

2922/201  
EARTH SCIENCE AND ENVIRONMENTAL  
INFORMATION SYSTEMS  
Oct./Nov. 2022  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY  
MODULE II

EARTH SCIENCE AND ENVIRONMENTAL INFORMATION SYSTEMS

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have an answer booklet for this examination.*

*This paper consists of TWO sections; A and B.*

*Answer ALL the questions in section A and any THREE questions from section B in the answer booklet provided.*

*Each question in section A carries 4 marks while each question in section B carries 20 marks.*

*Maximum marks for each part of a question are as shown.*

*Candidates should answer the questions in English.*

**This paper consists of 4 printed pages.**

**Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.**

SECTION A (40 marks)

Answer ALL the questions in this section.

1. Name the first **four** components of a basic communication system. (4 marks)
2. State **four** effects of the channel component on the transmitted signal in a basic communication system. (4 marks)
3. State **four** limitations of using remote sensing in environmental studies. (4 marks)
4. Describe the process of measuring the velocity of a target using a doppler radio detection and ranging (RADAR) system. (4 marks)
5. Draw labelled diagrams describing each of the following:
  - (a) equatorial orbit satellite; (2 marks)
  - (b) polar orbit satellite. (2 marks)
6. (a) Describe Geographic Information System(GIS). (2 marks)  
(b) Name **two** types of GIS data. (2 marks)
7. Outline the **four** steps involved in the formation of the solar system from nebula. (4 marks)
8. Name the types of folds labelled I, II, III and IV shown in Figure 1: (4 marks)

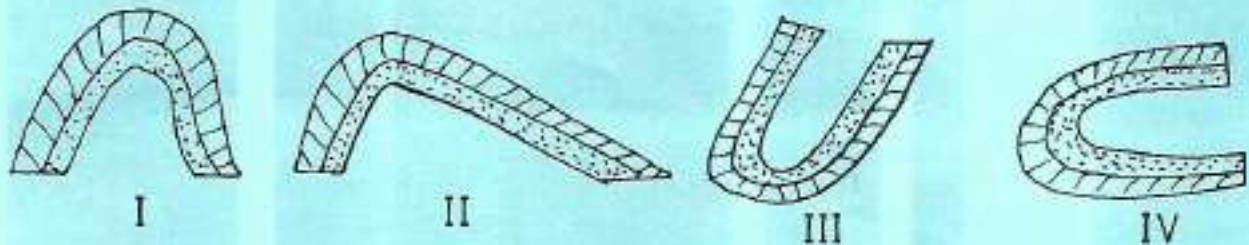


Fig.1

9. Distinguish between a normal fault and a reverse fault. (4 marks)
10. Describe the following properties of minerals:
  - (a) tenacity; (2 marks)
  - (b) luster. (2 marks)

**SECTION B (60 marks)**

*Answer any THREE questions from this section.*

11. (a) Write in full the acronym GPS. (1 mark)
- (b) Name **three** components of a GPS. (3 marks)
- (c) Using a flow diagram, outline the working of a GPS tracker on a vehicle given; global system for mobile communication (GSM) network, tracker, internet, control centre servers and main servers mobile phone. (14 marks)
- (d) State **two** advantages of GPS surveys. (2 marks)
12. (a) Define 'radiative transfer'. (2 marks)
- (b) List **four** types of interactions between incoming solar radiation and atmospheric gases. (4 marks)
- (c) With the aid of a labelled diagram, describe Kepler's second law of planetary motion. (5 marks)
- (d) (i) Describe 'satellite constellation'. (3 marks)  
(ii) List **four** applications of satellite constellations. (4 marks)
- (e) Name **two** components of a microwave communication system. (2 marks)
13. (a) Describe the application of each of the following:
- (i) GPS technology in monitoring endangered wildlife species; (5 marks)  
(ii) Remote sensing in observing crops. (5 marks)
- (b) State **five** applications of RADAR technology. (5 marks)
- (c) Describe the use of satellite communication in weather forecasting. (5 marks)
14. (a) Distinguish between a hinge area and a hinge line as used in folding. (4 marks)
- (b) Explain why most fold mountains are found on the edges of continental plate boundaries. (5 marks)
- (c) With the aid of a labelled diagram, describe the formation of a laccolith igneous rock. (6 marks)
- (d) (i) Describe the formation of pyroclasts in volcanic eruptions. (3 marks)  
(ii) State **one** condition which favours an explosive eruption in a volcanic activity. (2 marks)

15. (a) Name **three** major classes of rocks. (3 marks)
- (b) Figure 2 is a representation of the rock cycle. Name the:
- (i) types of rocks labelled A, B, and C. (3 marks)
- (ii) processes labelled K, L, M and P. (4 marks)

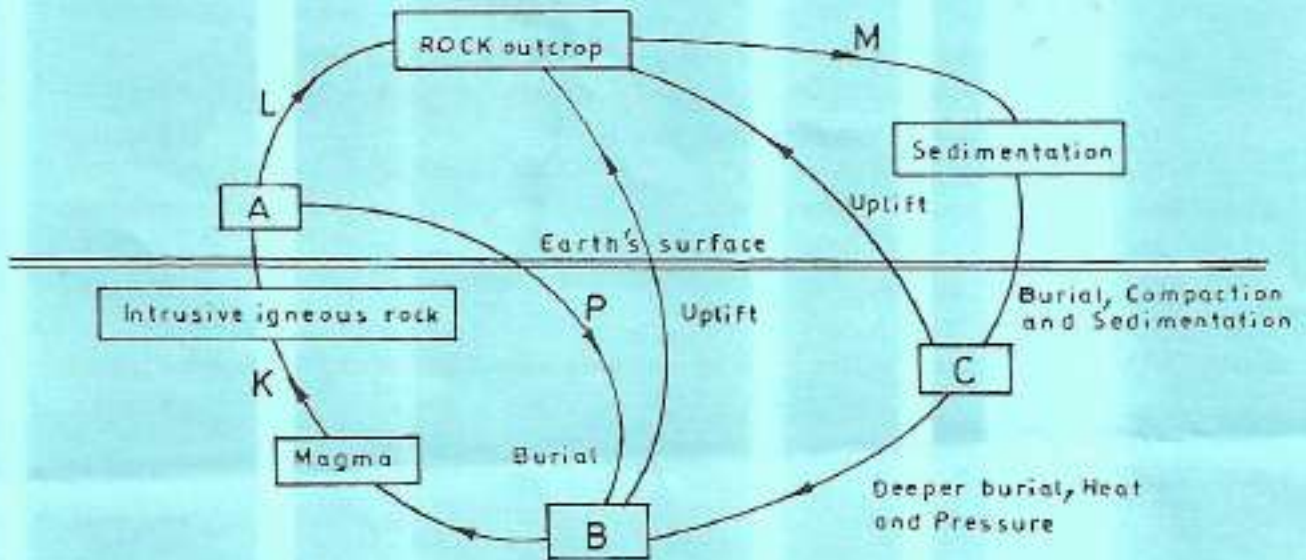


Fig.2

- (c) Describe **five** negative effects of mining activities on the environment. (10 marks)

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