

AMDE24 NATURAL GAS ENGINEERING

UNIT-1 NATURAL GAS TECHNOLOGY AND EARTH SCIENCE

- 1.1 Branches of petroleum Industry.
- 1.2 Sources of Information for natural gas engineering and its applications.
- 1.3 Geology and earth sciences: Earth sciences-Historical geology, Sedimentation process,
- 1.4 Petroleum reservoirs, Origin of petroleum. Earth temperatures & pressure,
- 1.5 Earth temperatures, Earth pressure.
- 1.6 Petroleum: Natural gas, LP gas, Condensate, & Crude oil.

UNIT-2 PROPERTIES OF NATURAL GASES

- 2.1 Typical compositions.
- 2.2 Equations of state: general cubic equations, specific high accuracy equations.
- 2.3 Use of equation of state to find residual energy properties, gas measurement gas hydrates, condensate stabilization, acid gas treating, gas dehydrations,
- 2.4 Compressors, process control deliverability test, gathering and transmission, and natural gas liquefaction.

UNIT-3 GAS COMPRESSION

- 3.1 Positive displacement and centrifugal compressors; fans. Calculation of poser requirements.
- 3.2 Compressible Flow in Pipes: Fundamental equations of flow: continuity, momentum, elegy equations.

UNIT-4 ISOTHERMAL FLOW IN PIPES

- 4.1 The Weymouth equation. Static and flowing bottom-hole pressures in wells.
- 4.2 Fundamentals of Gas flow in porous media: Steady state flow equations.
- 4.3 Definition of pseudo-pressure function.
- 4.4 Gas flow in cylindrical reservoirs: general equation for radial flow of gases in symmetrical homogeneous reservoirs.

UNIT-5 NON-DIMENSIONAL FORMS OF THE EQUATION;

- 5.1 Derivation of coefficients relation dimensionless to real variables.
- 5.2 Infinite reservoir solution: Pseudo-steady-state solution.
- 5.3 Gas Well Deliverability Tests: Flow-after-flow tests: prediction of IPR curve and AOF for the well.
- 5.4 Isochronal tests. Draw down tests: need for data at two flow rates.

References Book:

1. Standard Handbook of Petroleum and Natural Gas Engineering. 2nd Edition. William C Lyons, Gary C Plisga. Gulf Professional Publishing.