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ASR - Hydrogeology

GAT/637 2012 Series C

GEOPHYSICS

Paper II

Time : 150 Minutes *Max. Marks : 150*

INSTRUCTIONS

1. Please check the Test Booklet and ensure that it contains all the questions. If you find any defect in the Test Booklet or Answer Sheet, please get it replaced immediately.

2. The Test Booklet contains **150** questions. Each question carries **one** mark.

3. The Test Booklet is printed in four (4) Series, viz. [A] [B] [C] [D]. The Series, [A] or [B] or [C] or [D] is printed on the right-hand corner of the cover page of the Test Booklet. Mark your Test Booklet Series [A] or [B] or [C] or [D] in Part C on side 1 of the Answer Sheet by darkening the appropriate circle with Blue/Black Ball point pen.

Example to fill up the Booklet Series

If your Test Booklet Series is **A**, please fill as shown below :

● Ⓑ Ⓒ Ⓓ

If you have not marked the Test Booklet Series at Part C of side 1 of the Answer Sheet or marked in a way that it leads to discrepancy in determining the exact Test Booklet Series, then, in all such cases, your Answer Sheet will be invalidated without any further notice. No correspondence will be entertained in the matter.

4. Each question is followed by 4 answer choices. Of these, you have to select one correct answer and mark it on the Answer Sheet by darkening the appropriate circle for the question. If more than one circle is darkened, the answer will not be valued at all. Use Blue/Black Ball point pen to make heavy black marks to fill the circle completely. Make **no** other stray marks.

e.g. : If the answer for Question No. **1** is Answer choice (2), it should be marked as follows :

1	①	●	③	④

5. Mark Paper Code and Roll No. as given in the Hall Ticket with Blue/Black Ball point pen by darkening appropriate circles in Part A of side 1 of the Answer Sheet. Incorrect/not encoding will lead to ***invalidation*** of your Answer Sheet.

Example : If the Paper Code is **027**, and Roll No. is **95640376** fill as shown below :

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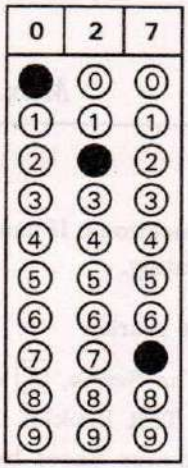

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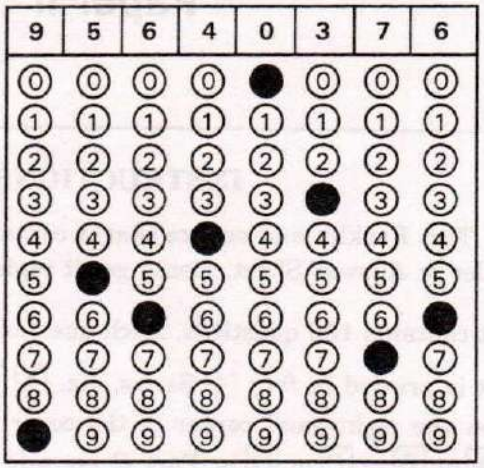

6. Please get the signature of the Invigilator affixed in the space provided in the Answer Sheet. An Answer Sheet without the signature of the Invigilator is liable for ***invalidation***.

7. The candidate should **not** do rough work or write any irrelevant matter in the Answer Sheet. Doing so will lead to ***invalidation***.

8. Do **not** mark answer choices on the Test Booklet. Violation of this will be viewed seriously.

9. Before leaving the examination hall, the candidate should hand over the original OMR Answer Sheet (top sheet) to the Invigilator and carry the bottom sheet (duplicate) for his/her record, failing which disciplinary action will be taken.

