Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 1st Semester Examination – June/July 2017
MRT 315-2 Geophysics

Uva Wellassa University

Instructions to candidates
Duration: 01 hour
Number of questions: 3 Essay
Answer TWO (02) questions only
Mark allocation: 40 Marks

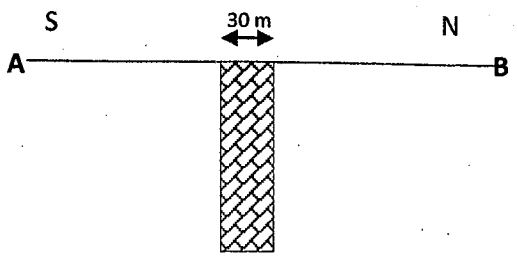
1. **a.** Explain briefly (with labelled sketches if necessary) the meaning of **TWO** of the following terms and include a comment on their significance in geophysics.
   I. Remnant magnetization
   II. Bouguer anomaly gravity
   III. Head waves in seismic method
   IV. Diurnal variation [5x2=10 mark]

   b. For each of the applications listed below, indicate (i) the primary geophysical method that should be used, (ii) why that method is particularly appropriate, (iii) one or more limitations of the method that should be considered;
   I. Reconnaissance exploration for iron ore deposit in a large (10 km X 10 km) area;
   II. Identification of dipping layers [5x2=10 mark]

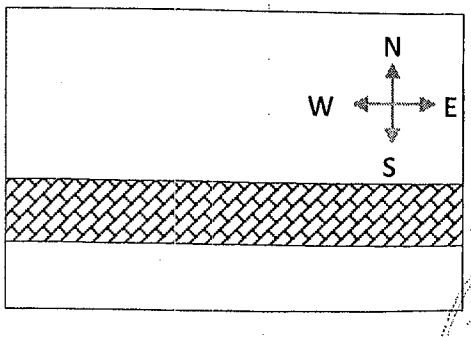
2. Magnetic map is a representation of local disturbances in the earth's magnetic field that are caused by magnetic minerals in the upper regions of the Earth's crust.

   a. Explain necessity of a base-station for an accurate magnetometer survey. [05 mark]

   b. Ground magnetic survey will be conducted to detect vertical dyke in the subsurface. Assume that the width of the dyke is 30 m and extend toward the East West direction.



Subsurface extention of dyke



Surface view of dyke

i. Suppose you are permitted to conduct this magnetometer survey. Discuss the survey procedure that you hope to follow in the site with special reference to the grid or profile planning, data acquisition methodology and data reduction procedures. [10 mark]

ii. Model the shape of expected anomaly through the line AB. Assume that the survey area is lies in the magnetic equator. [05 mark]

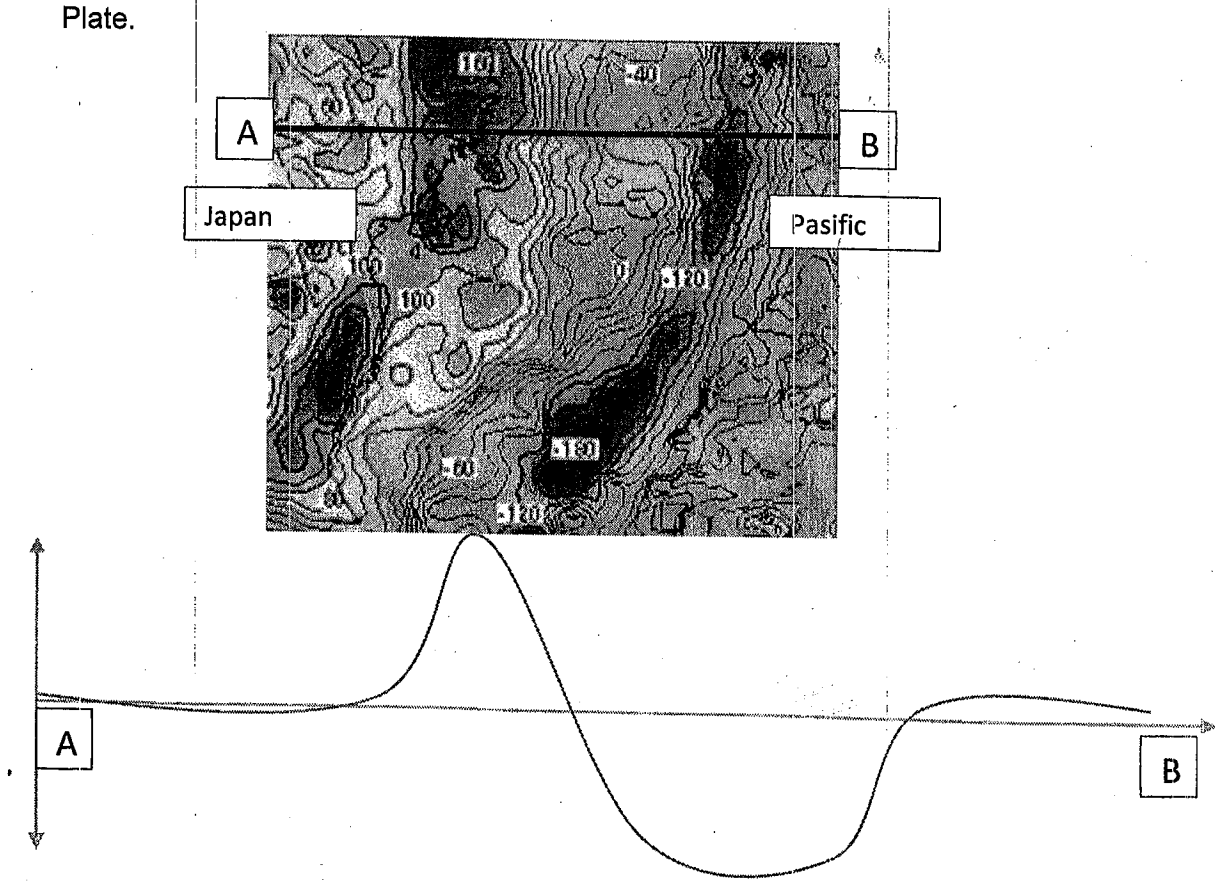
3. Gravity is one of the widely used geophysical techniques. However, quality data acquisition depends on following well-established survey and processing procedures.

a. What are the key factors that affect gravity readings? [03 mark]

b. Why is it important to conduct gravity reduction before interpretation of gravity data? [05 mark]

c. What is free-air gravity anomaly? [04 mark]

d. Following figure shows the free-air gravity anomaly map across the Japan Plate and Pacific Plate.



i. The above profile shows free-air gravity anomaly variation through the AB line. Sketch the subsurface tectonic structure along the Japan Plate and the Pacific Plate with strong justification.
(Hint: which plate plunges into the other?) [08 mark]