

**Written Test Syllabus for Questions Based on Subject Knowledge
for the Post of Superintending Engineer (Production)**

Post Code: SPE:01

ADVERTISEMENT NO: EX RECT/2024/03 dated 15.02.2024

Sl.No	Topic	Description
1	Petroleum Exploration	<ul style="list-style-type: none"> • Classification and description of some common rocks with special reference to clastic and non-clastic reservoir rocks • Origin, migration and accumulation of Petroleum • Petroleum exploration methods • Normal and Abnormal Formation Pressure, Artesian Effect, faulting, salt beds, Gas cap effect, charged Sands
2	Oil and Gas Well Drilling Technology	<ul style="list-style-type: none"> • Well Planning • Drilling method • Drilling rigs Rig operating systems. • Drilling fluid's function and properties • Drilling fluid maintenance equipment • Oil & gas well cementing operations • Drill string & Casing string function, operations, selection & design • Drilling problems, their control & remedies. • Directional survey • Application of horizontal, Multilateral, extended reach and slim wells
3	Well Control	<ul style="list-style-type: none"> • Hydrostatic Pressure, Formation Pressure, Fracture Pressure • Formation Injectivity Test. • Primary Well Control, Secondary Well Control • Basic Calculations • Barriers – philosophy, management, testing • Influx Characteristic and behaviour, principles • Causes of kick • Causes of reduction in Hydrostatic Head • Kick Indication • Prevention and Control of Kick • BOP Drills Shut in principles and procedures. • Well Kill methods –forward circulation, reverse circulation, well kill calculations, bull heading, lubricate and bleed, hydrates • Periodic Inspection of Well Control Equipment & Control system selection • Blowout Preventer testing • Minimum Requirements for Well Control Equipment for Workover Operations as per OISD-RP-174
4	Reservoir Engineering	<ul style="list-style-type: none"> • Petrophysical properties of reservoir rocks • Coring and core analysis. Reservoir fluid properties • Phase behaviour of hydrocarbon system • Flow of fluids through porous media • Water and gas coning • Reservoir pressure measurements • Reservoir drives • Drive mechanics and recovery factors
5	Petroleum Production Operations	<ul style="list-style-type: none"> • Well completion equipment and Well completion techniques. • Well production problems and mitigation. • Well intervention & Workover operations including fishing operation. • Workover & completion fluids • Production testing • Formation damage <ul style="list-style-type: none"> ▪ Introduction to Oil Recovery methods: ▪ Well Completion Design • Well Activation methods • Well stimulation techniques.

		<ul style="list-style-type: none"> • Artificial lift techniques <ul style="list-style-type: none"> ▪ Performance Evaluation ▪ Flowing well performance • Field processing of oil & gas • Metering and measurements of oil & gas • Production system analysis & optimization • Pressure vessels • storage tanks • shell and tube heat exchangers • pumps and compressors • shell and tube heat exchangers • pumps and compressors
6	Enhanced Oil Recovery Techniques	<ul style="list-style-type: none"> • Basic principles and mechanism of EOR Screening of EOR process • Concept of pattern flooding • Recovery efficiency • Permeability heterogeneity • Macroscopic and Microscopic displacement efficiency <p>EOR methods:</p> <ul style="list-style-type: none"> • Chemical flooding • Miscible flooding • Thermal recoveries (steam stimulation hot water & steam flooding • in-situ combustion) • Microbial EOR.
7	Health Safety and Environment in oil & gas mines with applicable laws	<p>Health hazards in Petroleum Industry:</p> <ul style="list-style-type: none"> ▪ Toxicity ▪ Physiological ▪ Asphyxiation ▪ Respiratory and skin effect of petroleum hydrocarbons ▪ Sour gases <p>Safety System:</p> <ul style="list-style-type: none"> ▪ Manual & automatic shutdown system ▪ Blow down systems ▪ Gas detection system ▪ Fire detection and suppression systems ▪ Personal protection system & measures ▪ HSE Policies ▪ Disaster & crisis management in Petroleum Industry <p>Environment:</p> <ul style="list-style-type: none"> ▪ Environment Clearance, Environment Impact Assessment, Environment Management Plan ▪ Consent to Operate (CTO), Consent to Establish (CTE) ▪ Impact on ecosystem air, water and soil ▪ The impact of drilling & production operations on environment ▪ Environmental transport of petroleum wastes ▪ Oil spill and oil spill control ▪ Waste treatment methods – Effluent Treatment, Hazardous waste and Management <p>Applicable statutory laws and practices pertaining to Workover Operations under oil & gas mines</p> <ul style="list-style-type: none"> ▪ Mines Act 1952, Mine Rules 1955, Mines Vocational Training Rules -1966, Oil Mine Regulations – 2017 (in particular Duty of officials), ▪ Work Permit System as per OISD-STD-175 ▪ Standard of firefighting Equipment for Workover Installations as per OISD-STS-189 ▪ Safe Practices for Workover and Well Stimulation Operations as per OISD-GDN-182
8	Risk Management	<ul style="list-style-type: none"> ▪ Understanding of Unsafe Act, Unsafe Conditions, near miss, accident/incident. ▪ Hazard and Risk. ▪ Incident risk management to reduce the probability of a kick and minimise the potential influx volume in a well control event. ▪ Management of Change (MOC) process to change a well control procedure. ▪ Importance of checklists for operations with well control implications ▪ Well control drills

09	General Engineering Concepts for Production /Workover	<ul style="list-style-type: none"> ▪ Production Planning and Control (Forecasting Models, Aggregate Production Planning, Scheduling, Material Requirement Planning) Inventory Management. ▪ Structure and properties of engineering materials: stress-strain diagrams for engineering materials. ▪ Principle of hydraulics: Bernoulli's Theorem and its important applications, Viscosity, Streamline and Turbulent flow, Pressure and Fluid Statics, Dynamics of Fluid Flow, Flow through pipes. ▪ Types of Loads, Failure Theory, Designed stress and factor of safety, stress concentration, selection of materials ▪ Shafting: Design of shaft subjected to bending, torsion, axial and combined loading Keys, ▪ Power Transmission Elements: Belt and Chain Drives, ▪ Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; riveted and welded joints; shafts, gears, brakes and clutches ▪ Basic Thermodynamics, Laws of Thermodynamics, Properties of steam, Air standard cycles, Fuels and Combustions, Concepts of regeneration and reheat and I.C Engines: Air-standard Otto' Diesel, Air & Gas Compressors. ▪ Types of pumps, discharge through pumps,
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