

## **2.10 30265 FLUID POWER AND TRIBOLOGY**

### **UNIT-1 INTRODUCTION:**

- 1.1 Basic idea about fluid power systems
- 1.2 Advantage of fluid power
- 1.3 Application of fluid power
- 1.4 Description of hydraulic power pack unit
- 1.5 Characteristics properties of hydraulic fluid

### **UNIT-2 HYDRAULIC PUMPS:**

- 2.1 Principle of hydraulic pumps and pump capacity
- 2.2 Classification of pumps
- 2.3 Construction and working of various rotary and reciprocating oil pumps

### **UNIT-3 HYDRAULIC VALVES:**

- 3.1 Construction and working of various types of hydraulic valves viz. flow control valves, pressure control valves
- 3.2 direction control
- 3.3 valves check valves and special valves used in fluid power system.

### **UNIT-4 ACTUATORS:**

- 4.1 Various types of hydraulic cylinders
- 4.2 Cylinder cushioning, cylinder mountings
- 4.3 Semi rotary actuators
- 4.4 Different type of hydraulic motors, Hydraulic motor circuits

### **UNIT-5 ACCUMULATORS AND HEAT EXCHANGERS:**

- 5.1 Function of hydraulic accumulators in hydraulic circuits
- 5.2 Construction and working of various types of accumulators and heat exchangers

### **UNIT-6 HYDRAULIC CIRCUIT AND DEVICES:**

- 6.1 Speed control circuit, pressure reducing circuit, sequencing circuit, reciprocating circuit, rapid traverse and feed circuit
- 6.2 Intensifier, hydraulic coupling, torque converter and power operated clamping devices
- 6.3 Fault diagnosis and preventive measures of hydraulic circuits.

### **UNIT-7 PACKING AND SEALS:**

- 7.1 Classification of seals, static seals, dynamic seals
- 7.2 Sealing materials

### **UNIT-8 PIPES AND PIPE FITTINGS:**

- 8.1 Study of various types of pipes, tubes and hoses used in hydraulic circuits
- 8.2 Pipe fittings

8.3 Cutting and bending of pipes and tubes

**UNIT-9 PNEUMATICS:**

9.1 Various pneumatic system components viz compressors, Air filters, Regulators and lubricators

9.2 Different types of pneumatic valves and Actuators

9.3 Various pneumatic circuits and devices

**UNIT-10 LUBRICATION PRINCIPLES:**

10.1 Friction, wear

10.2 Necessity of lubrication

10.3 Dry lubrication, Boundary lubrication, hydrodynamic lubrication

**UNIT-11 PROPERTIES OF FLUIDS:**

11.1 Viscosity, temperature and pressure v/s viscosity

11.2 Viscosity index, flash and fire point, oiliness cloud and pour points, emulsification, specific gravity, colour etc.

**UNIT-12 LUBRICANTS AND APPLICATIONS:**

12.1 Lubricant sources and composition, liquid lubricants, solid lubricants, Greases etc, Lubricant additives properties of specific lubricants, selecting the lubricant under various conditions.

12.2 Functions of a lubricant in the following : Sliding bearings, rolling bearing, gears, chains, wire rope, metal working, seals and packing.

12.3 Standard tests for physical and chemical properties of lubricants, performance test, record of scheduling and storage

**UNIT-13 LUBRICATION OF EQUIPMENTS:**

13.1 Machine tools, electric motors, air compressors, small tools and appliances,

13.2 automotive engines (points of lubrication, frequency, types and precaution are to be explained).

**UNIT-14 LUBRICANT APPLICATION SYSTEM:**

14.1 Manual devices wick feed and drops feed oiler. Air-oil mist or fog system, Ring, Chain and collar lubrication, Splash lubrication positive feed lubrication.

14.2 Pressure circulating system. Centralized lubrication system.

**Reference Books:**

1. Fluid Power & Tribology Agarwal & Bhatia