# AMMV11 MARINE STEAM ENGINES

**UNIT-1 STEAM AND VAPOUR POWER CYCLES**

1.1 Carnot cycle for steam and ideal efficiency. Rankine cycle with dry, saturated and super-heated steam. Modified Rankine, Reheat and Regenerative cycles. Binary vapour power cycles.

1.2 Feed pump working. Isentropic efficiency, cycle efficiency, work ratio.

1.3 Reheating and Regenerative feed heating and their effect on thermal efficiency.

**UNIT-2 MARINE STEAM ENGINE**

2.1 Modified Rankine cycle for steam engines. Hypothetical indicator diagram.

2.2 Mean effective pressure and work transfer- diagram factor.

2.3 Indicated power- Specific steam consumption- indicated thermal efficiency- efficiency ratio. Energy balance- compound steam engines.

**UNIT-3 STEAM NOZZLES**

3.1 General flow analysis. Velocity at exit. Critical pressure ratio and maximum mass flow.

3.2 Convergent and convergent-divergent nozzles – isentropic flow –effect of friction.

3.3 Nozzle area at the throat and exit. Problems of steam flow through nozzles.

**UNIT-4 MARINE STREAM TURBINE PLANTS**

4.1 General principle of Impulse and Reaction Turbines. Compounding of steam turbines - Pressure and Velocity compounding, stage efficiency overall efficiency and re-heat factor.

4.2 Multi-Stage Turbine with regenerative and reheat cycles. Maximum work output condition. Typical steam plant with turbines, condensers and boilers.

4.3 Thermal efficiency of steam turbine plant.

**UNIT-5 BASIC PRINCIPLE OF HEAT TRANSFER**

5.1 Conduction: Fourier law of Conduction. One dimensional Heat Diffusion equation.

5.2 Convection: Forced and Free Convection.

5.3 Radiation: Stefan-Boltzmann's equation. Law of Radiation – Problems.

**References Books:**


1. Y.V.C. Rao, “Thermodynamics”, 2nd Edition, Wiley Eastern Ltd., New Delhi, 1993.
2. E. Ratha Krishnan, “Fundamentals of Engineering Thermodynamics”, 1st Edition, Prentice – Hall of India, New Delhi, 2000.
3. Gorden Rogers, Yon Mayhew, “ Engineering Thermodynamics Work and Heat Transfer”, 4th Ed. Pearson,2011.