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P525

[3832] - 302
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 10: Formation Evaluation - I
(New Syllabus) (Sem. - III)

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) ***You are advised to attempt not more than 5 questions.***

Q1) What is the difference between natural and spectral Gamma Ray logs? Explain the qualitative and quantitative application of each of them. **[20]**

OR

Describe the conventional resistivity logging method with reference to principles, devices used, log presentation and track and applications.

Q2) Describe in details self potential log with reference to principle, shape of SP curves, interpretation and applications. **[15]**

Q3) Explain temperature logging, its objective, principle, property measured and applications. **[15]**

Q4) Write short notes on any three of the following: **[15]**

a) Describe in a diagram different components of wireline logging.
b) Mud logging techniques and equipment.
c) Core Analysis.
d) Principle, instruments and application of LWD.
e) Delaware effect.

P.T.O.

Q5) Explain induction logging. When would you prefer to run it in a borehole for determination of formation resistivity (R_t) when following conditions exist

a) $R_m < 5R_w$.

b) $R_t < 500\ \Omega m$.

c) Bed thickness is greator than $40''$. **[15]**

Q6) Describe focussed micro log with reference to objectives and property measured, principle, electrode arrangement depth of investigation. **[15]**

Q7) Write short notes on any two. **[15]**

a) Archie's Principle.

b) Main electrochemical activities in development of SP in borehole.

c) Difference between hydrostatic and lithostatic pressure environment and its relation to fluid pressure in borehole.

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P526

[3832] - 303
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 11: Drilling and Well Completions
(New Course)

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) ***You are advised to attempt not more than 5 questions.***

Q1) Describe in detail the components of a drill string with neat diagrams. **[20]**

OR

Describe the well control and power systems of an Oil rig in detail.

Q2) a) Describe semi-submersible ships with reference to their components and advantages. **[8]**

b) Describe in detail tripping operations. **[7]**

Q3) Answer the following:

a) Write a note on pipe - handling equipments. **[8]**

b) Explain the design factors of roller cone bits. **[7]**

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

a) Pressure drop across bit.

b) Drag bits.

c) Rheological properties of mud.

d) Classification of well types.

e) Advantages and disadvantages of under balanced drilling.

P.T.O.

Q5) Describe different types of casings along with their functions and advantages. **[15]**

Q6) a) Describe the cement additives used as accelerators and retarders. **[7]**

b) Explain the causes of pipe - sticking. **[8]**

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

a) Types & functions of packers.

b) Multiple string completions.

c) Lost circulation materials.

d) Types of Fishing tools.

e) Driller's method of well control.

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P527

[3832] - 401
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 13: Reservoir Performance

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) ***You are advised to attempt not more than 5 questions.***

Q1) What are different types of pressures encountered in the reservoir? Explain the Horner's method of pressure build - up analysis in detail. **[20]**

OR

Describe the multiple rate flow test analysis and drill stem test pressure analysis in detail.

Q2) What are permeability curves? Describe in detail, the reservoir limit tests (RLT). **[15]**

Q3) Define a Pressure Transient analysis. Describe in detail, the diffusivity equation and its solution. **[15]**

Q4) Write notes on (Any Three): **[15]**

a) Flowing - well performance.
b) Injection well testing.
c) Pulse testing.
d) Pseudo - pressure analysis.

Q5) What are the parameters that are considered during a development plan of an oil field? Describe their importance in detail. **[15]**

P.T.O.

Q6) What is meant by a tank model design? Describe the designing of a 3D models for reservoir simulation, in detail. **[15]**

Q7) Write notes on: (Any Three). **[15]**

a) History matching during reservoir simulation.

b) Immiscible gas injection.

c) IPR.

d) Role of reservoir engineers.

e) Oil recovery by nuclear explosion.

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P528

[3832] - 402
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 14: Formation Evaluation - II
(Sem. - IV)

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) ***You are advised to attempt not more than 5 questions.***

Q1) Describe the SONIC or Litho - density Log with reference to principles, tools, log representation, geological effects and applications. **[20]**

Q2) Explain the environmental effects and geological factors influencing density logs. **[15]**

Q3) Describe Schlumberger Neutron Tools and add a note on their depth of investigation and vertical resolution. **[15]**

Q4) Write notes on (Any Three): **[15]**

a) Principle of Chlorine Log.
b) Neutron sources used for neutron logging.
c) Elastic properties determined from Sonic log.
d) Variable density log (VDL).
e) Neutron diffusions with reference to TDT log.

