

Engineering Chemistry (b)

Fuels and Combustion.—Further consideration of solid, gaseous, and liquid fuels. Methods of preparation and burning—*e.g.*, pulverized fuel, mechanical stokers, oil-burners. The calculation of flame and gas temperatures. Heat losses in gases. Furnace efficiency and factors affecting same. Pyrometers and other methods of temperature measurement. Gas analysis.

Lubrication.—Oil requirements of bearings, bearing friction, high speed and special bearings. The production of oils from crude petroleum. The preparation of greases.

Bearings.—Types of bearings. Bearing metals, recent developments, anti-friction bearings, porous bearings.

Plastics.—General outline of the types, production, and uses of the more common plastics, both thermo-setting and thermo-plastic. Compression, injection, and transfer moulding techniques, laminates, extrusion. The physical and chemical properties of engineering plastics.

Corrosion.—A general study of the problem of corrosion of engineering materials. Surface treatment of ferrous and non-ferrous materials by spraying, dipping, galvanizing, and plating.

Non-metallic Materials.—A general study of cement, concrete, mortars; clay, common and refractory bricks, paints, varnishes.

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 on the above prescription and that his attendance and work have been satisfactory.

Engineering Drawing and Design I

(a) *Drawing.*—Drawings and general knowledge of details of any common part or appliance for an engine, machine, electrical fitting, or structural construction, such as connecting-rods, cross-heads, governors, pistons for both steam and internal-combustion engines, electrical machine parts, and structural frames.

(b) *Design.*—Analysis of forces in simple mechanisms, and structures.

Calculation of dimensions of simple elements subjected to tension, compression, shear, bending, or torsion—for example, belted connections, riveted joints; shaft couplings and keys; boiler shell and stays; levers, cottered connections, pin connections, cams, simple structural and machine beam members.

Engineering Drawing and Design II (a). (Two papers—three hours each)

Working drawings of civil engineering details from sketches or assembly drawings. Assembly drawings from sketches or drawing of details.

The projection of additional outside and sectional views. The completion of drawings by the addition of simple suitable parts.

Designs worked out and prepared from data in the following sections:—

(a) *Structural Steelwork*—*e.g.*, roof trusses, girders, cranes, stanchions, and foundations.

(b) *Reinforced Concrete*—*e.g.*, piles, tanks, retaining-walls, floors.

Fully dimensioned working drawings to be made of some parts or part of the designs.