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UNIVERSITY OF RUHUNA

BACHELOR OF SCIENCE GENERAL DEGREE - LEVEL III (SEMESTER II)
EXAMINATIONS – JANUARY/FEBRUARY - 2018

SUBJECT: Chemistry

COURSE UNIT: CHE 3231

TIME: One (01) hour

Answer **three (03)** questions only.

01. Answer **all** parts.

- (a) (i) Define the term “mineral”. (15 marks)
- (ii) State **three (03)** non-silicate rock forming minerals with their chemical formulae. (15 marks)
- (b) “Physical properties of minerals can be used as the primary tool in the identification of minerals”.
- (i) List **five (05)** physical properties which can be used to identify minerals. (15 marks)
- (ii) Colour is not considered as a basic physical property in the identification of minerals, but it can be used to get an idea about the impurities present in the mineral after the identification. Briefly explain this statement giving a suitable example. (15 marks)
- (iii) If you are given following unlabeled minerals, how would you identify them on the basis of their physical properties?
Hematite Galena Calcite Apatite Beryl (20 marks)
- (c) Though it is not utilized efficiently, graphite is considered as an economic mineral in Sri Lanka. Write a brief account on graphite industry in Sri Lanka considering economic value, present and potential future industries for the economic development of the country. (20 marks)

02. Answer **all** parts.

(a) It has been estimated that over 60 million metric tons of apatite deposit exists within an area of 4 km² around Eppawala.

(i) Write a short account on the present status of phosphate fertilizer manufacturing process of Sri Lanka highlighting the quality of Eppawala apatite.

(15 marks)

(ii) Give the names and the relevant chemical reactions for the manufacture of possible value added fertilizer products of apatite.

(15 marks)

(iii) What are the other possible industries which can utilize this apatite deposit as the raw material?

(10 marks)

(iv) Give the name and chemical formula for another fertilizer mineral abundantly found in Sri Lanka along with **two (02)** areas and purpose(s) of using it in agriculture.

(10 marks)

(b) Justify the importance of “rolling process” in tea processing industry.

(20 marks)

(c) Briefly explain the following.

(i) “Oolong tea” manufacturing process

(ii) The quality control parameters of tea

(30 marks)

03. Answer **all** parts.

(a) Briefly explain the term “vulcanizing process” pertaining to rubber industry.

(12 marks)

(b) Briefly comment on the statement “chain segment pattern exist in natural rubber is very different from that of polyethylene”.

(N.B. Draw structures where appropriate).

(12 marks)

(c) What are the typical varieties of additives those are essentially included during the industrial processing to obtain the desired characteristics of the finished rubber products?

(16 marks)

- (d) Identify the features of fillers those are typically added to rubber to meet material property targets. (20 marks)
- (e) List the chemical parameters which are generally checked in quality control process of coconut oils. (20 marks)
- (f) Briefly explain the term “value addition” related to the coconut industry. (20 marks)

04. Answer **all** parts.

- (a) Briefly explain the following pertaining to essential oils;
- (i) typical features (15 marks)
 - (ii) uses (15 marks)
 - (iii) major applications of different varieties (20 marks)
- (b)
- (i) What is petroleum? (05 marks)
 - (ii) Give the composition of each of the following category of constituents in petroleum.
 - (I) Saturates
 - (II) Aromatics
 - (III) Asphaltics (21 marks)
 - (iii) Giving an example, briefly explain each of the following conversion reactions involved in petroleum reforming.
 - (I) Thermal and catalytic cracking
 - (II) Polymerization (24 marks)

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