10. Use of whitener is prohibited. If used, the answer sheet is liable for invalidation.

1. Clastic rocks consist primarily of _____ minerals.
   (1) carbonate
   (2) silicate
   (3) manganese
   (4) None of the above

2. To understand the electrochemical force, consider the _____ Model.
   (1) Schlumberger
   (2) Halliburton
   (3) Mounce and Rust
   (4) None of the above

3. The total electrochemical component E_c =
   (1) $E_d + E_m$
   (2) Log (R_1/R_2)
   (3) Log (R_{mf}/R_w)
   (4) None of the above

4. Example of clastic rocks are
   (1) Sandstone
   (2) Limestone
   (3) Dolomite
   (4) None of the above

5. During drilling a liquid mixture containing clays and other natural materials is called
   (1) Mud
   (2) Sand
   (3) Clay
   (4) None of the above

6. A _____ is the generalized term for any narrow shaft bored in the ground, either vertically or horizontally.
   (1) Bore hole
   (2) Cased hole
   (3) Open hole
   (4) None of the above

7. Positive Spontaneous Polarization (SP) anomalies are generated in a fresh bore hole due to
   (1) Salinity of the formation > Salinity of the bore hole fluid
   (2) Salinity of the bore hole fluid > Salinity of the formation fluid
   (3) No difference in salinities of bore hole fluid and formation fluid
   (4) None of the above

8. What integrated method can be commonly used for delineation of ground water ?
   (1) Electrical
   (2) Well-logging
   (3) Seismic
   (4) None of the above

9. For saline exploration, which method is used for demarcation ?
   (1) Resistivity Profiling
   (2) Sounding
   (3) Electrical Methods
   (4) None of the above

10. To identify the Dyke structure, which geophysical method is used ?
   (1) Electrical
   (2) Well-logging
   (3) Electrical Profiling
   (4) None of the above

11. To identify the fault zone, which geophysical method is very good ?
(1) Seismic
(2) Radioactivity
(3) Well-logging
(4) None of the above

12. To identify the major joints in geological formations, which type of methods are used ?
(1) Electrical
(2) Seismic
(3) Radioactivity
(4) None of the above

13. What are the geological structures that control groundwater ?
(1) Dykes
(2) Soil Cores
(3) Bed Rock
(4) None of the above

14. For plans of Geological Exploration, what economic constraints are to be considered ?
(1) Cost effectiveness
(2) Economic factor
(3) Quality
(4) None of the above

15. Stage of ground water development is defined in
(1) %
(2) Quantity
(3) Quality
(4) None of the above

16. What is artificial recharge studies ?
(1) Recharge the aquifers
(2) Filling of acquitted groundwater
(3) Environment pollution
(4) None of the above

17. The source fields of MT and GDS are
(1) Of internal origin
(2) Due to micro pulsation activity
(3) Due to micro pulsations and lightning activities
(4) Micro pulsations and lightning and Sq, L and magnetic storms

18. What is the source used in artificial radioactivity logs ?
(1) Radium
(2) Uranium
(3) Americium – Beryllium
(4) Potassium

19. Neutron Log measures
(1) Gamma-ray
(2) Neutron density
(3) Proton density
(4) Electron density

20. In the presence of Shale, Gamma-ray Log shows
(1) High
(2) Low
(3) High – Low
(4) None of the above

21. If a function is shifted in the time-domain by two seconds, then the amplitude spectrum
(1) is doubled
(2) is reduced to half
(3) remains unchanged
(4) is increased to four times

22. Multiplexing is an operation related to
(1) Auto correlation
(2) Cross correlation
(3) Filtering
(4) None of the above

23. To eliminate the ghost effect in seismic data processing _____ filtering technique is used.
(1) recursive
(2) non-recursive
(3) wiener
(4) band-pass

24. A mathematical process which is used to represent inverse filtering action is
(1) Convolution
(2) Cross correlation
(3) Auto correlation
(4) Deconvolution

25. More or less circular or elliptical contours suggest the presence of _____ bodies.
(1) two dimensional
(2) two and a half dimensional
(3) three dimensional
(4) fault

26. A saturated geological formation, which is relatively impermeable and does not yield appreciable quantity of water to wells, is known as
(1) Aquifer
(2) Aquifuge
(3) Aquiclude
(4) Aquitard

27. A saturated unconsolidated formation sandwiched between two basaltic rock formations gives rise to _____ resistivity sounding.
(1) H-type
(2) K-type
(3) A-type
(4) None of the above

28. The second derivative of gravity/magnetic anomaly emphasizes
(1) Low wavelength components
(2) High wavelength components
(3) Intermediate frequencies
(4) None of the above

