

*Refrigeration Engineering (a)*

Reversed heat engine cycles; Carnot, Joule, and Rankine.

The compression refrigerating cycle.

The properties of main refrigerants used.

The absorption cycle.

Refrigerating machines and equipment; compressors, condensers, valves, and piping for typical industrial undertakings using carbon dioxide and ammonia.

Methods of cooling; brine and brine system air cooling.

A candidate in this subject will be required to present a certificate from the Principal of the institution attended that he has carried out a course of practical work of at least thirty hours' duration based upon the above prescription and that his attendance and work have been satisfactory.

Alternatively, a candidate may be granted exemption from the laboratory work if he has spent a minimum of three months in an industrial refrigerating-plant approved by the Principal or in an engineering workshop engaged on the construction and operation of refrigerating machines and equipment.

*Refrigeration Engineering (b)*

Temperature-entropy, total heat-entropy, and pressure-enthalpy diagrams for refrigerants.

Wet and dry compression, multiple compression.

Applications of refrigeration. Ice-making, liquefaction of air. Cold storage.

The heat pump.

Heat transfer; insulation of cooling-chambers.

Air cooling and conditioning.

Household refrigerators; electrolux system; dry ice; silica gel cooling systems.

Erection, operation, and testing of refrigerating plants. Safety-devices and fire protection.

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*Strength of Materials I*

Simple stresses in tension, compression, shear, and torsion. Elasticity. Hooke's law. Stress due to temperature change. Bending and shearing force diagrams. Centroids and moments of inertia of plane figures. Stresses in simple beams. Bolted, welded, and riveted joints in shear and tension. Ropes, chains, and slings. Stress in thin-walled cylinders and spheres. Empirical formulæ for struts and columns. Slenderness ratio. Stress and deflection of close-coiled springs. Elementary consideration of the physical properties of cast iron and mild steels. British standard specification for iron and steel. British standard test pieces. Testing machines for tension, compression, and bending. Test procedure. Stress-strain diagrams. The testing of rope, chain, and welded joints to Marine Department requirements.

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