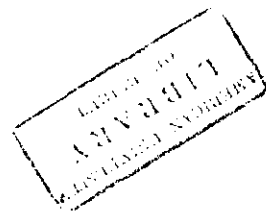


AMERICAN UNIVERSITY OF BEIRUT
Geology Department
Geology 305
Final Exam



January 31, 2000

Student Name: _____

Part I. Circle T = true or F = false and explain why if it is false (52 pts.)

T F 1. In the tilt-angle method, the angle (tilt) of the resultant of the primary and induced secondary fields is measured.

T F 2. In Sundberg method, the secondary magnetic field is inversely symmetrical about the cross over point above the top of the body.

T F 3. In the case of EM profiling, greater depth penetration is achieved using the lowest frequencies and greatest inter-coil separations.

T F 4. The distance between the EM anomaly peaks is twice that of the dipole length.

T F 5. Most TEM systems record the transient voltage at one interval during the voltage decay.

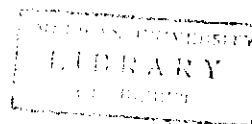
T F 6. The three data processing stages described by Stephan et al. (1991) are: a) prestack processing; b) selective stacking, and c) post-stack processing.

T F 7. TEM apparent resistivity sounding can be extremely useful in hydrological investigations and in geological mapping, but provide very little information for mineral exploration.

T F 8. There are eleven major VLF transmitters distributed around the world used primarily for geophysical investigations.

T F 9. The largest amplitudes of the various electric and magnetic components lie at the ground surface and decrease with depth.

T F 10. The major disadvantage in VLF is that the repeatability of measurements is difficult along the same profile when surveyed on different occasions.



- T F 11. If a topographic high (ridge) is at right angle to the VLF survey direction, then no association with topography may be evident (no effect).
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- T F 12. VLF tilt-angle data are interpreted qualitatively and quantitatively, and the turning point between positive and negative polarity is above the top of the conductor.
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- T F 13. The major advantage of magneto-telluric method is its unique capability for shallow, deep and very deep investigations without artificial power source.
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- T F 14. By measuring the changes in the magnetic H and electric E fields over a range of frequencies, an apparent resistivity sounding curve can be produced.
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- T F 15. Based on the antenna frequencies, GPR can be divided into two discrete classifications: a) geological applications with frequencies > 500 MHz; b) engineering and nondestructive testing with frequencies < 500 MHz.
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- T F 16. GPR has been used in police investigations to help in locating buried bodies.
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- T F 17. In wide-angle reflection and refraction (WARR) GPR surveys, bistatic mode is advantageous.
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- T F 18. Horizontal resolution in GPR is a function of frequency and velocity.
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- T F 19. The real permittivity ϵ' indicates the absorption or energy loss with the dielectric material.
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- T F 20. The relative dielectric constant ϵ_r varies from 3 in air to 31 in water.
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- T F 21. The study of radioactivity is of great importance to: a) estimate the heat produced by radioactive disintegration; b) explore radioactive ore bodies and; c) date geological events.
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- T F 22. The heat production of a given rock type (granite) depends on the concentration of the radioactive elements in it.
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- T F 23. Orthoclase and plagioclase are suitable for K-Ar dating, whereas sanidine and microcline are unsuitable.
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T F 24. The advantages of Rubidium – Strontium method are; it is an abundant element (Rb) and it represents a solid-solid system (in comparison with K-Ar).

T F 25. On continents, the highest heat flow is in older Precambrian shield zones and the lowest is in younger Cenozoic terrains.

T F 26. Heat transfer by conduction (only) through the uppermost 1000 km of the earth would take about 5 billion years.

Part II. Answer only four of the following six questions (48 pts.)

1. Introduce the TDEM/TEM surveys, draw a scheme.
2. Describe the principles of operation and field measurements of the Telluric method.
3. Discuss the interpretation methods of the Magneto-Telluric method.
4. Indicate and discuss the modes of GPR data acquisition.
5. Discuss the fundamentals of radioactive disintegration.
6. Introduce the Radiocarbon and Tritium methods.

GOOD LUCK