0212N893

Candidate's Seat No :_____

Integ. M.Sc in App Geo Sem.-5 Examination

AGL 305

Introduction to Geophysics

December-2024

Time : 2-30 Hours] **[Max. Marks : 70**

QUESTION – 1 Write the following

(I) What is geophysics, and how does geological data enhance geophysical data. 7

(II) Highlight four significant advantages of subsurface geophysical methods compared to excavation, and list the four primary methods of geophysical investigation. 7

OR

(i)Discuss the principles of seismic wave propagation and the types of seismic waves. 7

(ii)Explain how seismic wave understanding helps in describing the Earth's internal layers, and provide an overview of their properties. 7

QUESTION – 2 Write the following

Discuss the principles and applications of any one of the following geophysical method. Also, outline the various corrections applied for their data interpretation.

(I)Gravity method 7

(II)Magnetic method 7

OR

(i)Discuss the electrical geophysical method and their application and principle. Also mention the different types of configurations of electrode used in electrical method and their application. 7

(ii) Discuss the seismic geophysical method and their application and principle.Also write two different methods used to deduce the subsurface properties. 7

QUESTION – 3 Write the following

(i) What is geophysical field survey. Write down the benefits for carrying out a geophysical field survey. 7

(ii) What are the requirementsof carrying out a geophysical field surveywith a special highlight on literature review of area of interest.7

OR

(i)Write the work plan to carry out a geophysical field survey. 7

(ii)Write down the accessories and field equipment required for a geophysical field survey. 7

(P.T.O)

QUESTION – 4 Write the following

(I) What is the main purpose of using geophysical methods in ground water exploration andwhy is it important to explore ground water properly. 7

(II) Write any three subsurface groundwater exploration method in brief. 7

OR

(ii)What are the stages and challenges involved in groundwater exploration. Explain the purpose of well logging. 7

Describe any four well logging techniques and also mention their depth of investigation. 7

QUESTION –5*Attempt any seven out of twelve. 14

(i)Which of the following statements accurately describes the role of seismic methods in geological exploration?

A) Seismic methods primarily focus on surface surveys and are not effective in subsurface investigations.

B) The generation and detection of seismic waves through various techniques help in identifying subsurface geological structures and natural resources.

C) Seismic methods are exclusively used for oil and gas exploration and have limited applications in environmental studies or infrastructure development.

D) The principles of seismic wave propagation are irrelevant to analyzing the geological properties of the Earth's crust.

(ii) Which advancements enhance the accuracy and efficiency of seismic surveys?

A) Improved Road construction techniques

B) Technological advancements in data collection and interpretation

C) New laws governing natural resource management

D) Enhanced weather prediction models

(iii)What are the types of seismic waves studied in seismic methods?

A) Only sound waves

B) Seismic waves are not categorized

C) Types of seismic waves are not specified in the document

D) Different types of seismic waves including primary and secondary waves

(iv)What is acoustic impedance in the context of seismic methods?

A) The speed at which seismic waves travel through different geological materials.

B) The measure of how much seismic wave energy is reflected or transmitted at the interface between two materials.

C) The frequency of seismic waves generated during an earthquake.

D) The depth at which seismic waves are first detected during a survey.

(v) What are the two primary surveying modes in electrical resistivity methods?

A) Static and dynamic

B) Sounding and profiling

C) Direct and indirect

D) Horizontal and vertical

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(vi) What is the primary purpose of the electrical resistivity method?
A) To measure the temperature of subsurface materials
B) To map the subsurface electrical resistivity structure
C) To locate groundwater directly
D) To analyze seismic waves

(vii) What happens when the outer current electrodes' separation is increased in the sounding mode?
A) The depth of exploration decreases
B) The area covered by the survey shrinks
C) The current is driven deeper into the subsurface
D) The electric potential is minimized

(viii) Acoustic impedance is the product of _____
(ix) What is the formula for the reflection coefficient at an interface between two different media in seismic exploration _____
(x) What are the four primary methods of ground water exploration?
A) Aerial, Surface, Subsurface, and Esoteric
B) Aerial, Oceanic, Subsurface, and Surface
C) Surface, Ground, Aerial, and Oceanic
D) Subsurface, Aerial, Oceanic, and Esoteric
(xi)What is a key factor that a geophysicist should consider for a successful field campaign?

A) The personal interests of the survey team.
B) Weather conditions, topography, and access to the site.
C) The latest technology available in the market.
D) The opinions of local residents.

(xii) What is the purpose of conducting a literature review before a geophysical survey?
A) To gather irrelevant information.
B) To compile current and historic data for the areas of interest.
C) To avoid any planning for the survey.
D) To increase the project budget unnecessarily.