# PRESIDENCY UNIVERSITY
## BENGALURU

## SCHOOL OF ENGINEERING

### TEST 1

**Winter Semester**: 2021 - 22

**Course Code**: PET 2014

**Course Name**: Hydrocarbon Exploration (DE-V)

**Program & Sem**: B. Tech & IV Sem

**Date**: 27-04-2022

**Time**: 11.30 AM to 12.30 PM

**Max Marks**: 30

**Weightage**:  15 %

**Instructions:**

*(i) Read the all questions carefully and answer accordingly.*
*(ii) Question paper consists of 3 parts.*
*(iii) Scientific and Non-programmable calculators are permitted.*

## Part A [Memory Recall Questions]

**Answer both the Questions. Each question carries THREE marks.**          **(2Qx 3M= 6M)**

1.    Answer the Following:                              (C.O.No.1 & C.O.No.2) [Knowledge]

   a) _____ refers to visible oil and gas seeps
   b) The conversion of sedimentary organic matter into petroleum is termed as _____
   c) _____ kerogen is derived essentially from continental plants.

2. Petroleum source is characterized by three essential conditions. What are those?

## Part B [Thought Provoking Questions]

**Answer all the Questions. Each question carries FIVE marks.**          **(3Qx5M=15M)**

3. "Ostracodes are considered as an ideal bio stratigraphic tool". Why?

(C.O.No.1) [Comprehension]

4. "Geochemical expression of seepage is complex and varied". Justify the statement.

(C.O.No.2) [Comprehension]

5. Geochemical methods assume that hydrocarbons generated and trapped at depth leak in varying but detectable quantities to the surface. Identify the methods used for detection.

**Answer the Question. The question carries NINE marks.** **(1Qx9M=9M)**

6.  "Each kerogen type reflects variation in composition". Why? Identify the diagram and describe the statement with the help of diagram given below.
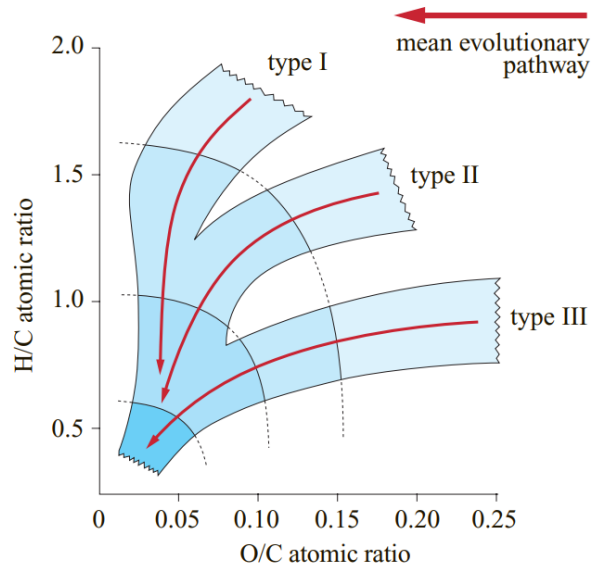


[C.O.No.1] [Comprehension]

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### SCHOOL OF ENGINEERING

**TEST 2**

**Winter Semester**: 2021 - 22

**Course Code**: PET 2014

**Course Name**: Geophysical methods for Oil and Gas Exploration

**Program & Sem**: B. Tech, IV

**Date**: 2nd June 2022

**Time**: 11.30 AM to 12.30 PM

**Max Marks**: 30

**Weightage**: 15 %

**Instructions:**

(i)   Read the all questions carefully and answer accordingly.

(ii)  Question paper consists of 3 parts.

(iii) Scientific and Non-programmable calculators are permitted.

## Part A [Memory Recall Questions]

**Answer all the Questions. Each question carries ONE mark.**          **(10Qx 1M= 10M)**

**Answer the following**                                           (C.O.No.3) [Knowledge]

1. The C.G.S unit of gravity is _____

2. IGRF stand for _____

3 _____ varies with latitude because of non-spherical shape of earth

4. Anomalies in earth magnetic field are caused by _____ and _____

5. The magnetic susceptibility of diamagnetic material is _____

6. The proportion of _____ in igneous rocks tends to decrease with increasing acidity

7. Diurnal correction causes the fluctuation of geomagnetic filed up to _____

8. _____ theory explains the source of internal origin of magnetic field

9. Magnetic field generates due to _____

10. When i = _____, magnetic field direction will be same direction of induced anomalous magnetic field.

## Part B [Thought Provoking Questions]

**Answer all the Questions. Each question carries THREE marks.**          **(4Qx3M=12M)**

(C.O.No.4) [Comprehension]

11. "CMP gather lies at the heart of seismic processing". Justify the statement with reasons

12 "Each seismic trace has three primary geometrical factors which determine its nature". Identify.

