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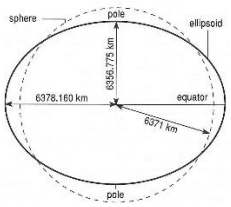
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May-June 2021

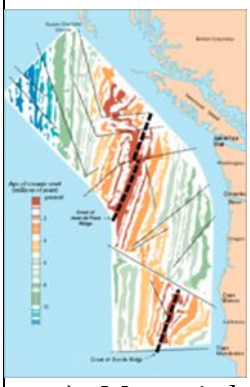
Course: Petroleum Exploration
Semester: II
Program: M.Sc. Petro-Geoscience **Time 03 hrs.**
Course Code: PEGS 7013 **Max. Marks: 100**
No. of Page(s): 7

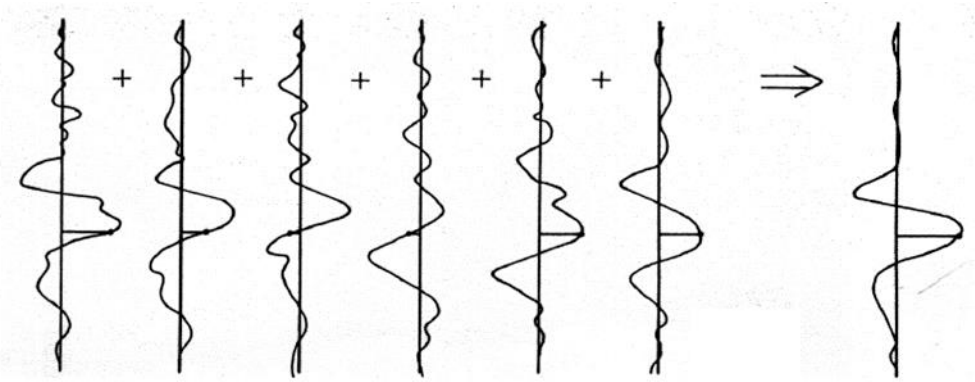
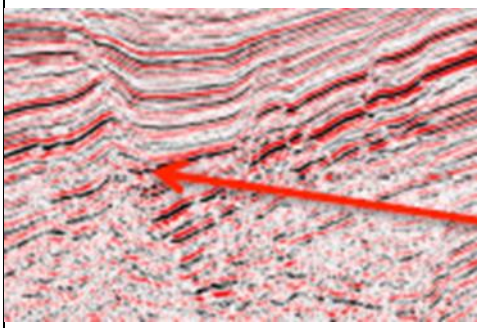
SECTION A

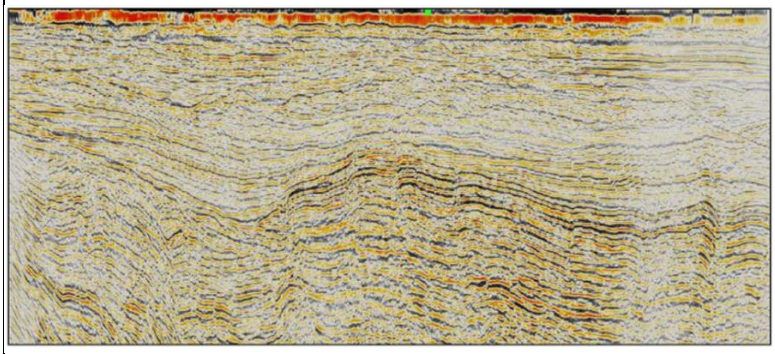
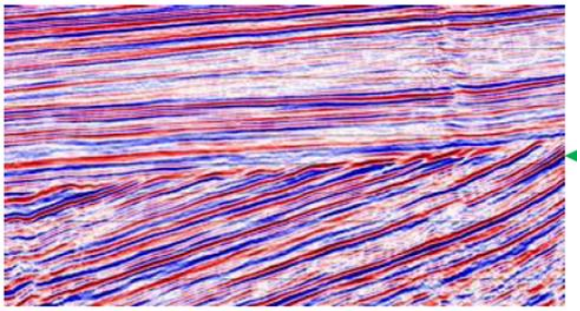
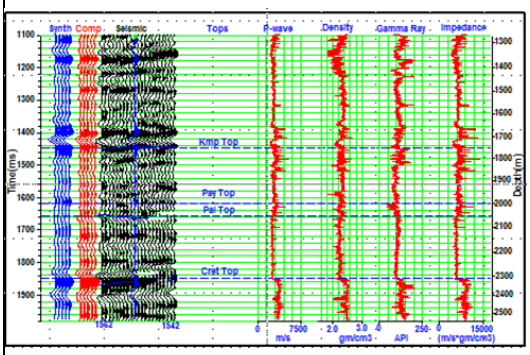
1. **Each Question will carry 5 Marks**
2. **Each Sub-Question consisting of MCQ, FIB and TF will carry one Mark.**
3. **Instruction: Complete the statement / Select the correct answer(s)**

