

AMMT08 DYNAMICS OF MACHINES

UNIT-1 FORCE ANALYSIS

- 1.1 Dynamic force analysis- Inertia force and Inertia torque- D'Alembert's principle
- 1.2 Dynamic Analysis in reciprocating engines- Gas forces- Inertia effect of connecting rod
- 1.3 Bearing loads- Crank shaft torque- Turning moment diagrams
- 1.4 Fly Wheels- Flywheels of punching presses- Dynamics of Cam follower mechanism.

UNIT-2 BALANCING

- 2.1 Static and dynamic balancing- Balancing of rotating masses
- 2.2 Balancing a single cylinder engine- Balancing of Multi-cylinder inline, V- engines
- 2.3 Partial balancing in engines- Balancing of linkages
- 2.4 Balancing machines-Field balancing of discs and rotors.

UNIT-3 SINGLE DEGREE FREE VIBRATION

- 3.1 Basic features of vibratory systems- Degrees of freedom- single degree of freedom
- 3.2 Free vibration- Equations of motion- Natural frequency- Types of Damping
- 3.3 Damped vibration-Torsional vibration of shaft- Critical speeds of shafts
- 3.4 Torsional vibration- Two and three rotor torsional systems.

UNIT-4 FORCED VIBRATION

- 4.1 Response of one degree freedom systems to periodic forcing
- 4.2 Harmonic disturbances- Disturbance caused by unbalance
- 4.3 Support motion- transmissibility- Vibration isolation vibration measurement.

UNIT-5 MECHANISM FOR CONTROL

- 5.1 Governors- Types- Centrifugal governors
- 5.2 Gravity controlled and spring controlled centrifugal governors
- 5.3 Characteristics- Effect of friction
- 5.4 Controlling force curves.
- 5.5 Gyroscopes- Gyroscopic forces and torques- Gyroscopic stabilization
- 5.6 Gyroscopic effects in Automobiles, ships and airplanes.

References Books:

- Thomas Bevan, "Theory of Machines", 3rd Edition, CBS Publishers and Distributors, 2005.
Cleghorn. W. L, "Mechanisms of Machines", Oxford University Press, 2005 Benson H. Tongue,
"Principles of Vibrations", Oxford University Press, 2nd Edition, 2007
Robert L. Norton, "Kinematics and Dynamics of Machinery", Tata McGraw-Hill, 2009.
Allen S. Hall Jr., "Kinematics and Linkage Design", Prentice Hall, 1961