Total No. of Questions : 7] **[Total No. of Pages : 2**

P1268

[3632] - 1
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 1 : Petroleum Geology
(Old Course) (Sem. - 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) Define a 'porosity' of a reservoir rock. Describe different types of porosities possessed by the reservoir rocks, giving their importance. Also add a note on their variation. **[20]**

OR

State the different modes of occurrence of petroleum deposits and describe various sub-surface occurrences of petroleum, with suitable examples.

Q2) Explain the formation of a structural trap and also describe various types of structural traps. **[15]**

Q3) Explain how organic matter is converted into petroleum giving suitable examples. **[15]**

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

a) Relative and effective permeability.

b) Stratigraphic traps.

c) Secondary migration of petroleum.

d) Chemical composition of oil field waters.

P.T.O.

Q5) Explain the following methods of direct detection of petroleum : **[15]**

a) Seismic.

b) Electrical.

Q6) What are different methods used in exploration for subsurface petroleum deposits? Describe different structure contour maps and cross-sections in detail. **[15]**

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

a) Hydrodynamic traps.

b) Radiation anomalies.

c) Isopach maps.

d) Chemical detection of oil deposits.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P1269

[3632] - 2
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 2 : Sedimentology
(Old Course) (Sem. - 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) Describe with neat diagrams internal structure of various types of ripples you have studied. Add a note on erosive ripples. **[20]**

OR

State and explain briefly chemical and mineralogical parameters of depositional environments.

Q2) What are sedimentary environment? Describe the Glacial environment with suitable examples. **[15]**

Q3) What are penecontemporaneous structures? State and describe with neat diagrams various types of penecontemporaneous structures. **[15]**

Q4) Write notes on (any 3) : **[15]**

a) Antidune cross bedding.

b) Wrinkle marks.

c) Pyroclastic deposits.

d) Bedforms and intensity of flow.

e) Outline of biological parameters.

P.T.O.

Q5) Define Walther's law. Describe surface environmental interpretation. **[15]**

Q6) What are sedimentary bodies? Describe the miscellaneous sedimentary bodies with a neat diagram. **[15]**

Q7) Write notes on (any 3) : **[15]**

a) Sedimentary tectonics in environmental reconstruction.

b) Fraude number.

c) Wave ripple bedding.

d) Cladtic shelves.

e) Non detrital minerals.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P1270

[3632] - 3

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 3 : Principles of Stratigraphy & Micropalaeontology

(Old Course) (Sem. - 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) Write in detail on the morphology of unicellular Protozoan (Foraminifera) with special reference to shape of the tests, chamber arrangement and apertural characters. Add a note on the significance of taxonomy. **[20]**

OR

Explain the term Lithostratigraphy. Discuss the significance of integrated Litho-bio-chronostratigraphy in basinal analyses.

Q2) Discuss the Ecology of marine ostracodes, substantiate your answer with special reference to bathymetry. **[15]**

Q3) Define Ecology and discuss various criteria used to understand the Foraminiferal ecology. **[15]**

Q4) Explain the term 'Organic Maturation'. Write its significance in oil exploration. **[15]**

Q5) Attempt any two : **[15]**

a) Geological time scale.

b) Hinges in Ostracodes.

c) Processing of calcareous microfossils.

P.T.O.

Q6) Attempt any two : **[15]**

a) Basinal correlation.

b) Application of O^{18}/O^{16} analyses.

c) Stratigraphic procedures.

Q7) Attempt any two : **[15]**

a) Geological applications of Foraminifera.

b) Types of microfossils.

c) Triangular diagrams to represent Paleoenvironmental settings.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P1271

[3632] - 4
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 4 : Prospecting
(Old Course) (Sem. - 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) Explain the seismic refraction or electromagnetic method of geophysical prospecting with reference to : **[20]**

a) Physical property of the rock it measures.

b) Instruments used.

c) Field procedures.

d) Interpretations and applications.

