BASIC PRINCIPLES OF ENGINEERING

Full Marks : 50

1. Introduction: The graphic language, principles of projection of points, straight lines, planes, solids, isometric projection, and intersection. 8
2. Unit, Dimension and their conversion with special emphasis to SI system. 8
3. Refrigeration-Principles of refrigeration, Basic refrigeration cycle and concepts of vapour compression cycle. Refrigerants- Ammonia, Freon brines, their properties & comparison. 8
4. Properties of steam and steam generation devices and their utilization. Types and characteristics of fuels use in thermal power generation. 8
5. Psychrometry- Humidity, relative humidity, water activity, dew point applications of psychrometric charts Importance of humidity in Food. 8
6. Temperature/pressure measuring devices and their application. 8
7. Fluids. Types and uses of valves, types of pumps. 8
8. Electricity- AC/DC concept, converters transformer Principles & types of electric motor, fuse, switches, basic understanding of electric circuit, composition and engineering properties of constructional material insulation materials(cast iron, steel, stainless steel, galvanised iron, copper, aluminium etc.)8
9. Mechanical power transmission - methods and principles. Gear system and hydraulic transformation bearings, couplings, cranks, shafts etc. 8
10. Pumps: type, working principle and industrial application 8

Practicals:

1. Simple engineering drawing.
2. Third angle projection method.
3. Exercise in relation to dimensional conversions.
4. Exercise in relation to uses of steam table.

5. Exercise in relation to uses of psychometric charts.
6. To study different parts and refrigeration controls of the following:
    a. Refrigerator,
    b. Water cooler,
    c. Deep freezer compare their cooling coil and internal systems.
7. Measurement of power in 3 phase circuits.
    a. For balance load.
    b. For unbalance load by wattmeter and power meters.
8. Polarity test, no load test, efficiency & regulation tests of single phase transformer.
9. Study of various measuring instruments.
10. Calculation of refrigeration load.

Textbooks:

1. S.C. Aror & S. Domkundwar, *A course in Refrigeration and air-conditioning.* Dhanpat Rai & Co. (Pvt.) Ltd., Delhi.
2. P.K. Nag *Engineering Thermodynamics,* Tata McGraw Hill Publishing Co. Ltd., New Delhi.
3. S.B. Mathur and S. Domkundwar, *Mechanical Engineering,* Dhanpat Rai & Sons Delhi.
4. N.D. Bhatt. *Elementary Engineering Drawing.*