Q5) Discuss the environmental factors influencing the response of EPT log, and a note on the applications of EPT log. **[15]**

Q6) Explain the use of Electrical Image logs in sedimentary and structural interpretations. **[15]**

P.T.O.

Q7) Write notes on: (Any Three). **[15]**

a) Principle of NML.

b) Measurement theory of EPT log.

c) Porosity overlays.

d) Quantitative interpretation of electrical images.

e) Uses of different cross - plots.

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P529

[3832] - 403
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 15: Production Operations
(New Course) (Sem. - IV)

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 formation damage? State different causes of damage. Explain in detail plugging caused by solids. **[20]**

OR

What are acid additives? How they help in simulation of an oil well?

Q2) State the important steps involved in a job design while carrying out fracturing. Explain job performance with reference to massive hydraulic fracture jobs. **[15]**

Q3) What are scales? Describe types of scales and causes of scales. **[15]**

Q4) Write notes on (Any Three): **[15]**

a) Concentric Tubing work over.
b) Inflow performance Test.
c) Types of perforators.
d) Well killing.

P.T.O.

Q5) What is gravel packing? What are the practical considerations in gravel packing? **[15]**

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) Well stimulation with surfactants.

b) Geologic factors affecting reservoir properties in sandstone reservoir.

c) Cementing material.

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P520

[3832] - 201
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 5: Fundamentals of Petroleum Geochemistry
(New Course) (Sem. - II)

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 the composition of petroleum? Describe paraffin series of hydrocarbons. **[20]**

OR

Explain in detail the non - hydrocarbon compounds of petroleum.

Q2) Explain Tissot and Welte's chemical classification of crude oil. **[15]**

Q3) What are "Oil Field Brines"? Describe Palmer's classification of oil field waters. **[15]**

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

a) Formation and types of kerogen.
b) Isomerism.
c) Olefin hydrocarbons.
d) U.S. Bureau of Mines classification of crude oil.

Q5) Describe in detail the following physical properties of crude oil. Refractive Index, Colour and fluorescence. **[15]**

P.T.O.

Q6) Describe with the help of pressure - temperature diagram, the behaviour of n - paraffin mixtures at critical point. **[15]**

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

a) Distillation of crude oil.
b) Second generation petrochemicals.
c) Stabilizers, Accelerators and Plasticizers.

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P521

[3832] - 202

M. Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 6: Depositional System Analysis & Petroliferous Basins of India

(New Course) (Sem. - II)

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) How are fluvial models constructed? Which criteria would you apply to recognize ancient fluvial systems? State and diagrammatically represent basic fluvial systems giving their discharge characteristics. **[20]**

OR

What is a delta? What is progradation of a delta? Explain your answer with the help of Mississippi delta and Nile delta.

Q2) Define 'Sedimentary Environment'. State the factors determining sedimentary environments. Give classifications of sedimentary environments you have studied. Which classification is quantitatively significant and applicable to ancient sediments. **[15]**

Q3) Describe briefly Krishna - Godavari basin, with reference to structural setting, geology and petroleum prospects. **[15]**

Q4) Write notes on (Any Three): **[15]**

a) Growth faults and salt diapirism.
b) Braided systems.
c) Geology and petroleum prospects of Jaisalmer Basin.
d) Progradation facies.

P.T.O.

Q5) Describe briefly how to recognize and discriminate depositional sequences in seismic stratigraphic interpretation. **[15]**

Q6) What do you mean by Sedimentary Basins? Explain briefly with neat diagrams formation of sedimentary basins in the context of plate tectonics. **[15]**

Q7) Explain the following: (Any Two). **[15]**

a) Sedimentary models as facies generators.

b) Recognition of ancient shelf deposits.

c) Depositional significance of slope geometry.