Q2) a) Describe the magnetic field of the earth. **[7]**

b) Discuss Wenner and Schlumberger configuration, with their merits & demerits. **[8]**

Q3) a) Discuss the principles of Geochemical Prospecting. **[8]**

b) Describe the working principles of worden Gravimeter. **[7]**

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

a) Proton precession magnetometer.

b) Non-polarising electrodes.

c) Applications of resistivity method.

d) Indicator floras.

e) Field procedures of self-potential method.

P.T.O.

Q5) Describe in detail how stereoscopic aerial photography is accomplished. **[15]**

Q6) Discuss applications of remote sensing in oil & mineral exploration. **[15]**

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

a) Discrepancies in aerial photographs.

b) Spectral reflectance of vegetation.

c) Atmospheric windows.

d) Photocharacters of granitic rocks.

e) Significance of annular drainage pattern.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P363

[3632] - 21

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 5 : Reservoir Studies - I (Dynamics) (Old 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 is meant by the term 'Material Balance equation'? Describe its use in estimation of initial oil-in-place for undersaturated volumetric reservoirs and give its limitations. **[20]**

OR

Describe the following :

a) Unit recovery and recovery factor for estimation of initial oil-in-place of undersaturated oil reservoirs.

b) Poiseulle's law for capillary flow unsteady state.

Q2) Define the terms GOR, WOR and formation volume factor. Also describe the effects of GOR and WOR on reservoir pressure conditions. **[15]**

Q3) Enumerate different types of reservoir pressures and describe various factors that affect the pressure conditions of the reservoir. Also add a note on reservoir pressure measurement. **[15]**

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

a) Water coning.

b) Combination drive.

c) Surface and interfacial tensions.

d) Saturated and undersaturated reservoirs.

e) Gas volume factor.

Q5) Explain the term 'drive mechanism'. Describe the characteristics and working of 'water' and 'Gas Cap' drives, under reservoir conditions. **[15]**

P.T.O.

Q6) Describe, in detail, the 'Diffusivity equation' for the mechanism of reservoir fluid flow in porous media and its applications. **[15]**

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

a) Casing and Channel leak.

b) Real gases and gases of the reservoir.

c) Water drive and its utility.

d) Formation of emulsions in reservoir fluids.

e) Effects of gas production trends under reservoir conditions.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P364

[3632] - 22

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

PETROLEUM TECHNOLOGY

PT - 6 : Petroleum Geochemistry (Old 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) Give the account of first generation petrochemicals. **[20]**

OR

Explain the molecular behaviour of pure hydrocarbons with reference to pressure-temperature variations.

Q2) What are the effects of water circulation on hydrocarbons. **[15]**

Q3) Describe Smith's classification of correlation index of crude oil. **[15]**

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

a) Types of kerogen.
b) Olefin hydrocarbons.
c) Isomerism.
d) Sachanen's chemical classification of crude oil.

Q5) What are oil field brines? How are they classified? **[15]**

Q6) What are the alkanes and cycloalkanes? **[15]**

P.T.O.

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

a) Gases in petroleum.

b) Fluorescence.

c) Optical activity in crude oil.

d) Colour of crude oil.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P365

[3632] - 23

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

PETROLEUM TECHNOLOGY

PT - 7 : Well Log Analysis (Old 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 is well logging? Enumerate different properties measured with the help of respective logging devices & describe "Creation of a Well log". **[20]**

OR

Explain how Focussed logs are advantageous over conventional resistivity logs and describe laterolog - 7 with reference to objectives, property measured, principles, depth of investigation and optimum logging conditions.

Q2) Explain the origin of self-potential in a Well-bore and applications of S.P.logs in oil geology. **[15]**

Q3) Describe in brief the different components of wire-line logging equipments with neat diagrams. **[15]**

Q4) Describe Natural Gamma Ray Log with reference to objectives and properties measured, principles, logging equipment, log representations and applications. **[15]**

Q5) Write notes on (any two) : **[15]**

a) Neutron capsule source.
b) Delaware effect.
c) Archies principle.
d) Induction logs.

P.T.O.

Q6) What is sonic log? Explain working of a Bore hole Compensated system (BHC), add a note on it's log interpretation & applications. **[15]**

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

a) Applications of Dipmeter log.

b) Qualitative uses of resistivity logs.

c) Role of log analysist on the field.

d) Shapes of S.P. curves.

e) Applications of Density log.

