AMMV12 MARINE ELECTRICAL MACHINES-II

UNIT-1 ELECTRICAL MEASUREMENTS AND CONTROL SYSTEM

1.1 Induction type energy meters-megger (Basic construction & principles of operation only).

1.2 Single phase and three phase wattmeter for power measurement Measurement of energy, speed, frequency and phase difference- Measurement of resistance, inductance and capacitance by Bridge method- Magnetic measurement.

1.3 Location of cable faults- transducers and its application in the measurement of pressure, flow, temperature, Torque, Humidity, Water content etc- simple electronic measuring devices

1.4 CRO, IC tester, Signal generator, Timers, Multi Tester, Clamp meter-Principle of operation and Application of Automatic control system-PID controller etc.,

UNIT-2 ALTERNATORS

2.1 Alternators- general arrangement- construction of salient pole and cylindrical rotor types- types of stator windings- e.m.f equation- distribution and pitch factor

2.2 Waveform of e.m.f. generated- rotating magnetic field- armature reaction- voltage regulation- load characteristics- open circuit and short circuit tests

2.3 E.m.f and m.m.f. methods- parallel operation of alternators- KW and KVA sharing- Brushless alternator- static excitation system.

UNIT-3 SYNCHRONOUS MOTORS

3.1 Principle of operation of 3-phase synchronous motor.

3.2 Operation of infinite bus bars torque/angle characteristics- hunting- methods of starting- merits and limits of synchronous motor over others.

UNIT-4 INDUCTION MACHINES

4.1 Three phase induction motor- Principle of operation and theory of action- slip speed- rotor to stator relationship- rotor frequency- rotor e.m.f. and current

4.2 Equivalent circuit relationship between rotor IR loss and rotor slip- torque/Slip characteristics- starting torque and maximum running torque

4.3 Effect of change in supply voltage on Torque-Induction generator.

UNIT-5 CONTROL OF INDUCTION MACHINES

5.1 Reversing- speed control of induction motor- Electronic methods of speed control of Induction Motor(IGBT, Thyristor)- Starting of induction motor – method of starting

5.2 Direct on-line starters- Star- delta starter- auto- transformer starter- starting of special high torque induction motors- single phase induction motor

5.3 Principle and operational characteristics- starting control- constructional details

5.4 Failure and repairs of electrical machines.

References Books:

1. Uppal S.L., “Electrical Power”, 13th Edition, Khanna publishers, Mumbai, 2002.
2. Berde, M.S., ”Electric Motor Drives”, 1st Edition, Khanna Publishers, Mumbai, 1995.