29. Salinity can be estimated using the ion
(1) Chlorinate
(2) Sulphate
(3) Bicarbonate
(4) None of the above

30. For the sedimentary and unconsolidated rocks the value of resistivity lies between
(1) $10^4 - 10^8\ \Omega\ m^2/m$
(2) $10^3 - 10^5\ \Omega\ m^2/m$
(3) $10 - 10^4\ \Omega\ m^2/m$
(4) $7 - 10^2\ \Omega\ m^2/m$

31. A 'Pluviometer' is an instrument that is used to measure

(1) Amount of precipitation

(2) Permeability of rocks

(3) Porosity of rocks

(4) Safe yields of UGW

32. Hail is a type of precipitation that consists of

(1) Ice crystals of delicate, feathery structure

(2) Hard pellets of ice

(3) Droplets of water deposited on objects near the ground

(4) Minute crystals of ice deposited on a cold surface

33. Which of the following materials has the highest porosity ?

(1) Clay

(2) Slit

(3) Gravel

(4) Sandstone

34. An influent stream is one which

(1) Flows into a parent stream

(2) Flows parallel to a consequent stream

(3) Recharges the groundwater

(4) Receives discharges from the groundwater

35. Deeply confined aquifers can be recharged by means of

(1) Water spreading

(2) Inverted wells

(3) Pits and shafts

(4) Induced recharge

36. In the crystalline rock area of the Peninsula, the minimum depth at which the water table is encountered is

(1) 0·66 m

(2) 1·22 m

(3) 3·75 m

(4) 6·1 m

37. The salinity of sea water can be determined by the ratio of

(1) Na/K

(2) Ca/Na

(3) C/c

(4) Rb/Sr

38. The depth of water can be determined by

(1) He method

(2) C^{14} method

(3) Salinity Temperature diagram

(4) None of the above

39. The rotary drill is most suited for

(1) Drilling blast hole in seismic method

(2) Ground water exploration

(3) Oil well drilling in soft rock

(4) All of the above

40. For drilling groundwater wells in extremely hard rock formation the following is used :

(1) Reverse included

(2) Down the hole hammer

(3) Diamond drill

(4) Cable tool drill

41. Fresh or salt water inter trapped in sediments during their deposition is clear

(1) Connate water

(2) Juvenile water

(3) Meteoric water

(4) Spring water

42. The most effective type of drilling for penetrating hard ground is

(1) Diamond drilling

(2) Rotary drilling

(3) Percussion drilling

(4) Churn drilling

43. Diamond drilling can be used to bore holes in

(1) Horizontal direction only

(2) Vertical direction only

(3) Horizontal and vertical direction only

(4) All directions

44. Hodograph is

(1) An instrument used to record the time of occurrence of an explosion

(2) A curve plotted on graphs which depicts the time taken by a seismic wave to travel from the point of explosion to a seismograph