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Total No. of Questions : 7] **[Total No. of Pages : 1**

P366

[3632] - 201

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

PETROLEUM TECHNOLOGY

PT - 5 : Fundamentals of Petroleum Geochemistry (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) Explain in detail, the non-hydrocarbon compounds of petroleum. **[20]**

OR

Explain in detail, the alkanes, cycloalkanes and aromatic hydrocarbons.

Q2) Explain Tissot and Weltes chemical classification of crude oil. **[15]**

Q3) What is the effect of water circulation on hydrocarbons? **[15]**

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

a) Types of Kerogen.
b) Porphyrins.
c) Density of petroleum.
d) Viscosity of petroleum.

Q5) Explain the behaviour at critical point of binary n-paraffin mixtures. **[15]**

Q6) Explain the atmospheric distillation of crude oil. **[15]**

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

a) Low shrinkage-high shrinkage gas.
b) Liquid-Solid chromatography.
c) Mass spectrometry.
d) Polymethyl Benzene.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P367

[3632] - 202
M.Sc. (Applied) (Sem. - II)
PETROLEUM TECHNOLOGY
PT - 6 : Depositional Systems Analysis and Petroliferous Basins
(New Course)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any four questions from the remaining.***
3) ***Figures to the right indicate full marks for the questions.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Define the terms 'Basement', 'Basin', 'Platform/Shelves' and 'Arches'. Explain the concept of sedimentary basins with reference to their mode of occurrence, evolution, geometry, sediment fill, tectonic/sedimentary processes and timing of structural growth in connection with generation, migration and accumulation of petroleum. **[20]**

OR

What do you mean by 'Sedimentary Basins'? Explain briefly with neat diagrams formation of sedimentary basins in the context of platetectonics.

Q2) State the spectral dip oriented types (facies) of the idealized fluvial system and explain with neat diagram depositional model of 'Idealized braided-fluvial system', giving its diagnostic features. **[15]**

Q3) Define 'Fan Delta'. Describe Fan delta model with reference to characteristics, tectonic setting and associated facies. **[15]**

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

a) Channel diversion.

b) Discharge characteristics of fluvial system.

c) E-log pattern of facies of wave dominated delta.

d) Growth faults and salt diapirism.

e) Back arc basins.

P.T.O.

Q5) What do you mean by Seismic stratigraphic interpretation? State different seismic reflection parameters used in seismic stratigraphy and describe briefly their geological significance. **[15]**

Q6) Describe briefly Krishna-Godavari basin, with reference to structural setting, geology and petroleum prospects. **[15]**

Q7) Describe any two of the following : **[15]**

a) Classification of sedimentary basins that combines the schemes of both Huff and Klemme.

b) Processes involved in deposition of slope sediments.

c) Sedimentary facies.

d) Mississippi delta.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P368

[3632] - 203

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

PETROLEUM TECHNOLOGY

PT - 7 : Petroleum Exploration (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) Describe seismic reflection technique of geophysical exploration and why is it used extensively in hydrocarbon exploration? **[20]**

OR

Distinguish between critical distance and crossover distance on a time-distance plot.

Q2) a) Write a note on proton precession magnetometer. **[7]**
b) Explain latitude and elevation correction of gravity data. **[8]**

Q3) a) Discuss the stages of geochemical prospecting for hydrocarbon. **[8]**
b) Explain the processes responsible for the transportation of hydrocarbon. **[7]**

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

a) Lacoste Romberg gravity meter.
b) Hooke's Law.
c) Wavefront and raypath.
d) Poisson's ratio.
e) Fluorescence technique for soil gas determination.

P.T.O.

Q5) Explain how magnetic method is useful in petroleum exploration, support your answer with atleast one Indian example. **[15]**

Q6) Discuss the roles of geologist at wellsite and development geologist in the laboratory. **[15]**

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

a) Eh-pH as an exploration tool.
b) Internal property maps.
c) Acoustic impedance in seismic reflection.
d) Torsion magnetometer.
e) Remote sensing in the exploration.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P369

[3632] - 204

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

PETROLEUM TECHNOLOGY

PT - 8 : Environmental Management and 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) Define pollution. Explain the concept and types of air pollutants. Add a note on precautionary measures for controlling air pollution. **[20]**

OR

Define noise pollution. Explain the concept and sources of noise pollution. Add a note on control of noise pollution, with suitable example.

