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The Open University of Sri Lanka
Faculty of Natural Sciences
B.Sc. Degree Programme

Department	: Physics
Level	: 5
Name of the Examination	: Final Examination
Course Code and Title	**: PHU5306 Applied Geology**
Academic Year	: 2020/21
Date	: 27.03.2022
Time	: 9.30 am – 11.30 am
Duration	: 2 hours

GENERAL INSTRUCTIONS TO CANDIDATES

- Read all instructions carefully before answering the questions.
- THIS QUESTION PAPER CONSISTS OF FOUR (04) PAGES WITH SIX (06) ESSAY TYPE QUESTIONS
- ANSWER **FOUR (04) QUESTIONS**.
- ALL ANSWERS MUST BE WRITTEN IN THE SEPARATE ANSWER SHEETS.
- Answers should be illustrated with sketch maps and diagrams where appropriate.
- MARKS ALLOCATED FOR EACH PART OF THE QUESTION ARE GIVEN IN BRACKETS.
- Non-programmable calculators are allowed
- Having any unauthorized documents/ mobile phones in your possession is a punishable offense

1 (i) Define the formation of three major peneplains according to Adams and Wadia, and their interpretations for the formation of three peneplains *(10 marks)*

(ii) Discuss the beginning of scientific interpretation of geological mapping of Sri Lanka *(5 marks)*

(iii) Explain the formation of vein quartz deposit at Ambalamana, Galaha? *(10 marks)*

2. (i) Briefly explain the major geological subdivisions of Sri Lanka *(10 marks)*

(ii) '*The Highland/Vijayan boundary of Sri Lanka was active during the Pan -African period*'. Explain the statement with available Models and some field examples. *(15 marks)*

3. (i) Explain why petroleum resources are confined to Cenozoic age whereas coal resources are confined to Carboniferous age *(5 marks)*

(ii) List suitable reservoir rocks, source rocks and cap rocks defined in petroleum generation *(5 marks)*

(iii) Imagine that you found gold flakes in an ore body. Calculate how much gold in the 100 g of ore body is required to mine gold profitably (concentration factor of Gold is assumed as 1250) *(5 marks)*

(iv) Write a statement on the possibility of prospecting oil/gas in the north-west coast of Sri Lanka from a geologist perspective. *(10 marks)*

4. (i) Define the groundwater table. *(5 marks)*

(ii) What are aquifers? What is the difference between the confined and unconfined aquifer? *(10 marks)*

(iii) State Darcy's law. Draw a labelled diagram of a Darcy tube, and label the variables used in Darcy's law. *(5 marks)*

(iv) How and where are solution cavities formed? *(5 marks)*

5. (i) How do you define a gem mineral? *(5 marks)*

(ii) What is the cause of 'asterism' (star effect) in corundum? Give evidences for presence of minerals leading to star effect. *(10 marks)*

(iv) List the technique (s) used to distinguish between:

(a) ruby and garnet

(b) diamond and zircon *(10 marks)*

6. (i) Discuss the three main parts in faceted gemstones. *(5 marks)*

(ii) Discuss main gemstone enhancing methods with reference to enhancing of ruby, topaz and sapphires *(5 marks)*

(iii) Explain the theory behind the polariscope. *(5 marks)*

(iv) You have three transparent red pieces of gemstones (rose quartz, red synthetic glass and red spinel). Can you separate these three minerals with your polariscope? Explain your answer with the optical diagrams. *(10 marks)*