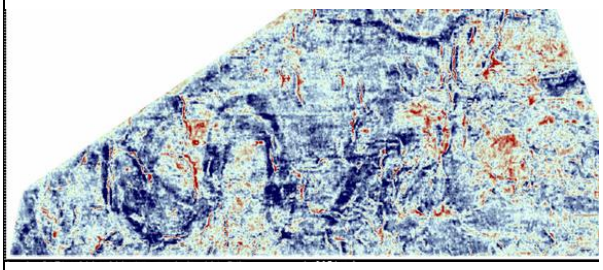
S. No.	Question	CO
Q 1	i) The difference in "g" between equator & poles is approximately--------cm/sec^2 a) 8 b) 10 c) 5 d) 3 ii) The Bouguer anomaly over an isostatically compensated region is : a) Zero b) Positive c) Negative d) Same as isostatic anomaly iii) In ---------- substances the magnetic susceptibilities are SMALL and POSITIVE and depends linearly on the applied field and reduces to zero on removal of the field a) Paramagnetic b) Diamagnetic c) Ferromagnetic iv) Magnetic readings taken at the same location at different times will yield the same results__ a) True b) False__ v) Below diagram depicts the reduction of gravity data pertaining to  a) Latitude b) Free air c) Bougeur d) Elevation	CO1

Q2	i) Gal is a) the c.g.s. unit of acceleration due to gravity (1 cm/s2) b) the m.k.s unit of acceleration to gravity (1 cm/s2) c) the f.p.s unit of acceleration due to gravity (1 cm/s2) d) None ii) 1 gravity unit is = to a) 0.01mGal b) 0.1mGal c) 0.001mGal d) 1mGal iii) The variation of the Bouguer anomaly should reflect the lateral variation in density such that a a) High-density feature in a lower-density medium should give rise to a positive Bouguer anomaly. b) A low-density feature in a higher-density medium should result in a negative Bouguer anomaly. c) Both a and b d) None iv) The magnetic domains are due to : a) Covalent bonds b) Doping c) Hysteresis loss d) Spin exchange interaction v) Which of the following exhibits negative magnetic susceptibility a) Pyroxene b) Quartz c) Olivine d) Biotite	**CO1**
Q 3	i) Put the below stages of seismic exploration in order a) Seismic sections are created from the raw data recorded by the field crew b) Land and marine seismic data is created and recorded all over the world by field crews c) Exploration wells are drilled to see if there are hydrocarbons in sufficient quantity to become a reservoir of economic viability d) Horizons and structures are identified and the location of possible hydrocarbon reserves are mapped ii) Typical seismic velocity (m/s) of Sandstone is a) 5900-6100 b) 1400-4300 c) 1000-2500 d) 1400-2400	**CO2**