Q2) Define production economics. Describe the concept of present day value and its effect on project analysis with examples. **[15]**

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

a) Advantages of decision Analysis.

b) Emissions during production.

c) Measures of profitability.

d) Factors of environmental impacts at different stages of offshore oil and gas production.

Q4) Explain the sources and types of water pollution. Add a note on control and prevention of oil spill. **[15]**

P.T.O.

Q5) What is meant by demand and supply? Explain the concept of elasticity of demand and supply. **[15]**

Q6) What is flaring? Explain diversity in flaring and concept of smokeless flare. Add a note on precautionary measures in flaring. **[15]**

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

a) Break even analysis.

b) Concept and sources of energy resources.

c) Sources and control of soil pollution.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P370

[3632] - 401

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

PETROLEUM TECHNOLOGY

PT - 13 : Basin Analysis and Petroliferous Basins

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:-

1) ***Question No. 1 is compulsory.***
2) ***Attempt any four questions from the remaining.***
3) ***Figures to the right indicate full marks for the questions.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Describe briefly how surface and subsurface studies could be carried out to study composition and recognition of ancient fluvial/deltaic systems. Which principle criteria would you apply? **[20]**

OR

Define delta. Describe with neat diagrams stages of development in ideal delta system, adding a note on morphological units of delta.

Q2) State the spectral dip oriented types (facies) of ideal fluvial system and explain with neat diagram depositional model of 'Idealized Braided fluvial system', giving its diagnostic features. **[15]**

Q3) Define 'Sedimentary Environment'. State the factors that determine sedimentary environments. Give classifications of sedimentary environments you have studied. Which classification is quantitatively significant and applicable to ancient sediments? **[15]**

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

a) Delta deposition.
b) Strand plain systems.
c) Sedimentary facies.
d) Growth faults and salt diapirism.
e) E-log pattern of facies of wave dominated delta.

P.T.O.

Q5) Outline stratigraphic interpretation of seismic facies. **[15]**

Q6) Describe briefly krishna-Godavari basin, with reference to structural setting, geology and petroleum prospects. **[15]**

Q7) Describe any two of the following : **[15]**

a) Tectonic setting and facies in fan delta.

b) Effect of tectonism on spatial arrangement of facies of marginal basins.

c) High destructive deltas.

d) Channel diversion.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P371

[3632] - 402

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

PETROLEUM TECHNOLOGY

PT - 14 : Hydrocarbon Resources : Economics and Management

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) State and explain measures of profitability. **[20]**

OR

What is meant by demand and supply? Explain the concept of elasticity of demand and supply with examples.

Q2) What is meant by chance node and decision node? Explain the utility of these terms in oil-well development. **[15]**

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

a) Monopolistic competition.
b) PDV concept.
c) Long term capital expenditure.
d) Safety measures and safe working.

Q4) Explain how the oil industry is responsible for air pollution. Describe various types of air pollutants released from different sectors of oil industries. **[15]**

Q5) What are flouing practices in oil industries? Describe how these can be improved from the point of view of environment protection. **[15]**

P.T.O.

Q6) With the help of a case study of Gandhar ,Oil & Gas field, describe the environment impact assessment of that region. **[15]**

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

a) Effluent Analysis.

b) Composition of the atmosphere.

c) Pollution due to waste drilling mud.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P372

[3632] - 403

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 15 : Production Operations

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) Explain the geological considerations in production operations and describe in detail, sandstone reservoirs. **[20]**

OR

What are acid additives? Explain how they help in stimulation of an oil well.

Q2) What are scales? Enumerate different types of scales and briefly explain their causes. **[15]**

Q3) What is meant by formation damage? Explain how solids bring about plugging of the reservoirs. **[15]**

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

a) Well stimulation with surfactants.
b) Effect of permeability on production.
c) Acids used in well acidizing.
d) Transient pressure test.
e) Porosity of carbonate reservoirs.

