RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

Bachelor of Science in Information Technology
First Year – Semester I Examination – March 2021

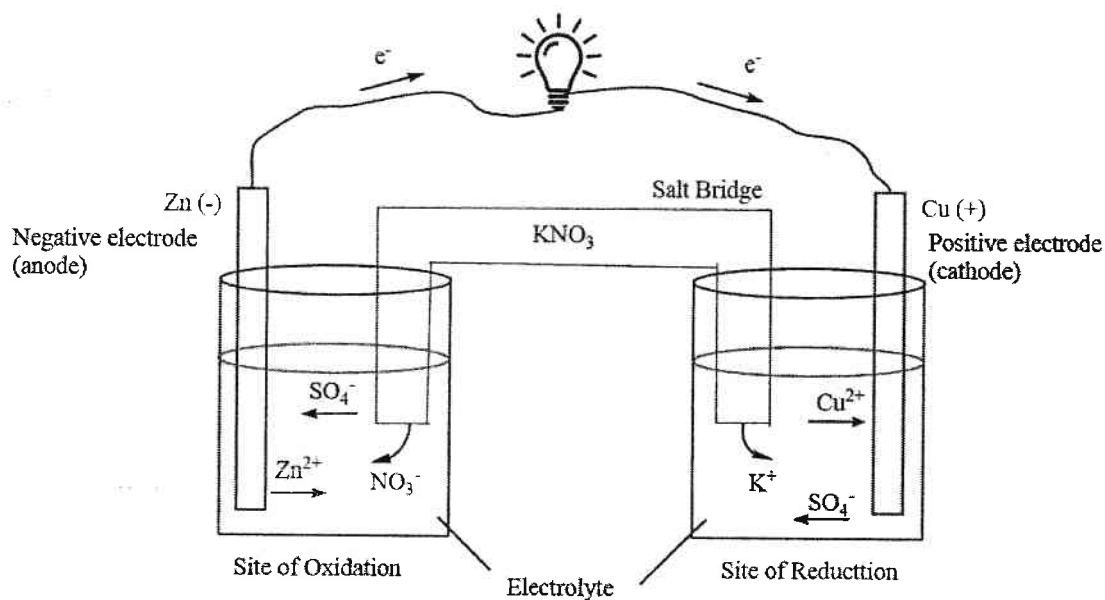### FDN 1205 – BASIC SCIENCE FOR NON SCIENCE STUDENTS

Time: Two (02) hours

Answer **ALL** the questions on the paper itself.
Calculators are permitted.

INDEX NO: ....

1.

a) Diagram of a Galvanic cell is given bellow.

Contd.

i. Write down the chemical reaction for the oxidation and reduction.

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(02 marks)

ii. Explain the use of the salt bridge in the setup.

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(01 mark)

b) An atom has 15 electrons.
  i. How many protons does it possess?

  .... (01 mark)

  ii. Give the count of most probable number of neutrons it would have.

  (01 mark)

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  iii. What is the charge of this atom?

  .... (01 mark)

c)
  i. Write down the atomic number, mass number and the number of neutrons of $^{37}_{17}X$.

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  (02 marks)

  ii. The atom X has another form in which there are only 18 neutrons exist. What is the common name given for the relationship of these two types of the same element? Write down the mass number of second form of the X.

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  (01 mark)

  Contd.

d) With the aid of the periodic table, write down the group in which the following elements are in.

Element	Metal /Nonmetal/ Metalloid	Main group, transition metal or inner transition metal	Solid, liquid or gas
V			
Ge			
F			
Hg			

(03 marks)

e) Predict the type of bonding between $TiCl_4$ and PCl_3. Justify your answer.

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(02 marks)

f) Identify whether each of the following is a cation or an anion and determine the charge on each.
   i. Iron with 26 protons and 23 electrons.

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   ii. Oxygen with 10 electrons.

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(02 marks)

g) Predict the chemical formula A_xB_y for each of the following atomic combinations.
   i. N and H: ....
   ii. Si and Cl: ....
   iii. Ca and S: ....   (02 marks)

Contd.

h) If you have a gas leak in your kitchen, you get a strong rotten egg like smell. However, when you burn the gas and get a flame you do not get such a strong smell. Explain the chemistry behind this observation.

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(03 marks)

i) Complete the following reactions.
   i. $Cd(s) + H_2SO_4(aq) \rightarrow$ .... $+ H_2(g)$
   ii. $CaNO_3(aq) + NaCO_3(aq) \rightarrow$ ....$(s) +$ .....$CO_3(aq)$
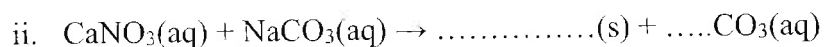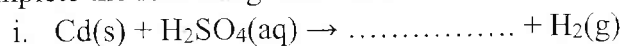
(02 marks)

j)
   i. Universe is composed with matter, space and energy. How would you define the matter?

   .... (01 mark)

   ii. A liquid can flow and take the shape of the container unlike a solid. Explain the reason using the particle model.

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(02 marks)

Contd.

k) Proteins are essential biomolecules for the existence of life.

    i. Give the structure of the simplest amino acid.

(01 marks)

    ii. Indicate the relationship of amino acids to proteins.

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(01 mark)

l) Name four key ingredients in cosmetics

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(02 marks)

2.

a) i. What is it meant by Science and Technology? Explain with an example.

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(05 Marks)

Contd.

ii. Use an example to describe the Scientific Method as an ongoing process.

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(05 marks)

b)   i. What is a galaxy?   (03 marks)

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Contd.

ii. Use a diagram to describe the top view of the map of the Milky Way. In your diagram show the most probable place for a super massive black hole.

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(04 marks)

c) Describe the formation of sedimentary, igneous and metamorphic rocks with a schematic diagram of the "rock cycle".

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(08 marks)

Contd.

3.

a) According to the National Center for Health Statistics, the average mass of an adult Sri Lankan male is 72 kg.

    i. Determine the mass and the weight of a 72 kg man on the moon where the gravitational field is one-sixth that of the earth. (Acceleration due to gravity on the earth is 9.8 ms^{-2}.)

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(04 marks)

    ii. Describe the laws associated in solving the part a) i.

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(05 marks)

    iii. If you try to throw a 10 kg bag horizontally at a friend, is it one-sixth easier on the moon than on the earth? Justify your answer.

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....(03 marks)

Contd.

b) A pen is at rest. It is made up of millions of molecules all pulling on each other. i.e. Cohesive inter-atomic forces present in any solid.

i. Why doesn't the pen accelerate spontaneously due to these forces?

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.... (02 marks)

ii. Describe the law associated with the above phenomena.

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(02 marks)

iii. If all forces come in pairs, then how come the earth doesn't accelerate towards apple falling from trees. Explain by evaluating the acceleration of the earth and apple separately.

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(04 marks)

Contd.

4.

a) Name and define different levels of organization in ecology.

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(03 marks)

a) Using an example, explain the importance of each separate niche occupancy.

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(05 marks)

b) Draw and label the Carbon cycle.

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Contd.

c) Define the terms "Bio accumulation" and "Bio magnification".

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.... (04 marks)

d) State **four (04)** steps that you can implement to minimize "global warming'.

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....   (02 marks)

e) List important rules of the binomial nomenclature.

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.... (02 marks)
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f) Name the **six (06)** kingdoms of nature.

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.... (03 marks)
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g) List **two (02)** differences between eukaryotic and prokaryotic cells.

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.... (02 marks)
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..End..