphs? (1)

    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 is a value of extrapolation.

    D. A slope is another name for gradient.

5.2 The dependent and independent variables are being plotted on _____ and _____, respectively. (1)

    A. Horizontal and vertical axis

    B. Vertical and y axis

    C. Vertical and horizontal

    D. None of the above

5.3 Which of the following is not an application of **Newton's 3rd law of motion?** (1)

A. A swimmer pushes the water backwards with their hands, and in return, the water pushes the swimmer forwards, thus enabling him to go forward during swimming.

B. A man walking on the ground: While walking, a person pushes the ground in the backward direction, and the ground in return pushes the person in the forward direction, thus making them walk.

C. A bird, while flying, pushes the air downwards with the help of its wings. Consistent with Newton's third law of motion, the air makes the bird go upwards.

D. None of the above

5.3 Which one of the following is correct? (1)

A. A bar graph is the same as a histogram

B. To draw a line graph, simply join all the points plotted.

C. Pie charts are also known as 360°.

D. A bar graph is well descriptive.

5.5 Given that an astronaut exert a force of 128 N on the moon and the gravitational field strength on the moon is 1.6 N/kg. What is the mass of the astronaut in kg? (1)

A. 75

B. 90

C. 80

D. 65

5.6 If the mass of the body is doubled and its acceleration becomes half, then the *Net Force* will of the body will_____. (1)

A. become double

B. remain the same

C. become half

D. become four times

5.7 When a net force is applied, the following can have an effect on the object **except;** (1)

A. No net change in the position of the object

B. Change (increase or decrease) the velocity of the object

C. Change the direction of the moving object

D. Change the shape of the moving object.

5.8 Which of the following is a renewable source of energy? (1)

    A. Nuclear energy

    B. Coal

    C. Crude oil

    D. Geothermal

5.9 What is the main difference in the generation of electricity with water and nuclear energy. (1)

    A. Nuclear energy is a dangerous source of energy and hydroelectric power is safe

    B. In nuclear energy fission of atoms heat water which turns the generator which generator electricity while in hydroelectric energy, potential energy of water turns the turbines which turns the electricity.

    C. Hydroelectric power is a renewable source of energy while nuclear energy is non-renewable source of energy.

    D. All of the above.

5.10 During the ascent phase of a rep of the bench press, the lifter exerts an *average* vertical force against a 5000-gram barbell while the barbell moves 0.8 m upward. How much work did the lifter do to the barbell? Express your answer in *kilojoules* (kJ). Assuming the acceleration due to gravity (g) to 10 m/s^2. (1)

BENCH-PRESS
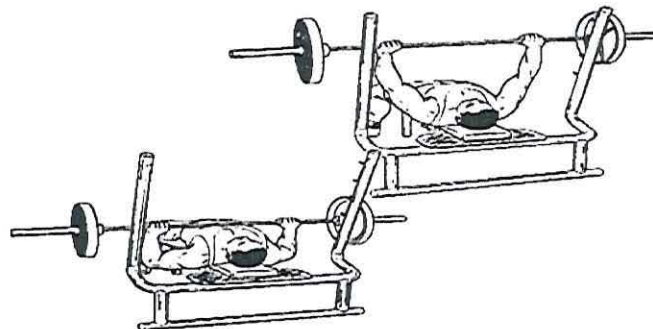
    A. 0.04 kJ

    B. 40 kJ

    C. 0.4 kJ

    D. 4 kJ

5.11 Which of the following statement is true about inelastic collision? (1)

A. Kinetic energy before collision is equal to kinetic energy after collision

B. Kinetic energy before collision is grater than the kinetic energy after collision

C. Kinetic energy before collision is less than the kinetic energy after collision

D. The total kinetic energy conserved

5.12 The current in a wire_____. (1)

A. depends on the potential deference applied

B. depends on the resistance and potential difference of the wire

C. does not depends on the resistance and potential difference

D. depends on the resistance of the wire.

USE THE CIRCUIT DIAGRAM TO ANSWER QUESTION 5.13 , 5.14 and 5.15
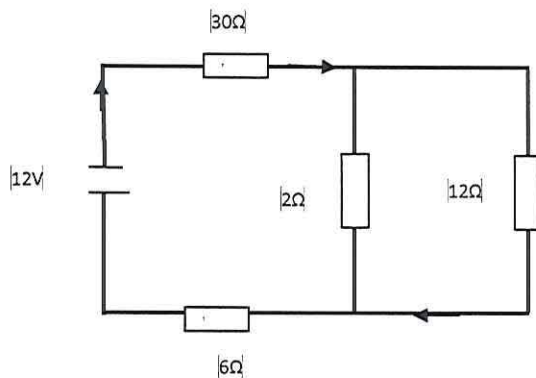
5.13 What is the resistance in parallel resistors? (1)

A. 38 Ω

B. 40 Ω

C. 1.17 Ω

D. 1.71 Ω

5.14   The equivalence resistance is _____ (1)

A. 40.12 Ω

B. 37.71 Ω

C. 38.00 Ω

D. 48.00 Ω

5.15 The total current at the 30 Ω resistor is _____.   (1)

   A. 0.318 A

   B. 0.030 A

   C. 0.250 A

   D. 0.300 A

5.16 When polonium 239 undergo alpha decay, it changes to uranium 235 in a process known

   as _____.   (1)

   A. transformation

   B. fission

   C. radioactivity

   D. transmutation

5.17 Which of the following particle is the lightest by size_____.   (1)

   A. gamma ray

   B. helium atom

   C. X rays

   D. an electron

5.18 What is the safest way to dispose of a large quantity of highly radioactive waste?   (1)

   A. burying it in dry underground rocks

   B. pouring it down the drain

   C. burning it on a fire

   D. pumping it into a river

5.19 A nuclide X decays to nuclide Y by alpha decay as illustrated by the nuclear equation;

   $_{92}^{a}X \rightarrow {}_{b}^{230}Y + 2{}_{2}^{c}He$ (1)

   Nuclide X and nuclide Y are likely to be_____

	Nuclide X	Nuclide Y
A	Th-234	U-239
B	U-238	Th-234
C	U-238	Th-230
D	U-238	Np-230

5.20 Which of the following is a heavier radiation particle? (1)

    A. gamma ray

    B. Beta particle

    C. alpha particle

    D. neutron

QUESTION 6 (15)

6.1 Study the following pie chart to answer the questions. In total 50 000 vehicles were sold by XYZ Auto Company in the year 1999.