Q5) What is meant by 'Sand control'? Describe the mechanical methods of sand control. **[15]**

P.T.O.

Q6) Why is 'work-over planning' required during production operations? Explain concentric tubing workovers, in detail. **[15]**

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

a) Propping agents.

b) Christmas Tree.

c) Measurement of corrosion.

d) CBL.

e) Flowmeters.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P736

[3632] - 31
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 9 : Reservoir Studies - II
(Old)

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 meant by pressure drawdown? How is it helpful in reservoir studies? Explain how rate of production can be used to determine reservoir parameters. **[20]**

OR

What is the meaning of 'Production Rate Decline Curve'? Explain, in detail, how estimation of future behaviour of reservoir can be done.

Q2) Describe, in detail, the steps undertaken in oil & gas field development. Also describe main objectives of the same. **[15]**

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

a) Reservoir bottom hole pressures and their utility in reservoir studies.
b) Reservoir limit test.
c) Permeability curves.
d) Static and flowing pressures.
e) Reservoir Performance Tests.

P.T.O.

Q4) What is meant by pressure maintenance in reservoirs. Explain, in detail, how water flooding is used in recovery of oil from the reservoir. **[15]**

Q5) Describe the principles, characteristics and limitations of micellar flooding in reservoirs. **[15]**

Q6) What is meant by modelling in reservoir simulation? Explain, in detail, how it is designed. **[15]**

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

a) Surfactant flooding.

b) Thermal flooding.

c) History matching in reservoir simulation.

d) Significance of IOR.

e) Displacement Efficiency.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P737

[3632] - 32

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 10 : Drilling and Well Completion Operations

(Old 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) Enumerate the major components of an oil rig and describe circulatory. **[20]**

OR

Rotary system in detail.

Q2) a) Describe a Drill ship with neat diagram. **[8]**
b) Discuss design factors of roller-cone bits. **[7]**

Q3) a) Describe tripping operations during drilling process. **[8]**
b) Describe different components of a drill-string. **[7]**

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

a) Draw works.
b) Pipe handling equipments.
c) Types of directional wells.
d) Jack-up rig.
e) Rig Personnel.

Q5) a) What are the functions of drilling muds? Add a note on oil-base muds. **[8]**
b) Describe different types of casings with their functions. **[7]**

P.T.O.

Q6) a) What is differential pipe-sticking? How it can be prevented? **[8]**

b) Discuss the procedure of primary cementing. **[7]**

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

a) Fishing tools used for retrieving junk.

b) KCl/Polymer muds.

c) Functions and components of cement.

d) Perforations.

e) Lost circulation materials.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P738

[3632] - 33

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 11 : Structural Geology and Geotectonics

(Old 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) What is meant by continental drift? State and explain briefly evidences of continental drift. **[20]**

OR

What is plate tectonics? What are plate boundaries? Explain with neat figures and examples the following plate boundaries :

a) Divergent.
b) Convergent.
c) Transform faults.

Q2) What is closure against a fault? Explain with neat figures effect of escape of oil and gas through faults on effective closure of the faulted structures. **[15]**

Q3) Explain with neat diagrams how lithological variations in reservoir rocks affect closure and closed area of the structures. **[15]**

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

a) Regional alterations in petroleum exploration.
b) Drag folds and major structure.
c) Beta diagram.
d) Economic aspect of the structure.
e) Key bed.

P.T.O.

Q5) State the characteristics of folds important to petroleum geologist and explain any two of them. **[15]**

Q6) What are salt domes? Explain briefly size, shape and composition of salt domes. Also explain with diagrams origin of salt domes. **[15]**

Q7) Describe any two of the following : **[15]**

a) Abnormal intervals and omission/repeatition of strata.

b) Role of joints and fractures in migration of oil and gas.

c) Major discontinuities within the earth.

d) Hot spots and Tripple junction.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P739

[3632] - 101

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 1 : Fundamentals of Petroleum Geology

(New Course) (Sem. - 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 are reservoir traps? How are they classified? Explain with neat diagram various structural traps. **[20]**

OR

Explain the different stratigraphic traps.

