

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF MASTERS OF SCIENCE IN PHYSICS

PHYS 893: EXPLORATION GEOPHYSICS

STREAMS: MSEC PHYS

DAY/DATE: THURSDAY 07/08/2025

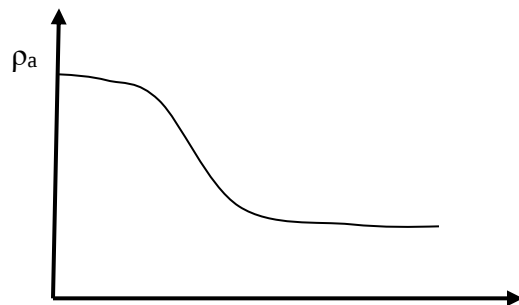
TIME: 3 HOURS

2.30 P.M. – 5.30 P.M

Attempt all questions

QUESTION ONE (15 MARKS)

- a) List and briefly discuss two main properties used to identify ores in geophysical explorations [4 Marks]
- b) What is forward modelling, explain the forward modelling procedure [5 Marks]
- c) In the interpretation of vertical electrical sounding, the graph below of apparent resistivity against electrode separation was obtained



a

Describe the subsurface represented by the graph [3 Marks]

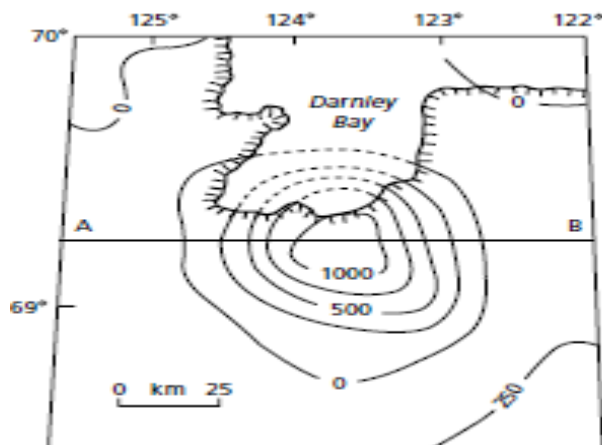
d) State any three limitations of resistivity method [3 Marks]

QUESTION TWO (15 MARKS)

- 2 a) Explain the use of Gravity survey in Petroleum Exploration [4Marks]
- b) Explain briefly the steps to follow in the interpretation of magnetic or gravity data [5Marks]
- c) Explain briefly why the earth's gravity field is not the same at all points on the earth's surface [3Marks]
- d) Describe how to minimize the ambiguity in geophysical data interpretation [3Marks]

QUESTION THREE (15 MARKS)

- a) The following gravity contour map was obtained from a survey. Considering the profile AB' give the qualitative interpretation of the anomaly [7Marks]



- c) Explain briefly the steps to follow in the interpretation of magnetic or gravity data [6Marks]
- d) Explain briefly why the earth's magnetic field is not the same at all points on the earth's surface [2Marks]

QUESTION FOUR (15 MARKS)

- a) Werner and Schlumberger electrode configurations are the main electrode arrangements used in resistivity investigations. Sketch the four electrode configurations in electrical resistivity survey for these modes of survey pointing out the merits of each of them and the demerits of one over the other in field studies [6Marks]

PHYS 893

b) Write down or derive the fundamental equations for each electrode arrangement

[3Marks]

c) Using any one electrode arrangement discuss how vertical electrical surveying can be conducted

[3Marks]

d) Sketch possible profile for a three layer geological system would appear when the layers are of same thickness but most resistive layers at the top and bottom

[3Marks]