Percentage of Vehicle Types that XYZ Auto Company sold in 1999
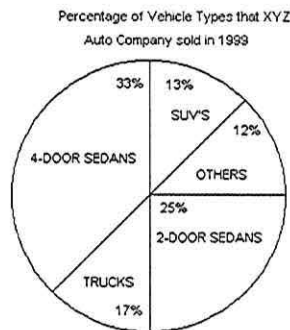
   (i) Calculate the total number of Trucks and SUV's sold. (3)

   (ii) How many vehicles were 4-doors only? (2)

6.2 A cart at the top of a 300 m hill has a mass of 420 g.

300
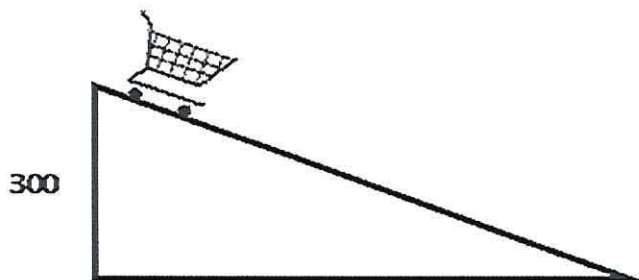
   (i) Assuming that the acceleration due to gravity is 9.8 m/s/s. What is the cart's gravitational potential energy? (2)

   (ii) Assuming that energy is conserved and there is no friction, calculate the cart's speed at the bottom of the hill. (3)

6.3 Construct a circuit diagram containing 3 resistors a, b, c in parallel, resistors d and e in series, with an ammeter and 2 cells in series with a conventional current and an open circuit. (5)

END

PERIODIC TABLE OF THE ELEMENTS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 **H** 1.00794																	2 **He** 4.00260
3 **Li** 6.941	4 **Be** 9.01218											5 **B** 10.81	6 **C** 12.011	7 **N** 14.0067	8 **O** 15.9994	9 **F** 18.9984	10 **Ne** 20.179
11 **Na** 22.9898	12 **Mg** 24.305											13 **Al** 26.9815	14 **Si** 28.0855	15 **P** 30.9738	16 **S** 32.06	17 **Cl** 35.453	18 **Ar** 39.948
19 **K** 39.0983	20 **Ca** 40.08	21 **Sc** 44.9559	22 **Ti** 47.88	23 **V** 50.9415	24 **Cr** 51.996	25 **Mn** 54.9380	26 **Fe** 55.847	27 **Co** 58.9332	28 **Ni** 58.69	29 **Cu** 63.546	30 **Zn** 65.38	31 **Ga** 69.72	32 **Ge** 72.59	33 **As** 74.9216	34 **Se** 78.96	35 **Br** 79.904	36 **Kr** 83.8
37 **Rb** 85.4678	38 **Sr** 87.62	39 **Y** 88.9059	40 **Zr** 91.22	41 **Nb** 92.9064	42 **Mo** 95.94	43 **Tc** (98)	44 **Ru** 101.07	45 **Rh** 102.906	46 **Pd** 106.42	47 **Ag** 107.868	48 **Cd** 112.41	49 **In** 114.82	50 **Sn** 118.69	51 **Sb** 121.75	52 **Te** 127.6	53 **I** 126.9	54 **Xe** 131.29
55 **Cs** 132.905	56 **Ba** 137.33	71 **Lu** 174.967	72 **Hf** 178.49	73 **Ta** 180.948	74 **W** 183.85	75 **Re** 186.207	76 **Os** 190.2	77 **Ir** 192.22	78 **Pt** 195.08	79 **Au** 196.967	80 **Hg** 200.59	81 **Tl** 204.383	82 **Pb** 207.2	83 **Bi** 208.908	84 **Po** (209)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** 226.025	103 **Lr** (260)	104 **Rf** (261)	105 **Db** (262)	106 **Sg** (263)	107 **Bh** (264)	108 **Hs** (265)	109 **Mt** (268)	110 **Uun** (269)	111 **Uuu** (272)	112 **Uub** (269)		114 **Uuq**		116 **Uuh**		118 **Uuo**

Lanthanides:

57 **La** 138.906	58 **Ce** 140.12	59 **Pr** 140.908	60 **Nd** 144.24	61 **Pm** (145)	62 **Sm** 150.36	63 **Eu** 151.96	64 **Gd** 157.25	65 **Tb** 158.925	66 **Dy** 162.50	67 **Ho** 161.930	68 **Er** 167.26	69 **Tm** 166.934	70 **Yb** 173.04

Actinides:

89 **Ac** 227.028	90 **Th** 232.038	91 **Pa** 231.036	92 **U** 238.029	93 **Np** 237.048	94 **Pu** (244)	95 **Am** (243)	96 **Cm** (247)	97 **Bk** (247)	98 **Cf** (251)	99 **Es** (252)	100 **Fm** (257)	101 **Md** (258)	102 **No** (259)