(3) An instrument which records the intensity of earthquake shocks

(4) A graph showing the variation of seismic velocities with depth

45. The hodograph of a reflected wave is

(1) Hyperbolic

(2) Parabolic

(3) Rectilinear

(4) Curvilinear

46. What is the main aim of seismic method in groundwater exploration ?

(1) Determining the thickness of over burden

(2) Determining the thickness of basement rocks

(3) Determining the permeability of the aquifers

(4) None of the above

47. Drift correction is

(1) Instrumental

(2) Natural

(3) Both of the above

(4) None of the above

48. The Fresh and Salt water boundary is accurately determined by

(1) Gravity method

(2) Magnetic method

(3) Electrical Resistivity method

(4) Seismic method

49. The Charged Body Method clearly indicates

(1) The quality of groundwater

(2) The quantity of groundwater

(3) The groundwater flow direction

(4) None of the above

50. The Self-Potential or Spontaneous Polarization (SP) Method is most suitable for the exploration of

(1) Sulphides

(2) Nitrates

(3) Oxides

(4) Carbonates

51. Air-borne electromagnetic method is best suited for the prospecting of

(1) Limestone

(2) Ferro-magnesium ores

(3) Barite deposits

(4) Base metal deposits

52. The seismic velocities in groundwater depend on

(1) Salinity of groundwater

(2) Quantity of groundwater

(3) Elastic constants of groundwater

(4) None of the above

53. Drilling is employed mainly for

(1) Determining the stratigraphy or rock sequence

(2) Locating and evaluating substances of economic value

(3) Extracting economically valuable substances

(4) All of the above

54. Rotary drilling can be used to assess

(1) Mineralogy of a rock

(2) Texture of rock

(3) Type of rock

(4) All of the above

55. The well depth of a producing well is selected considering the factors

(1) Aquifer of poor quality should be avoided

(2) There should be no partial penetration

(3) Maximum number of aquifers should be tapped so that the discharge is maximum

(4) All of the above

56. The selection of the well screen material depends on

(1) Water quality

(2) Grain size of the productive horizon

(3) Cost

(4) None of the above

57. Pumping tests are conducted to

(1) Identify the aquifer boundaries, their nature and distance

(2) Determining the aquifer constants T and S

(3) Determining the efficiency of the well

(4) Select suitable pump for installation

58. Sea water intrusion occurs in coastal aquifers

(1) When permeable formations are exposed into sea water

(2) When impermeable formations are exposed into sea water

(3) In (2) above when hydraulic gradient is towards the land

(4) In (1) above when hydraulic gradient is towards the land

59. Jacob's modification of the Theis non-equilibrium equation are valid for

(1) Small values of u

(2) High values of u

(3) Early pump test data

(4) Long duration pump test data

60. The ambiguity with respect to the formation Shaly Sand & the Sandstone Aquifer can be differentiated by the following electrical method :

(1) Resistivity method

(2) Induced Polarization method

(3) Self Potential method

(4) Charged body method

61. According to Darcy's law, the volume of water passing through the porous media is

(1) Directly proportional to the thickness of bed

(2) Inversely proportional to the thickness of bed

(3) Independent of the thickness of bed

(4) Inversely proportional to the head loss

62. Deforestation is occurring in many countries and it is therefore difficult to detect the ongoing damage. Which of the following types of remote sensing would be best suited for locating deforestation ?

(1) Thermal Infrared

(2) Microwave

(3) Radar

(4) Color Infrared

63. To compare, overlay, or cross-analyze two maps in a GIS

(1) Both maps must be in digital form

(2) Both maps must be in the same map projection

(3) Both maps must be at the same equivalent scale

(4) Both maps must be on the same coordinate system

64. Which of the following types of remote sensing would be most useful in obtaining an accurate terrain representation of Venus ?

(1) Radar

(2) Microwave

(3) Landsat

(4) Sonar

65. An automated system for the capture, storage, retrieval, analysis and display of spatial data is known as

(1) a GPS

(2) Landsat

(3) a GIS

(4) None of the above

66. Living vegetation appears _____ on false-color IR images.

(1) white

(2) black

(3) blue

(4) red

67. With which type of remote sensing imagery would a baseball field of artificial turf be differentiated from natural grass ?

(1) Radar imagery

(2) Color infrared

(3) Color photography

(4) All of the above

68. Precipitation is usually expressed in which of the following units ?

(1) g/m^2

(2) m^3

(3) mm

(4) m*l*

69. Which of the following is ***not*** a method of estimating river discharge ?

(1) Dilution gauging

(2) Atmometer readings

(3) Velocity-Area measurement

(4) None of the above

70. Which of the following is defined as 'the erosion of soil by overland flow processes' ?

(1) Hyper-consolation flew

(2) Field isolation

(3) Rain wash

(4) Flow track

71. Which of the following languages is more suited to a structured program ?

(1) PL/I

(2) Fortran

(3) Basic

(4) Pascal

72. A computer assisted method for the recording and analyzing of existing or hypothesized system is

(1) Data transmission

(2) Data flow

(3) Data capture

(4) Data processing

73. The brain of any computer is

(1) ALU

(2) Memory

(3) CPU

(4) Keyboard

74. What difference does the 5^{th} generation computer have from other generation computers ?

(1) Technical advancement

(2) Scientific code

(3) Object Oriented Programming

(4) All of the above

75. A ground water recharge area is what ?

(1) An underground lake or stream

(2) The area where water enters an aquifer

(3) Water held in the soil

(4) The place that precipitation soaks into the ground

76. Which of the following statements is ***false*** ?

(1) Watershed management must be integrated into the pricing of water.