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P522

[3832] - 203
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 7: Petroleum Exploration
(New Course) (Sem. - II)

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 seismic refraction technique of geophysical exploration and for what it is used in hydrocarbon exploration. **[20]**

OR

Describe why seismic technique of geophysical exploration is more extensively used than gravity and magnetic methods in petroleum exploration.

Q2) a) Write a note on static and a static gravimeters.

b) Write a note on the factor (physical para) responsible for gravity and magnetic anomaly and explain with a diagram. **[15]**

Q3) a) Enumerate the processes bringing about weathering of petroleum during its seepage to surface.

b) Explain the basis of near surface geochemical prospecting for hydrocarbons. **[15]**

Q4) Write notes on any three. **[15]**

a) Use of radar imagery for oil prospecting.

b) Worden gravimeter.

c) Explain Huygen's principle with suitable diagram.

d) Difference between critical distance and refraction.

e) Gravitational field of the earth.

P.T.O.

Q5) Discuss the conditions indicating vertical migration of hydrocarbon. **[15]**

Q6) Draw for a two layer earth model the direct, Seismic refraction and Seismic reflection time distance graph. **[15]**

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

a) Microbial methods.

b) Stress strain curve showing the elastic, plastic and nepture zone.

c) Geophone vs hydrophone.

d) Graphical method of anomaly separation.

e) Noises during Seismic reflection data acquisition.

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P523

[3832] - 204
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 8: Environmental Management & Economics
(New Course)

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 different sources and types of air pollutants observed in an oil industry? Describe the air pollution caused by flaring and the environmental factors associated with it. **[20]**

OR

Enumerate various types of pollution caused by the oil industry. Describe various types of pollution caused during exploration, drilling and production.

Q2) What are the main sources of water pollution in an oil industry? Describe the standards of detecting water pollution. Also explain the procedure for the control and prevention of a oil spill. **[15]**

Q3) What is meant by EIA model? Explain the development of Gandhar oil field in the light of EIA. **[15]**

Q4) Write notes on (Any Three): **[15]**

a) Fresh water pollution in the oil industry.
b) Environmental management on an offshore oil field.
c) Future of energy resources.
d) Air pollution due to LPG plant.
e) Pitless drilling system and its importance.

P.T.O.

Q5) State and explain all the factors responsible for the increase in drilling costs. Explain the ways in which these can be reduced during the oil field management. **[15]**

Q6) What is the meaning of 'Decision Tree Analysis'? Describe the utility of it in the oil field management, giving suitable example. **[15]**

Q7) Write notes on (Any Three): **[15]**

a) Concept of depreciation and depletion.
b) EMV.
c) Concept of elasticity of demand & supply.
d) Law of variable proportion.
e) Monopoly and monopolistic competition.

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P524

[3832] - 301
M. Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 9 : Reservoir Dynamics
(New Course) (Sem. - III)

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) Define Viscosity. Explain how viscosity of reservoir fluids affects the reservoir conditions. **[20]**

OR

What is meant by 'Drive mechanisms' in the reservoir? Explain, in detail, the Dissolved gas and Gas cap drives, along with their characteristics and utility.

Q2) What are volumetric and non - volumetric reservoirs? Explain the nature of undersaturated oil reservoirs with regard to FVF and solubility of gas. **[15]**

Q3) Write notes on (Any Three): **[15]**

a) Use of Perfect gas law in Reservoir studies.
b) Water Drive.
c) Compressibility of fluids.
d) Sources of heat energy in reservoir.
e) Linear flow of incompressible fluids - steady state.

P.T.O.

Q4) What is meant by MBE? Explain, in detail, how MBE for gas reservoirs can be calculated. **[15]**

Q5) What are the uses of PVT analyses? Explain, how various types of PVT data are obtained for PVT analyses & evaluated. **[15]**

Q6) Write notes on (Any three). **[15]**

a) Water production trends in reservoirs.

b) Calculation of 'Oil - in - Place' by volumetric method.

c) Effects of permeability and thickness of formations on pressure conditions of well bore.

d) Applications of diffusivity equation in reservoir studies.

e) Radial flow of incompressible fluids steady state.

Q7) Describe the method for estimation of radial flow of compressible fluids within the reservoirs and its applications. **[15]**

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