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SEAT No. :

P703

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[4129] - 301

**M.Sc. (Applied) (Sem. - III)
PETROLEUM TECHNOLOGY**

PT - 9 : Reservoir Dynamics

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Question No. 1 is compulsory. Out of the remaining attempt 4 questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *You are advised to attempt not more than 5 questions.*

Q1) What are surface and interfacial tensions that affect reservoir fluids? Describe, in detail, how these affect the displacement of reservoir fluids and natural gas within reservoirs. **[20]**

OR

What is a geothermal gradient? How are temperatures of the reservoir originated? Describe, their Measurement mechanism and effects.

Q2) What is MBE? What are different ways of obtaining the data for MBE? Explain, in detail, the estimation of initial oil-in-place for under saturated oil reservoirs. **[15]**

Q3) Write notes on (any three). **[15]**

- a) Various pressures recorded in a reservoir.
- b) Volumetric and non-volumetric reservoirs.
- c) Formation volume factor.
- d) Sources of reservoir energy.
- e) Pressure conditions around a flowing well.

Q4) Explain, in detail, the mechanism for a linear flow of incompressible fluid-steady state in a reservoir. **[15]**

P.T.O.

Q5) Explain, the utility of Gas Cap Drive and Gravitational segregation drive for the oil production from a reservoir. **[15]**

Q6) Write notes on (any three) **[15]**

- a) Selection of PVT data for MBE.
- b) Influence of reservoir pressures on rate of oil production.
- c) Relation between WOR and reservoir pressures.
- d) Unit recovery and recovery factor.
- e) Recent trends in reservoir dynamics.

Q7) Explain, how conditions under the cap rock in a reservoir are different than those studied in Darcy's experiment. Give the applications of this low in reservoir studies. **[15]**



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M.Sc. (Applied) (Sem. - III)
PETROLEUM TECHNOLOGY
PT - 10 : Formation Evaluation - I

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *Question No. 1 is compulsory. Out of the remaining attempt 4 questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *You are advised to attempt not more than 5 questions.*

Q1) What is Mud-logging? Enumerate different parameters monitored during mud-logging. Explain how mud-logging information helps information evaluation. **[20]**

Q2) a) Describe the working of a MWD tool and add a note on its application.
b) Explain the sequence of events in simple drill stem test and add a note on its applications. **[15]**

Q3) Explain the difference between conventional and Focussed resistivity tools and add a note on the quantitative applications of Resistivity Logs. **[15]**

Q4) Write notes on (any three)

- a) Core logging.
- b) RFT.
- c) Bore hole environment.
- d) Scintillating counter.
- e) Archie's principle. **[15]**

Q5) Describe the induction log with reference to principles, tools, Log interpretation, Depth of investigation and quantitative applications. **[15]**

P.T.O.

- Q6)** a) Explain the difference between Natural Gamma Ray Log and spectral Gamma Ray Log with reference to tools used & applications. **[15]**
- b) Describe the tools used in caliper logging and add a note on its applications.

Q7) Write notes on (any three). **[15]**

- a) Shale Potential.
- b) MSFL.
- c) Principles and applications of Dielectric Log.
- d) Identification of permeable beds using Microlog and SP log.
- e) Quantitative applications of SP log.



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SEAT No. :

P705

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M.Sc. (Applied) (Sem. - III)

PETROLEUM TECHNOLOGY

PT - 11 : Drilling and Well Completions

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Question No. 1 is compulsory. Out of the remaining attempt 4 questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Your are advised to attempt not more than 5 questions.*

Q1) Mention briefly the different types of on shore Oil-Well Drilling Rig's. Enumerate the major differences in these rigs. Describe in detail the different components of the Oil Well Rig. **[20]**

Q2) Describe in detail the functions of different components making up the "Circulatory system" of an Oil Well Rig. **[15]**

Q3) Answer the following questions.

- a) Describe BHA used in a Pendulum Assembly during directional drilling. **[7]**
- b) Describe briefly the deflection tools used in directional drilling. **[8]**

Q4) Write notes on (any three)

- a) Types of casings and their functions.
- b) Fishing Tools.
- c) Drilling Team.
- d) Rheological properties of drilling mud.
- e) Well planning objectives. **[15]**

P.T.O.

Q5) Using the Bingham Plastic model, determine the various pressure drops, nozzle velocity and nozzle sizes for a section of 12.25 inch hole. Two pumps are used to provide 700 gpm.

Data:

Plastic velocity	=	12 CP
Yield Point	=	12 lb / 100 ft ²
Mud Weight	=	8.8 lb/gal
drill pipe ID	=	4.276 inch.
drill pipe OD	=	5 inch.
Length	=	6,480 ft.
drill collars ID	=	2.875 inch.
drill collars OD	=	8 inch.
Length	=	620 ft.

Last casing was 13.375 inch with an ID of 12.565 inch. 13.375 inch casing was set at 2550 ft. The two pumps are to be operated at maximum standpipe pressure at 2200 psi.

