AMAE-20 AUTOMOTIVE ENGINE COMPONENTS DESIGN

UNIT-1 INTRODUCTION

1.1 Engineering materials
1.2 Introduction endurance limit,
1.3 Notch sensitivity.
1.4 Tolerances, types of tolerances and fits,
1.5 Design considerations for interference fits, surface finish, surface roughness,
1.6 Rankine's formula- Tetmajer's formula- Johnson formula- design of pushrods.

UNIT-2 DESIGN OF CYLINDER, PISTON AND CONNECTING ROD

2.1 Choice of material for cylinder and piston,
2.2 Design of cylinder, piston, and piston pin, piston rings, piston failures,
2.3 Lubrication of piston assembly.
2.4 Material for connecting rod,
2.5 Determining minimum length of connecting rod,
2.6 Small end design, shank design, design of big end cap bolts.

UNIT-3 DESIGN OF CRANKSHAFT

3.1 Balancing of I.C. engines, significance of firing order.
3.2 Material for crankshaft,
3.3 Design of crankshaft under bending and twisting,
3.4 Balancing weight calculations,
3.5 Development of short and long crank arms.
3.6 Front and rearend details.

UNIT-4 DESIGN OF FLYWHEELS

4.1 Determination of the mass of a flywheel for a given co- efficient of speed fluctuation.
4.2 Engine flywheel - stresses on the rim of the flywheels.
4.3 Design of hubs and arms of the flywheel,
4.4 Turning moment diagram.

UNIT-5 DESIGN OF VALVES AND VALVE TRAIN

5.1 Design aspects of intake & exhaust manifolds,
5.2 Inlet & exhaust valves, valve springs,
5.3 Tappets and valve train.
5.4 Design of cam & camshaft.
5.5 Design of rocker arm.
5.6 Cam profile generation.

References Books:

1. Jain.R.K, "Machine Design", Khanna Publishers, New Delhi, 2005.
2. Giri.N.K, "Automobile Mechanics", Khanna Publishers, New Delhi, 2007.