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The Open University of Sri Lanka
B.Sc. Degree Programme (Level – 05)
PHU5305 – Essentials of Geology
Final Examination 2025/26

Date: 9th January 2026 Time Allowed: 2 hours (9.30-11.30)

Paper consists of ***Six (06)*** questions. Answer ***Four (04)*** questions selecting ***Two (02)*** questions from each of the sections **A** and **B**. Answers should be illustrated with sketch maps and diagrams where appropriate. Each question carries equal marks.

SECTION A - Earth and Surface Processes

1. (i) Why is the Earth considered a unique planet in the Solar System? *(25 marks)*

(ii) Discuss the different types of seismic waves and explain how they differ in their mode of propagation. *(25 marks)*

(iii) Describe the structure of the Earth using evidence obtained from the study of seismic waves. *(25 marks)*

(iv) Explain the differences between the continental crust and oceanic crust. *(25 marks)*

2 (i) Describe how the Law of Superposition helps geologists determine the relative ages of rock layers. *(25 marks)*

(ii) Explain how plate tectonics has influenced Earth's geological history. *(25 marks)*

(iii) Describe the process of fossilization and explain why fossils are valuable geological records. *(25 marks)*

(iv) Discuss the major radiometric dating methods used in geology. *(25 marks)*

3 (i) Explain the theory of plate tectonics and discuss the evidence supporting it. *(25 marks)*

(ii) What drives the motion of plates? *(25 marks)*

(iii) Discuss divergent plate boundaries and explain how new crust is formed. *(25 marks)*

(iv) Describe type of plate moments at the following locations using your knowledge in plate tectonics.

(a) At Mariana Trench
(b) at Iceland
(c) at Himalayas
(d) at Red Sea
(e) at Japanese islands

SECTION B – Earth Materials

4. (i) Discuss the methods used to identify minerals in the laboratory. *(25 marks)*

(ii) What key properties are used to identify the following minerals?

a. Pyroxene from Amphibole
b. Muscovite from Biotite
c. Galena from Pyrite
d. Feldspar from Quartz
e. Calcite from Talc *(5 marks each)*

(iii) Explain how the chemical composition of a mineral determines its physical properties. *(25 marks)*

(iv) Describe the structure and chemistry of silicate minerals and explain why they are the most abundant minerals in the Earth's crust. *(25 marks)*

5 (i) Discuss the concept of the rock cycle and its significance in understanding Earth processes. *(25 marks)*

(ii) Discuss the classification of sedimentary rocks based on their origin. *(25 marks)*

(iii) What are the key properties used to identify the following rock types?

a. granite and rhyolite
b. breccia and conglomerate
c. quartz and marble
d. slate and gneiss
e. limestone and sandstone *(10 marks each)*

6. (i) Distinguish between intrusive (plutonic) and extrusive (volcanic) igneous rocks, giving examples. *(25 marks)*

(ii) Explain how cooling rate affects the crystal size and texture of igneous rocks. *(25 marks)*

(iii) Describe the general process of metamorphism and the factors that cause the formation of metamorphic rocks. *(25 marks)*

(iv) Distinguish between foliated and non-foliated metamorphic rocks, giving examples of each. *(25 marks)*