Name: Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, January 2021

Course: Methods in Petroleum Exploration   **Semester: I**
Program: M.Tech. Petroleum Engineering   **Time 03 hrs.**
Course Code: PEGS 7019   **Max. Marks: 100**

SECTION A
Each Question will carry 5 Marks.

S. No.	Question	CO
Q 1	Classify the petroleum source rocks based on their hydrocarbon generation potential. Define each.	CO3
Q 2	Describe the importance of HI and OI. Mention how to calculate original HI and OI from rock eval data	CO3
Q 3	Describe importance of Gravity method in petroleum Exploration.	CO4
Q 4	Define Geomagnetism.	CO4
Q 5	From well logs, the following P-wave velocities were determined: Sandstone 4.3 km/s, Water 1.5 km/s, Gas 0.3 km/s, Shale 2.4 km/s. Compute the average P-wave velocity in the gas-saturated reservoir having 12% porosity.	CO5
Q6	Explain significance of Geochemistry in petroleum Exploration.	CO3

SECTION B
1. Each question will carry 10 marks
2. Instruction: Write short notes

Q 7	Explain the scheme of exploration of oil and gas deposits by geochemical method.	CO3
Q 8	Describe in detail the procedure of geological mapping in a region.	CO2
Q 9	Differentiate between working principle of Proton Precession and Fluxgate Magnetometers with neat schematic diagrams. **OR** Discuss Magnetic data acquisition and processing	CO4
Q 10	Describe gravity data acquisition and processing (data reduction).	CO4
Q11	A) A spherical cavity of radius 8 m has its centre 15 m below the surface. If the cavity is full of sediments of density 1.5×10^3 kg/m^3 and is in a rock body of density 2.4×10^3 kg/m^3. Calculate the maximum value of its gravity anomaly in mGal?	CO4

	B) A sphere of density $\rho = 0.5$g cm^{-3} has a radius R of 50m and is buried 150m below the (x, y) plane. Compute the corresponding gravity anomaly above the center, at points P1 (50, 0) and P2 (30, 40), (Assume density of Earth to be 2.5g cm^{-3}).	

SECTION-C

1. Each Question carries 20 Marks.
2. Instruction: Write long answer.

Q 12	A seismic data acquisition company carried out geophysical survey in a basin and observed following P-wave velocities in three different layers as 4.1km/s, 6.8km/s and 3.5km/s respectively. Consider the amplitude of incident wave as unity and density of all the layers as 2700kg/m^3, depth to first and second interfaces are 600m and 1500m respectively and that there is no geometrical spreading, attenuation, or scattering. Construct the seismic record of amplitude versus time of the arrival of first three waves in the geophone. **OR** Describe in detail about: a) Types of seismic waves and their properties. b) What will be S-wave velocity of a medium having a Poisson's ratio and a P-wave velocity of 0.5 and 3 km/s respectively? **c)** Different factors that affect seismic amplitudes.	CO5