(2) International development aid is irrelevant to water management.

(3) Polluters must be charged according to their effluents.

(4) Water efficiency must be promoted as the primary strategy for meeting future water needs.

77. There are three main loops in the hydrologic cycle. These are

(1) The surface runoff loop, the evapotranspiration loop, and the groundwater loop

(2) Air, land and soil

(3) Lakes, oceans and rivers

(4) Fresh water, salt water and groundwater

78. Cyclones or hurricanes do not develop within about 5° N and S of the Equator because the

(1) Pressure gradient is weak

(2) Trade winds converge

(3) Ocean surface temperature is high

(4) Coriolis force is very weak

79. Hydrogenous sediment in the oceans is

(1) Derived from skeletal debris

(2) Precipitated by chemical or biochemical reactions

(3) Produced by weathering of rocks on land

(4) Ejected by volcanoes

80. Which rock type would constitute best aquifer ?

(1) Sandstone

(2) Conglomerate

(3) Limestone

(4) Basalt

81. Most clay minerals have negative charge on their surfaces. This has an important role for

(1) Metal nutrients supply to the plants

(2) Phosphate supply to the plants

(3) Weather ability of clay minerals

(4) Supply of H^+ ions to the plants

82. Which of the following rocks contributes the highest amount of radioactive heat in the Earth's crust ?

(1) Basalt

(2) Gabbros

(3) Dunite

(4) Granite

83. Snell's law of refraction deals with which of the following properties of refracted waves ?

(1) Amplitude

(2) Direction

(3) Energy

(4) Phase

84. Gamma-ray log measurements are used to quantify

(1) Hydrocarbon saturation

(2) Porosity of the formation

(3) Density of the formation

(4) Volume of shale in the formation

85. The apparent resistivity sounding curve representing the resistivity structure $p_1 > p_2 < p_3 < p_4$ is

(1) HK-type

(2) HA-type

(3) KH-type

(4) KQ-type

86. The logging technique that uses non-conductive drilling fluids is

(1) SP logging

(2) Resistivity logging

(3) Induction logging

(4) Radiometric logging

87. Which of the following instruments contains piezoelectric material ?

(1) Hydrophone

(2) Geophone

(3) Gravimeter

(4) Magnetometer

88. The equipment surface over which the gravitational field has equal value in known as

(1) Geoid

(2) Spheroid

(3) Ellipsoid

(4) Mean sea level

89. The angle between the present geographic north and geomagnetic north is

(1) 1·5°

(2) 7·5°

(3) 11·5°

(4) 23·5°

90. Within the lithosphere, water is found in

(1) Liquid state only

(2) Solid state only

(3) Vaporous state only

(4) Liquid and vaporous states only

91. Lowest density values are obtained from Gamma-Gamma Log response from the following formations :

(1) Shale's

(2) Limestone's

(3) Dolomites

(4) Coal

92. Gamma Ray Log can be used in

(1) Open hole

(2) Cased hole

(3) Both (1) and (2)

(4) None of the above

93. The distribution of ground water is not uniform. Hence what type of Integrated methods can be used to identify the aquifer ?

(1) Electrical, Seismic

(2) Electrical only

(3) Gravity only

(4) None of the above

94. The three layer VES curves only represent Geo-electrical section as

(1) p_1/h_1, p_2/h_2, p_3/h_3

(2) p_1, p_2, p_3

(3) h_1, h_2, h_3

(4) None of the above

95. Which factor is controlling the choice of an effective assemblage of geophysical method ?

(1) Physical contrast

(2) Physical measurement

(3) All of the above

(4) None of the above

96. How many types of Artificial recharge methods are exits ?

(1) Two types

(2) Three types

(3) Four types

(4) None of the above

97. What recharge methods are to be taken up for recharging the real estate status for ground water ?

(1) Rain water harvesting

(2) Artificial recharge

(3) Sea water

(4) None of the above

98. Identification of weak zone for filling cement grouting

(1) Electromagnetic method

(2) Gravity method

(3) Magnetic methods

(4) None of the above

99. What methods can be used in identification of sand thickness estimation ?

(1) Electrical method

(2) Radioactivity method

(3) Electrical/Seismic method

(4) None of the above

100. Which integrated methods can be used to take up for mineral explorations such as ferrous (Iron, Manganese, Chromium) ?

