AMMV15 MARINE AUXILIARY MACHINERY-I

UNIT-1 ENGINE ROOM LAYOUT, PIPING SYSTEMS AND FITTINGS

1.1 Layout of main and auxiliary machinery in Engine Rooms in different ships.
1.2 Steam and condensate system, water hammering in pipes, Expansion joints in pipelines,
1.3 Bilge – ballast, fuel oil bunkering and transfer system, bunkering procedure, precautions taken, fuel oil service system to main and auxiliary engines,
1.4 Lubricating oil and Engine cooling system to main and auxiliary engines, central cooling and central priming systems, control and service air system,
1.5 Domestic fresh water and sea water (Hydrophore) service system, drinking water system, fire main system.

UNIT-2 VALVES, COCKS, PACKING, JOINTS, FILTERS AND STAINERS

2.1 Straight way cocks, right angled cock, „T cock, spherical cock, Boiler gauge glass cock (cylindrical " cock).
2.2 Globe valves, SDNR valve, swing check valve (storm valve), gate valves, butterfly valves, relief valves, quick closing valves, pressure reducing valves, control valves, change over valve chests, fuel oil transfer chest, valve actuators, steam traps.
2.3 Packings, Insulation of materials, Types, - Various applications.
2.4 Seals – purpose of bearing seal, description and application of non-rubbing seals and rubbing seals, simple felt seal, seals suitable for various peripheral speeds,
2.5 V-ring seals, Lip seals. Filtration, filter elements basket strainers, duplex strainers, edge type strainers, auto-kleen strainers, back flushing strainers, magnetic filter, rotary filters, fine filters.

UNIT-3 PUMPS

3.1 Types of pumps for various requirements- their characteristics, performance and application in ships- centrifugal pumps- gear pumps
3.2 Screw pumps and reciprocating pumps- care and maintenance of pumps, operation of all pumping systems on board such as bilge, ballast and cargo pumping operations.

UNIT-4 HEAT EXCHANGERS, EVAPORATORS AND DISTILLERS

4.1 Principle of surface heat transfer- description, contact heat transfer, construction of shell and tube type – flat plate type, single and double pass
4.2 Lubricating oil coolers, fuel oil heaters, fresh water coolers, compressed air coolers, Main Engine charge air cooler, Fresh water heaters, steam condensers, evaporators and condensers in refrigeration system
4.3 Materials used in all the above heat exchangers, expansion allowance- temperature controls effect of air in the system- maintenance.
4.4 Distillation of water, distilling equipment, problem of scale formation and method of controlling, methods of distillation, single effect and double effect shell type evaporator,
4.5 Low pressure vacuum type evaporator, flash evaporators, multiple effect evaporators- construction and operation salt water leaks and detection,
4.6 Reverse osmosis desalination plant, membranes, drinking water and treatment.

UNIT-5 STEERING SYSTEM

5.1 Hydraulic Telemotor system (Transmitter and receiver), Bypass valve- charging system, hydraulic power unit- hunting gear heleshaw pump principle,

5.2 Construction and operation- pawl and ratchet mechanism, 2-ram and 4-ram steering gear- All electric steering gear, principle and operation

5.3 Hunting gear and emergency steering gear.

5.4 Electro-hydraulic steering gear, Raphson and slide Actuators, Rotary vane steering gear

5.5 Principle- construction- operation- safety features, relief, isolating and bypass valves, steering system regulations and testing- trouble shooting- rectification maintenance.

5.6 Navigational safety of a ship- case history, cause and /or errors- how to avoid rudder restraining, general requirements- requirements for large tankers and gas carrier, additional requirements (electrical) definitions

5.7 Controls- automatic system, general arrangement- rudder and pintle, rudder wear down- rudder carrier.

References Books:

1. H.D. McGeorge, "General Engineering Knowledge", 3rd edition, Butter worth – Heineman, London, 1991.