

Roll No: -----



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

END Semester Examination, MAY 2018

Program: B-TECH GSE & GIE

Semester – IV

Subject (Course): METHODS OF PETROLEUM EXPLORATION-I

Max. Marks : 100

Course Code : GSEG-201

Duration : 3 Hrs

No. of page/s: 03

All the questions of section A & B are compulsory. Wherever necessary do with neat sketches.

SECTION –A

[5 x 4=20 marks]

Q. 1 Choose the correct answer/answers:

[5 marks]

- a) Which one of the following sedimentary basins is related to extension?
(i) foredeep (ii) half-graben (iii) piggyback (iv) fore-arc
- b) In a borehole environment, transition zone refers
(i) mud filtrate (ii) formation water (iii) mix zone (iv) none
- c) Which combination of sorting and roundness of sand grains results in highest permeability?
(i) well sorted, poorly rounded; (ii) well sorted, well rounded;
(iii) poorly sorted, poorly rounded; (iv) poorly sorted, well rounded
- d) Which one of the following river systems forms the largest fluvio-deltaic system in the world?
(i) Mississippi–Ohio (ii) Red–Mekong (iii) Ganga–Brahmaputra (iv) Yellow–Ba Hoi
- e) The void ratio (in percentage) of sandstone is 25. Its porosity in percentage is.....
(Fill in the blank).

Q. 2 Assess the source rock potential of Cambay Formation of Eocene age. [5 marks]

Q. 3 Write short notes on i) rift basin and ii) downwarp basin. [5marks]

Q. 4 Explain why a rock that contains several fossil types is more useful for dating rocks than a rock that contains only one fossil type. [5 marks]

SECTION –B [8 x 5= 40 marks]

- Q. 5** (a) Enumerate the tools and equipment required to undertake geological mapping.
[4 marks]
- (b) Discuss the importance of subsurface mapping in petroleum exploration. [4marks]
- Q. 6** Draw the 2 D facies model of Mississippi deltaic depositional system. Discuss the sediment texture and hydrocarbon prospect in a delta depositional system. [8 marks]
- Q. 7** Discuss different types of facies. Elucidate the tools of techniques for micro facies analysis. [8 marks]
- Q. 8** Elaborate importance of remote sensing techniques in petroleum exploration. [8 marks]
- Q. 9** Draw a flowchart to represent the basin types and explain with suitable examples. [8 marks]

SECTION –C

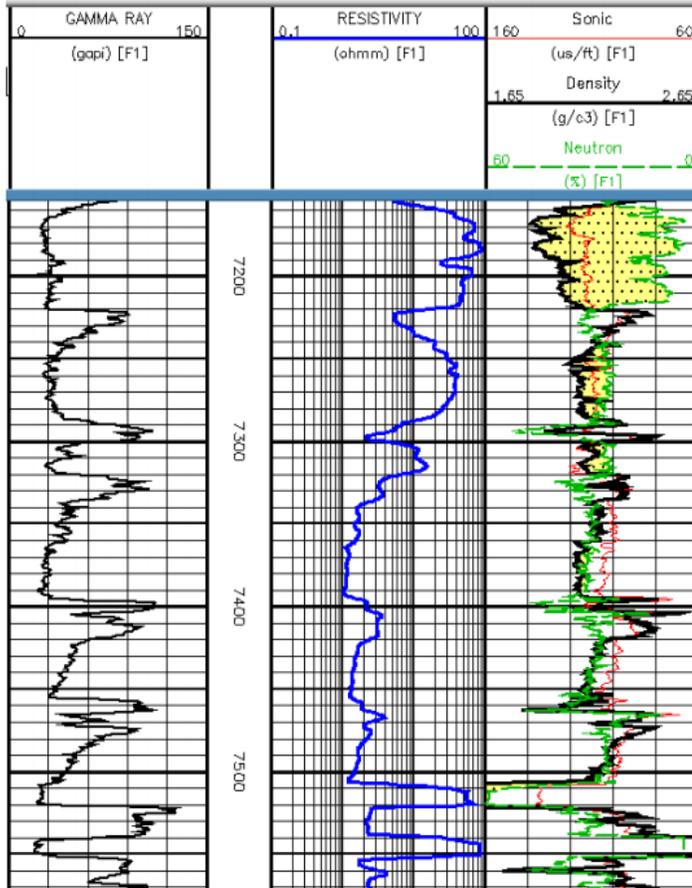
[2 x 20 = 40 marks]

- Q. 10.** “In this ever-changing economic and political climate, petroleum explorationists and field development geologists are being asked to find more oil and develop older reserves”.
- a) Evaluate the diagnostic tools used for petroleum exploration. [3 marks]
- b) Analyze the megascopic and microscopic techniques for petroleum exploration. [10marks]
- c) Explain your role in petroleum exploration as geoscience/ geoinformatics engineer. [7marks]
- Q 11.** “A geological model is a spatial representation of the distribution of sediments and rocks in the subsurface.” [10+10=20marks]
- (b) How will you assess the reservoir quality and quantity using well logging techniques?

(c) In a clean sandstone formation ρ_b is the measured bulk density 2.23 gms/cc, ϕ is porosity in fraction, ρ_f is fluid density in gm/cc and ρ_{ma} is matrix density for appropriate lithology. If we assume ρ_f to be equal to 1gm/cc for water, then by measuring bulk density of clean water bearing formations derive the porosity of the rock.

[or]

Refer the following well log profile and answer the following questions



- Demarcate the sandstone layers (mention the depth)
- Calculate the clay volume for depth zone of 7290-7300m
- Interpret the reservoir zones and assess the presence of hydrocarbon qualitatively