(1) Magnetic

(2) Electromagnetic

(3) Radioactive

(4) None of the above

101. Compressive strength of rock is expressed by a simple relationship

(1) $Co = p/A$

(2) $Co = A/p$

(3) $Co = p \times A$

(4) None of the above

102. In most engineering properties it is the _____ that is taken into consideration.

(1) dry density

(2) bulk density

(3) saturated density

(4) None of the above

103. Example of cavity fillings are

(1) Fissure veins

(2) Ladder veins

(3) Saddle-reefs

(4) None of the above

104. Sea water intrusion problems are detected by _____ method.

(1) Gravity

(2) Electromagnetic

(3) Seismic

(4) Electrical Resistivity

105. Which geophysical method is useful in determination of engineering properties of rock formations in in-situ condition ?

(1) Gravity

(2) Electromagnetic

(3) Seismic

(4) Radiometry

106. _____ is defined as the capacity of soil to transmit water through it.

(1) Permeability

(2) Porosity

(3) Density

(4) None of the above

107. Infiltration refers to the _____ movement of water from the ground surface.

(1) downward

(2) upward

(3) normal

(4) None of the above

108. Ground water occurs in the

(1) Zone of aeration

(2) Zone of saturation

(3) Capillary zone

(4) None of the above

109. The upper surface of the zone of saturation is called the

(1) Intermediate zone

(2) Water table

(3) Capillary fringe

(4) None of the above

110. A rock formation which yields appreciable quantities of ground water is called

(1) Aquifer

(2) Aquitard

(3) Aquiclude

(4) None of the above

111. Ground water constitutes one portion of the Earth's water circulatory system known as the
(1) Hydrologic cycle
(2) Precipitation
(3) Condensation
(4) None of the above

112. The _____ of a rock or soil is a measure of the contained interstices or voids expressed as the ratio of the volume of interstices to total volume.
(1) porosity
(2) specific yield
(3) permeability
(4) None of the above

113. The _____ to ground water aims at augmentation of ground water reservoir by modifying the natural movement of surface water utilizing suitable civil construction techniques.
(1) artificial recharge
(2) hydrologic cycle
(3) aquifer
(4) None of the above

114. The water yielding capacity of an aquifer can be expressed in terms of
(1) Porosity
(2) Specific yield
(3) Storage coefficient
(4) None of the above

115. The artificially induced degradation of natural ground water is considered as
(1) Ground water pollution
(2) Soil pollution
(3) Air pollution
(4) None of the above

116. _____ can be significant in agricultural areas as a diffuse source of ground water pollution.
(1) Pesticides
(2) Liquid waste
(3) Sewage waste
(4) None of the above

117. Incoming UV radiation at wavelength < 0·3 is completely observed in the upper atmosphere by
(1) CO_2
(2) H_2O
(3) Ozone
(4) None of the above

118. Electromagnetic radiation emits from
(1) Earth
(2) Sun
(3) Moon
(4) None of the above

119. Well logging methods are carried out in
(1) Ground
(2) Air
(3) Bore holes
(4) None of the above

120. With increase in salinity of the ground water, resistivity of the formation
(1) Increases
(2) Decreases
(3) Remains unaltered
(4) None of the above