13 "Maximum transmission of seismic energy requires a matching of acoustic impedance" validate the statement.

14 "If we carryout magnetic surveying at i = 90°, i = 45 ° and i = 0° respectively, what will be direction of main magnetic field with respect to induced anomalous magnetic field? Explain it with illustration.

## Part C [Problem Solving Questions]

**Answer both the Questions. Each question carries FOUR marks.** (2Qx4M=8M)

15. a) A gravity reading is taken in a stationery helicopter hovering 1.5 km above mean sea level at a particular location. What is the difference in value of g measured in helicopter and at mean sea level vertically beneath the helicopter?

 b) Identify the type of correction, that has to be taken into account while doing marine gravity surveying and what happens to $\Delta g_E$ if, the ship moves towards east and then west?

(C.O.No.3) [Application]

16. a) A seismic wave is incident normally on a reflector with reflection coefficient 'R' of 0.01. What proportion of incident energy is transmitted?

 b) The P-wave velocity and poisons ratio for a homogeneous and isotropic sedimentary rock are 2500 m/s and 0.3 respectively. Determine the S-wave velocity of rocks in m/s.

(C.O.No.4) [Application]

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## BENGALURU

## SCHOOL OF ENGINEERING

### END TERM EXAMINATION

**Winter Semester**: 2021 - 22

**Course Code**: PET 2014

**Course Name**: Geophysical methods for Oil and Gas Exploration

**Program & Sem**: B. Tech & IV Sem

**Date**: 4th July 2022

**Time**: 09.30 AM to 12.30 PM

**Max Marks**: 100

**Weightage**: 50 %

**Instructions:**

*(iv) Read the all questions carefully and answer accordingly.*

*(v) Question paper consists of 3 parts.*

*(vi) Scientific and Non-programmable calculators are permitted.*

### Part A [Memory Recall Questions]

**Answer all the Questions.**                                   **(10Qx 1M= 10M)**

(C.O.No.3) [Knowledge]

1. Identify the **True** or **False** statements

a) Fan filtering removes the effect of earth filtering

b) Stacking is the process of increasing Signal to Noise ratio

c) Migration is the process of reconstructing the seismic section

d) Collecting all the traces with a common midpoint forms a common midpoint gather

e) Fresnel Zone is the indicator of vertical resolution

f) Earth act as a band reject for seismic filter for seismic wave that travel through it.

g) In seismic surveying, the energy contained in the ray increases due to geometrical spreading of the energy

h) If R or R' = 1, all the incident energy is transmitted

i) Display or collection of one or more seismic traces is termed as shot gather

j) It is difficult to relate acoustic impedance to a tangible rock property. But in general, harder the rock, the higher its acoustic impedance

2. Answer any five Questions. Each question carries Two marks          (5Qx2M=10M)

   I.    Define Active seepage and Passive seepage

   II.   Define zone of maximum disturbance

   III.  Define any Two principles of stratigraphy

   IV.   Define Paleontology and Palynology

V. Identify the difference between Type -I and Type -II kerogen

VI. Define diagenesis and Metagenesis

(C.O.No.2, 3) [Knowledge]

3. Match the Following                                                    (5Qx1M=5M)

| I. | Migration | - | Surface Wave |
| II. | CMP | - | Reconstruction of seismic sections |
| III. | Vibroseis | - | Attenuation of seismic energy |
| IV. | Geometrical Spreading | - | Non-Explosive source |
| V. | Rayleigh wave | - | CDP |

## Part B [Thought Provoking Questions]

**Answer all the Questions. Each question carries FIVE marks.**           **(7Qx5M=35M)**

4. "In case of dipping reflectors, the record surface departs from the reflector surface and thus causes the distorted picture of the reflector geometry". Comment on this

(C.O.No.4) [Comprehension]

5. "Synclines within which the reflector curvature exceeds the curvature of the incident wave front are represented on non-migrated seismic sections by a 'bow-tie' event". Identify the reason behind the statement given with illustration            (C.O.No.4) [Comprehension]

6. Fan filtering is used to remove coherent noise events from seismic records on the basis of particular angles at which the events dip. Demonstrate how fan filtering aids in suppressing unwanted events            (C.O.No.4) [Comprehension]

7. Magnetic surveying is rapid and cost-effective technique and represents one of the most widely used geophysical methods. Explain the other applications of magnetic surveying in brief            (C.O.No.3) [Comprehension]

8. Before the interpretation of gravity survey, it is necessary to correct for all variations in earth gravitational field which do not result from differences of density in underlying rocks. And this is referred as gravity reduction. Describe any two methods of reduction to the geoid.