	iii) The magnetic anomaly depicted in the below figure relates with  a) Magnetic low & high b) Ocean Floor stripes c) Volcanic eruption d) Sedimentary Beds iv) Why is it useful to look at frequency data? a) It can be quicker/easier to do certain post-processing functions in the frequency domain. b) Time series data is complicated because it is unclear when certain events occur. c) Frequency data shows us the power of events so we can write music about it. d) Option 4 v) Velocity = a) Change in density over change in time (D/T) b) Change in distance over change in time (D/T) c) Change in time over change in speed (T/S) d) Option 4	
Q 4	i) Seismic waves which travel through interior part of earth are known a) Body waves b) Surface waves c) Inner waves d) deep ways ii) Waves which are responsible for back and forth movement of earth are called a) s wave b) p wave c) q wave d) w wave iii) Multicomponent seismic which plays a very important role in the characterization of unconventional plays by mapping the distribution of sweet spots brings the opportunity to analyze a) P-wave b) S-wave c) P-wave and S-wave type velocity d) Love-wave	**CO3**

	iv) Stacking improves signal-to-noise ratio of weak reflection signals  The above statement is a) False b) True c) Can't say v) . The statement that Fold = number of traces in a trace gather is a) False b) True c) Can't say	
Q 5	i) In the seismic data processing, the CDP gather comes in the last stage of Processing. The statement is a) True b) False c) Can't say ii) NMO correction is made while a) Acquisition of seismic data b) Interpretation of seismic data c) Processing of seismic data d) None iii) Which prominent feature can be interpreted from the below seismic section  a) Post rift onlap b) Syn rift faulting c) Post rift offlap d) Folding	**CO4**

	iv) Is this seismic line of high quality or low quality  a) Low Quality b) High Quality c) None v) Which important seismic feature is seen in below seismic line vi)  a) Onlap b) Erosional truncation c) Internal convergence d) Apparent truncation	
Q 6	i) A contour map that displays the variation in time between two seismic events or reflections is called A. Isochron Map B. Isochore map C. Structure map ii) Below diagram shows a  a) Seismic section b) VSP Profile c) Synthetic Seismogram d) Well stratigraphy	**CO4**

	iii) Below seismic section depicts the mapping  a) Braided River system b) Meandering Channel c) Folds d) None iv) Reservoir characterization refers to all the pertinent information that is required to describe a reservoir in terms of its ability to store and produce hydrocarbons. a) True b) False v) Seismic attributes are mathematical descriptions of the shape or other characteristic of a seismic trace over specific time intervals. a) True b) False	

SECTION B

1. **Each question will carry 10 marks**
2. **Instruction: Write short / brief notes**

Q 7	a) Describe different exploration methods and related measured parameters used in hydrocarbon industry. (5M) b) Application of Remote Sensing and Satellite Imagery in Petroleum exploration. (5M)	**CO1**
Q 8	Define Gravity and magnetic anomaly. What are the application of these anomalies in hydrocarbon exploration? .	**CO2**
Q 9	a) Describe in detail the principle of Seismic Survey and types of spread and their application for seismic data acquisition. (5M) b) What determines seismic wave velocity? (5M) **OR** Write short notes on any five with suitable diagram (2Marks each) a) Acoustic Impedance b) Reflection Coefficient c) Foldage d) Trace Analysis e) What is a reflector f) Seismic Noise g) Polarity Reversal	**CO2**
Q 10	a) Describe in detail with a flow chart the various stages of seismic data processing. (5M) b) Common Midpoint (CMP) method (5M)	**CO3**

Q 11	Define Geochemical anomaly. How geochemical methods are used in petroleum exploration (10M) **OR** Discuss the Vertical Seismic Profiling (VSP) survey and its use in seismic interpretation (10M)	**CO3**
	SECTION C (20 Marks) **1 Question compulsory with internal choice**	
Q 12	Describe Exploration's Task with a flow chart. How the qualitative and quantitative Seismic Interpretation of Seismic Data is done for firming up a drillable prospect. **OR** Describe seismic attributes. How they can be used for 3-D seismic visualization in structural and stratigraphic interpretation.	**CO 4**