Surface equipment of type 4 is used with

Stand point	:	45 ft long, 4 inch ID
Hoge	:	55 ft long, 3 inch ID
Swivel	:	30 ft long, 3 inch ID
kelly	:	40 ft long, 4 inch ID
Eq. length	:	3.826 inch ID: 424 ft

[15]

Q6) Answer any two of the following:

[15]

- Describe different strength properties of casings used in Oil Well.
- Explain the functions of different cement additives used for cementing an Oil Well.
- Write a detailed note on Perforations of an Oil Well.

Q7) Write notes on (any three).

[15]

- Choke Manifold System.
- Roller cone Bits.
- Driller's method of Pressure control.
- Under Balanced Drilling.
- Lost circulation materials.



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SEAT No. :

P706

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M.Sc. (Applied) (Sem. - IV)
PETROLEUM TECHNOLOGY
PT - 13 : Reservoir Performance
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Question No. 1 is compulsory. Out of the remaining attempt 4 questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Your are advised to attempt not more than 5 questions.*

Q1) What is meant by the term 'Permeability'? State various factors affecting reservoir permeability with neat diagram? Describe how permeability curves can be studied for understanding the reservoir performance:

OR

What are different types of pressure informations obtained during reservoir studies? Describe, how pressure draw-down analysis is useful in understanding the reservoir performance. **[20]**

Q2) What is the difference between draw down and pressure build up tests? Describe the multiple rate flow test analysis and its usage during reservoir studies. **[15]**

Q3) Describe, in detail, various physical principles of reservoir engineering. **[15]**

Q4) Write notes on (any three):

- a) Importance of pressure analysis method.
- b) Pseudo-pressure analysis.
- c) Uses of permeability curves.
- d) Stages of development of oil fields.
- e) Determination of rate of production for reservoir parameters. **[15]**

P.T.O.

Q5) Describe, in detail, the criteria for rational development of oil and gas fields. **[15]**

Q6) Explain why a simulation model is required during reservoir studies. Describe the designing of 3 D models for reservoir simulation. **[15]**

Q7) Write notes on (any three). **[15]**

- a) History matching during simulation.
- b) Future of enhanced oil recovery.
- c) Water flooding and its utility.
- d) Immiscible gas injection.
- e) Different stages in development of an oil field.



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SEAT No. :

P707

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M.Sc. (Applied) (Sem. - IV)

PETROLEUM TECHNOLOGY

PT - 14 : Formation Evaluation - II

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Question no. 1 is compulsory. Out of the remaining attempt 4 questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *You are advised to attempt not more than 5 questions.*

Q1) Describe Neutron. OR Acoustic log with reference to the principle, units of measurement and applications. **[20]**

Q2) a) Write a note on High Resolution Spectroscopy (HRS). **[8]**

b) Write in brief on the depth of investigation and vertical resolution of EPT log. **[7]**

Q3) Explain how geological factors affect the measurement of litho density tool and add a note on the environmental effect on its measurement. **[15]**

Q4) Write notes on (any three): **[15]**

- a) Absorption Equation.
- b) Difference between litho density and density with reference to principles and application.
- c) Acoustic impedance and reflection coefficient.
- d) Use of two detectors in density tool.
- e) BHTV tools.

P.T.O.

Q5) Describe the window method and Weighted Least Square (WLS) method used as measuring technique in modern induced Gamma Ray spectrometry. **[15]**

Q6) Describe the principles and application of Thermal Decay Time (TDT) log, what are its advantages over Neutron logs. **[15]**

Q7) Write notes on (any three): **[15]**

- a) Use of Porosity Overlays.
- b) Clay volume from geophysical logs.
- c) Reflection and refraction waves.
- d) NML Tool.
- e) Cement Bond log.



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SEAT No. :

P708

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[4129] - 403

M.Sc. (Applied) (Sem. - IV)
PETROLEUM TECHNOLOGY
PT - 15 : Production Operations

Time : 3 Hours]

[Max. Marks : 80

Instructions :

- 1) Question no. 1 is compulsory. Out of the remaining attempt 4 questions.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*
- 4) Your are advised to attempt not more than 5 questions.*

Q1) What are surfactants? Explain the different types and discuss how they can help to prevent formation damage. **[20]**

OR

What are scales? Describe in detail causes of scale deposition and explain how scales are removed chemically and mechanically? **[20]**

Q2) What is formation damage? Explain in detail plugging caused by fluid filtrates and partical migration. **[15]**

Q3) What is acidizing? Explain matrix acidizing in detail. **[15]**

Q4) Write notes on (any three): **[15]**

- a) Effect of clay on sandstone permeability .
- b) Transient pressure Test.
- c) Cement additives.
- d) Work over systems.

Q5) What is sand control? Explain gravel packing technique in detail. **[15]**

P.T.O.

Q6) What is corrosion? List the causes of corrosion. Explain in detail how corrosion can be controlled. **[15]**

Q7) Explain the following (any two). **[15]**

- a) Perforating and packer fluids.
- b) Fractures and joints in reservoir rocks.
- c) Evaluation of perforator performance.