Q2) Explain in detail the interdisciplinary nature of Petroleum Geology. **[15]**

Q3) Give a historical overview of search for petroleum. **[15]**

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

a) Organic theory of origin of oil.
b) Surface occurrences of petroleum.
c) Inorganic theory of origin of oil.
d) Primary migration of oil.

Q5) What are reservoir fluids? Give their distribution in reservoir. **[15]**

Q6) Define a porosity and describe different types of porosities possesed by the reservoir rocks. **[15]**

P.T.O.

Q7) Explain the following (any three) : **[15]**

a) Relative permeability.

b) Oil seepages.

c) Fragmental reservoir rocks.

d) Formation of kerogen.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P740

[3632] - 102
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 2 : Principles of Sedimentology
(New Course) (Sem. - 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 are current ripples? Describe with neat diagrams various types of mega current ripples with reference to morphology, internal structure and genesis. **[20]**

OR

What are climbing ripple lamination? State and describe different types of climbing ripple laminations, giving their hydrodynamic interpretation.

Q2) Define environment. Describe the importance of sequence in environmental reconstruction. **[15]**

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

a) Origin and scale of cross bedding.

b) Oxidation-Reduction Potential.

c) Sandstone dykes and sills.

d) Current lineation.

Q4) Give the tabular classification of environment. Describe the marine environment. **[15]**

P.T.O.

Q5) Define diagenesis. Describe the digenesis of sandstone. Add a note on its size distribution. **[15]**

Q6) Explain briefly with neat figures the various types of scour marks or tool marks. **[15]**

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

a) The classification and nomenclature of volcano clastic rocks.

b) Upper flow Regime.

c) Subsurface environmental interpretation based on vertical grain size profile from geophysical logs.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P741

[3632] - 103

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 3 : Interpretative Micropaleontology and Stratigraphy

(New Course) (Sem. - 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) Explain the term Paleoecology. Enumerate your answer in dealing with important Criteria used in paleoecological inferences with special reference to foraminifera **[20]**

OR

Write in detail on the significance of Microfossils in oil exploration.

Q2) Define stratigraphy. Enumerate the scope of principals of stratigraphy in solving stratigraphic problems. **[15]**

Q3) Discuss the biofacies, paleoecology and Geological history of the continental shelf region of Bombay offshore region (Paleogene sequence). **[15]**

Q4) Attempt any two : **[15]**

a) Types of Microfossils.

b) Hinges in Ostracodes.

c) Pollen and Spores.

P.T.O.

Q5) Attempt any two : **[15]**

a) Chronostratigraphy and its significance.

b) Sequence stratigraphy.

c) Unconformities.

Q6) Attempt any two : **[15]**

a) Marker Beds.

b) Lithofacies.

c) Platform types of Basins.

Q7) Write on the significance of Index fossils in establishing Biostratigraphy. Add a note on the basinal correlations. **[15]**

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P742

[3632] - 104

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 4 : Structural Techniques in Petroleum Exploration

(New Course) (Sem. - 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) Explain with neat diagrams, how lithological variations in reservoir rocks affect closure and closed area of the structures. **[20]**

OR

What do you mean by closure and closed area of faulted structures? What assumptions would you make about the imperviousness of fault planes? Explain with neat structure map and cross section, how you would estimate closure of anticline on upthrown or downthrown sides of faults.

Q2) State the characteristics of folds important to petroleum geologist. Define Regional dip and Reversal. Explain the concept of Regional dip and Reversal, describing how you would calculate these parameters. **[15]**

Q3) State the surface methods of recognition of faults in the field and explain any three of them. **[15]**

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

a) Relation of closure and thickness of producing zone.
b) Structure contour maps.
c) Beta diagrams.
d) Piercement and Nonpiercement salt domes.
e) Competent and Incompetent rocks.

P.T.O.