(C.O.No.3) [Comprehension]

9. The variation of magnetic field is more while going from equator to pole. Explain the statement given using proper equations            (C.O.No.3) [Comprehension]

10. Temporal variations in Earth's magnetic field causes periodic changes in polarity in geomagnetic field. Describe the types of temporal variations which cause fluctuations in magnetic field.            (C.O.No.3) [Comprehension]

## Part C [Problem Solving Questions]

**Answer all the Questions. Each question carries TWENTY marks.        (2Qx20M=40M)**

11.  A) Go through the figures and graph provided thoroughly. Identify, interpret and explain the following:
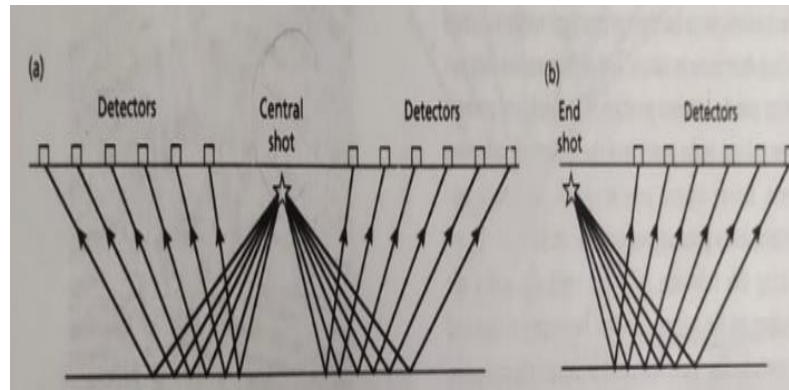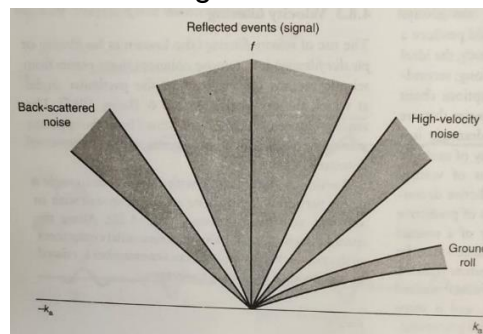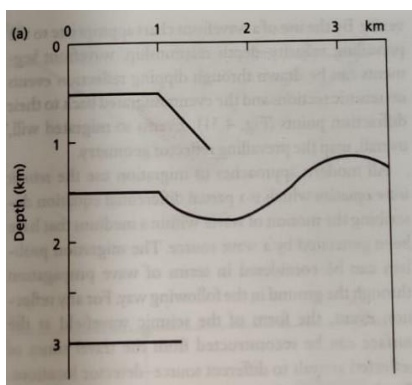
(C.O.No.4) [Application]
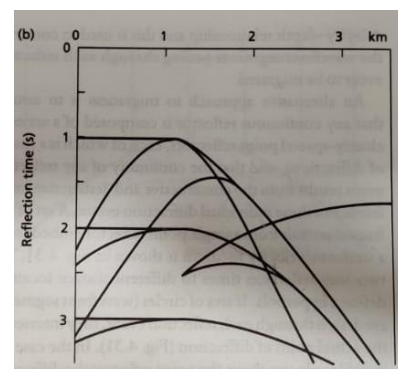


Figure: 1



Figure: 2



Figure:3



Figure:4

b) Reflection surveys are normally designed to provide a specified depth of penetration and a particular degree of resolution of subsurface geology in both vertical and horizontal dimensions. How is it possible to get higher resolution of subsurface geology in both the dimensions? Prepare a note on various parameters that can also be adjusted.

(C.O.No.4) [Application]

12. The diagram which is shown below plots the H/C ratio of kerogen versus the O/C atomic ratio. Prepare a note on evolutionary pathway of kerogen followed by identifying the various composition of the same.
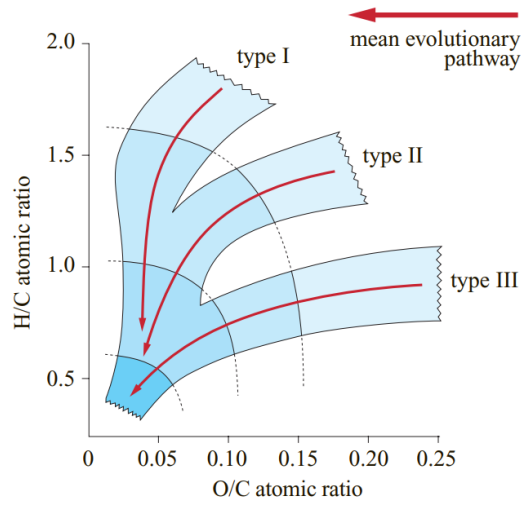
Figure: 5                    (C.O.No.1) [Application]