121. The hydraulic conductivity of a rock is expressed by its

(1) Porosity

(2) Magnetic susceptibility

(3) Permeability

(4) Resistivity

122. Long period variation of Earth's magnetic field is known as

(1) Diurnal variation

(2) Magnetic storms

(3) Secular variation

(4) None of the above

123. Magnetic field of the Earth in S.I. units is

(1) Columb

(2) Gaussians

(3) Gauss

(4) Nano Tesla

124. Permeability is measured in units called

(1) Stokes

(2) Poise

(3) Darcy

(4) Weber

125. Example of paramagnetic material is

(1) Limonite

(2) Garnet

(3) Gypsum

(4) Quarry

126. The order of P-wave velocity in sedimentary rocks is

(1) 100 – 500 m/s

(2) 500 – 6000 m/s

(3) 100 – 400 m/s

(4) 200 – 1200 m/s

127. Near Vertical Seismic reflection uses

(1) Small offsets

(2) Long offsets

(3) Very long offsets

(4) Zero offset

128. Surface waves are

(1) Random noise

(2) Instrument generated

(3) Coherent and Shot generated

(4) None of the above

129. The frequency range for magneto-telluric method in ground water exploration is

(1) 0·001 to 100 Hz

(2) 550 KHz to 30 MHz

(3) 1 to 10 GHz

(4) above 100 GHz

130. The measurement of physical property variation with depth, i.e., conductivity in the case of EM is known as

(1) Sounding

(2) Profiling

(3) Depth Profiling

(4) None of the above

131. The source for MT sounding is
(1) VLF EM stations
(2) Radio broadcasting stations
(3) Thunderstorm and variation of Earth's magnetic field
(4) Gravitational variations of the Earth

132. In transient EM methods
(1) The Primary field is measured in the absence of the Secondary field
(2) The Secondary field is measured in the absence of the Primary field
(3) The Primary and Secondary fields are both measured together
(4) Only the Primary field is measured

133. In AFMAG method the source coils are
(1) One square loop wound on a ferrite core
(2) Two mutually perpendicular coils
(3) Long grounded wire
(4) Helmholtz coils

134. In the Radio wave methods the propagation of the wave field consists of the following components :
(1) Sky wave only
(2) Sky wave, direct wave and ground wave
(3) Only the ground wave
(4) The sky wave and ground wave

135. The GPR uses the principle
(1) Scattering of electromagnetic waves
(2) Total internal reflection of audio frequency waves
(3) Reflection of sky waves
(4) None of the above

136. The skin depth of the electromagnetic energy is
(1) Directly proportional to the frequency
(2) Directly proportional to the conductivity
(3) Directly proportional to magnetic permeability
(4) Inversely proportional to the square root of frequency, conductivity and magnetic permeability

137. In the tilt angle method, the parameters measured are
(1) Intensity of the electrical and magnetic fields
(2) Conductivity
(3) Magnetic permeability
(4) In phase and quadrature components

138. The Electromagnetic Method of exploration in Geophysics is based on the principle of
(1) The Galvanic DC current passed through a fixed contact on the surface
(2) Mutual induction
(3) The thermal energy contained in rocks
(4) None of the above

139. The frequency range of the Slingram method is
(1) 0·01 Hz to 1 Hz
(2) 200 Hz to 2000 Hz
(3) 2 MHz to 10 MHz
(4) 550 KHz to 30 MHz

140. The human eye is sensitive to only _____ in EM spectrum.
(1) UV
(2) IR
(3) Visible
(4) None of the above

141. The path of a satellite is called

(1) Orbit

(2) Altitude

(3) Surface

(4) Orbit and Altitude

142. An object in orbit around a celestial body is called

(1) Aircraft

(2) Rocket

(3) Satellite

(4) None of the above

143. The diameter of the bore hole is determined by

(1) Caliper Log

(2) Temperature Log

(3) Inclinometer Log

(4) Flow meter Log

144. The Conductivity of the formation is measured by means of

(1) Caliper logging

(2) Induction logging

(3) Sonic logging

(4) Radiation logging

145. Cap rock is

(1) Permeable rock

(2) Impermeable rock

(3) Sonic logging

(4) Radiation logging

146. Formation Factor F for sands

(1) $F = 0{\cdot}62/\phi^{2{\cdot}15}$

(2) $F = 0{\cdot}81/\phi^{2}$

(3) $F = 1/\phi^{2}$

(4) None of the above

147. The formation water quality is easily determined by

(1) Density Log

(2) Resistivity Log

(3) Self Potential (SP) Log

(4) Neutron Log

148. The dynamic range of a present day Geophone is

(1) 60 dB

(2) 40 dB

(3) 80 dB

(4) 120 dB

149. In a Sand-Shale sequence, the impermeable beds are clearly indicated by

(1) Density Log

(2) Magnetic Susceptibility Log

(3) Natural Gamma Ray Logs

(4) Inclinometer Log

150. The secondary porosity of a formation is determined by the combination of

(1) Acoustic Log — Density Log

(2) Acoustic Log — Neutron Log

(3) Density Log — Neutron Log

(4) None of the above

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