Q5) What are drug folds? How are they produced? Explain with neat diagrams, how drug folds are useful to determine true top of bed and also to interpret major structure with which they are associated. **[15]**

Q6) Explain in detail oil and gas production from fractures and pores. **[15]**

Q7) Describe any two of the following : **[15]**

a) Abnormal Intervals.

b) Slippage as Mechanical adjustment during folding.

c) Truncation and Overlap.

d) Structural significance of diagenetic changes in sediments.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P743

[3632] - 301
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 9 : Reservoir Dynamics
(New) (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) What is meant by surface-, interfacial- and adhesion tension in reservoir fluids? Explain, with the help of neat diagrams, the effects of surface tension on the oil and gas displacement in the reservoir. **[20]**

OR

Define the viscosity of reservoir fluids. How is it affected with changes in composition of oil? Explain, in detail, the effects of viscosity variation and fluid compressibility in the reservoirs.

Q2) What are the different natural sources of energy in the reservoirs? Explain, in detail, the characteristics and mechanism of dissolved gas drive. **[15]**

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

a) Characteristics of Gravity drive.

b) Infinite and finite reservoirs.

c) Gas volume Factor.

d) Capillary pressure and oil displacement in reservoirs.

e) Anomalous pressure conditions in reservoirs.

P.T.O.

Q4) Describe the applications of Poiseulle's law for capillary flow-unsteady state in studying the mechanics of fluid flow in reservoirs. **[15]**

Q5) Describe, in detail, how data is selected in PVT studies of reservoirs. **[15]**

Q6) Describe, with the help of diagrams, how a Generalised Material Balance Equation is used in estimation of hydrocarbon reserves. **[15]**

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

a) GOR.

b) Characteristics of Gas condensate reservoirs.

c) Effects of rate of production on pressure conditions of reservoirs.

d) Reservoirs under Gas cap drives.

e) Probe analysis.

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Total No. of Questions : 7] **[Total No. of Pages : 2**

P744

[3632] - 302
M.Sc. (Applied)
PETROLEUM TECHNOLOGY
PT - 10 : Formation Evaluation - I
(New Syllabus) (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) Describe role of geophysical wire logging in formation evaluation in detail. **[20]**

OR

What do you understand by "logging environment". Explain the effects of invasion on resistivity measurement with the help of resistivity profile.

Q2) Explain the origin of self potential in a borehole and the applications of SP logs in oil geology. **[15]**

Q3) Explain the quantitative use of resistivity logs. **[15]**

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

a) Services offered by mud logging.
b) Where is LWD normally applied and the services provided.
c) Core logging.
d) Microlog.
e) Archie's principle.

Q5) Explain with a neat diagram caliper log and its application. **[15]**

P.T.O.

Q6) Describe Natural Gamma Ray log with reference to principles, equipment, unit of measurements and applications. **[15]**

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

a) Difference between microlog and microlaterolog.

b) Role of log analyst in the field and laboratory.

c) Relation between formation resistivity (Rt) and water saturation (Sw) using the basic concept of resistivity.

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P745

[3632] - 303

M.Sc. (Applied)

PETROLEUM TECHNOLOGY

PT - 11 : Drilling and Well Completions

(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) Enumerate the types of mobile off shore rigs and describe semi-submersible and submersible rigs with neat diagrams. **[20]**

OR

a) Describe Drill-string design with neat diagrams.

b) Draw a neat diagram showing major components of an oil rig.

Q2) a) Explain the design factors of tricone bits. **[8]**

b) Write a note on chemical additives of drilling muds. **[7]**

Q3) a) Describe BHA for the direction wells. **[8]**

b) Discuss types of Non-Newtonian fluids. **[7]**

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

a) NaCl and cement as mud contaminants.

b) Well-site personnel.

c) Classification of well types.

d) Roller cone bits.

e) Pipe and annular losses in connection with rig hydraulics.

P.T.O.

Q5) a) Explain how differential pipe-sticking can be prevented. **[8]**

b) Enumerate situations requiring fishing job. Describe atleast three tools for fishing junk. **[7]**

Q6) a) Enumerate the types of well completions and describe comingled completions. **[8]**

b) Describe different types of packers with their functions and advantages. **[7]**

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

a) Cement additives and their effects.

b) Perforations.

c) Casing accessories.

d) KCl/ polymer muds.

e) Functions of cement and their basic components.

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