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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – January 2025** |
| **Date:** 06 / 01 / 2025 **Time:** 09:30 AM – 12:30 PM |

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| **School:** School of Engineering | **Program:** B.Tech. in Petroleum Engineering | |
| **Course Code:** PET2014 | **Course Name:** Geophysical Methods for Oil and Gas Exploration | |
| **Semester**: V | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **24** | **24** | **26** | **26** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 2 marks. 10Q x 2M=20M** | | | | |
| **1** | Choose the Correct Answer:  The shells of Foraminifera are primarily composed of \_\_\_\_\_\_\_\_\_\_.  (A) Calcium carbonate  (B) Silica  (C) Clay minerals  (D) Organic material | **2 Marks** | **L1** | **CO1** |
| **2** | Define a Petroleum Trap. | **2 Marks** | **L1** | **CO1** |
| **3** | Recall a word to Fill in the Blank:  Geochemical methods focus on the analysis of \_\_\_\_\_\_\_\_\_\_ composition in rocks, soils, and gases. | **2 Marks** | **L1** | **CO2** |
| **4** | Recall a common limitation of geochemical exploration. | **2 Marks** | **L1** | **CO2** |
| **5** | Choose the Correct Answer:  \_\_\_\_\_\_\_\_\_\_ is a type of gravity correction.  (A) Bouguer correction  (B) Isostatic correction  (C) Free-air correction  (D) All of the above | **2 Marks** | **L1** | **CO3** |
| **6** | Recall a word to Fill in the Blank:  Magnetic surveys use instruments called \_\_\_\_\_\_\_\_\_\_ to measure magnetic field \_\_\_\_\_\_\_\_\_\_. | **2 Marks** | **L1** | **CO3** |
| **7** | Label True or False:  (a) Gravity surveying is used for detecting subsurface density variations.  (b) Gravity surveys are limited to shallow subsurface investigations. | **2 Marks** | **L1** | **CO3** |
| **8** | Choose the Correct Answer:  Seismic reflectance occurs due to \_\_\_\_\_\_\_\_\_\_.  (A) Change in density and velocity at a boundary  (B) Magnetic anomalies  (C) Gravitational variations  (D) Atmospheric pressure | **2 Marks** | **L1** | **CO4** |
| **9** | Recall a word to Fill in the Blank:  The reflection coefficient is calculated based on differences in \_\_\_\_\_\_\_\_\_\_ and acoustic \_\_\_\_\_\_\_\_\_\_. | **2 Marks** | **L1** | **CO4** |
| **10** | Name the two primary types of seismic waves used in exploration. | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions. Total Marks 80** | | | | | |
| **11.** | **a.**  **b.** | Summarize the importance of calcareous nanofossils and nanoliths in petroleum exploration.  Explain how ostracods are used to interpret depositional environments and their relevance to petroleum exploration. | **20 Marks** | **L2** | **CO1** |
| **or** | | | | | |
| **12.** | **a.**  **b.** | Interpret a Van Krevelen diagram to evaluate the maturity of a source rock.  Describe how hydrocarbon seeps are identified and their implications for exploration. | **20 Marks** | **L2** | **CO1** |
|  |  |  |  |  |  |
| **13.** | **a.**  **b.** | Explain how seepage acts as a natural indicator of hydrocarbon accumulations and its limitations.  Describe the role of geochemical methods during the initial stages of petroleum exploration. | **20 Marks** | **L2** | **CO2** |
| **or** | | | | | |
| **14.** | **a.**  **b.** | Explain how geochemical data is integrated with geological and geophysical data to enhance exploration success.  Summarize the use of remote sensing techniques in identifying seepage-related anomalies. | **20 Marks** | **L2** | **CO2** |

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| **15.** | **a.**  **b.** | Explain Elevation Corrections and Tidal Correction applied before interpreting the results of gravity survey.  Describe the Principle of Fluxgate Magnetometer. | **20**  **Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **16.** | **a.**  **b.** | Explain the Principle of the LaCoste and Romberg Gravimeter.  Describe Geomagnetic Correction. | **20 Marks** | **L2** | **CO3** |

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| **17.** | **a.**  **b.** | Explain the Seismic Trace.  Illustrate the figure presented below. | **20**  **Marks** | **L2** | **CO4** |
| **Or** | | | | | |
| **18.** | **a.**  **b.** | Illustrate Common Mid Point (CMP) and Common Depth Point (CDP) surveying.  Demonstrate the figure presented below. | **20**  **Marks** | **L2** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***