AMMV19 MECHANICS OF MARINE MACHINES

UNIT-1 MECHANISMS

1.1 Introduction- science of mechanisms- terms and definitions kinematic inversion- slider crank chain inversions- four bar chain inversions

1.2 Grashoff s law- Determination of velocities and acceleration in mechanisms- relative motion method (graphical) for mechanisms having turning, sliding and rolling pair

1.3 Coriolis acceleration,

1.4 Force Analysis Of Mechanisms: Static, Inertia and combined force analysis- graphical and analytical method.

1.5 Slider crank mechanism and four bar mechanism, turning moment diagram and flywheel- applications in engine, punching presses.

UNIT-2 THEORY OF GEARING

2.1 Classification of gears, law of gearing, nomenclature- involutes as a gear tooth profile –lay out of an involute gear, producing gear tooth

2.2 Interference and undercutting- minimum number of teeth to avoid interference, contact ratio, internal gears.

2.3 Cycloid tooth profiles- comparison of involutes and cycloidal tooth forms,

2.4 Backlash of Marine Gearing. Self-Shift Synchronous Gears

UNIT-3 CONTROL MECHANISMS

3.1 Governors- gravity controlled and spring controlled

3.2 Governor characteristics- governor effort and power

3.3 Gyroscopes- gyroscopic forces and couple- forces on bearing due to gyroscopic action

3.4 Gyroscopic effects on the movement of air planes and ships, stability of two wheel drive and four wheel drive.

UNIT-4 BALANCING

4.1 Static and dynamic balancing- balancing of rotating masses

4.2 Balancing of several masses in different planes

4.3 Balancing of rotors, balancing machine, unbalance due to reciprocating parts

4.4 Balancing of inline engines- firing order- balancing of V and W engines- balancing of radial engines- Lanchester technique of engine balancing.

UNIT-5 VIBRATION

5.1 Periodic motion- non harmonic periodic motion

5.2 Undamped free vibration- linear and torsion solution

5.3 Natural frequency of single degree freedom system

5.4 Free vibrations with viscous damping of single degree freedom system and solution – logarithmic decrement.

5.5 Forced vibration of single degree freedom system with damping

5.6 Reciprocating and rotating unbalance- vibration isolation and transmissibility

5.7 System with two degrees of freedom – shaft with two rotors, system with many degrees of freedom.

5.8 Three rotor system- geared system- torsional vibration of major components in Ships - problems.

References Books:

1. Shingley, J.E. & John Joseph Uivker, Jr., "Theory of Machines and Mechanisms", 2nd Ed., McGraw – Hill International Editions, London, 1981.
2. Ghosh A. and Malik, A.M. "Theory of Mechanisms and machines", 2nd Ed., Affiliated East – West Press Pvt. Ltd., New Delhi, 1988.
3. Francis. TSE. Ivan E-Morse Rolland T. Hinkle, "Mechanical Vibrations", 2nd Ed., CBS Publishers and Distributed, India, 1983.