

ITEM NO.20 & 21 IN PROGRAMME NO.15/2009

CATEGORY NO.369/2007 & 189/2007

DETAILED TOPICS

1. HAND TOOLS & THEIR USE

Various Hand Tools, Their care and maintenance, using of Hand Tools, various operations by using hand tools.

2. PRECISION INSTRUMENTS USUALLY USED IN ENGINEERING FIELD.

Instruments used for measuring length, diameter, thickness, use of dies and taps, Thread cutting procedure by using Dies and Taps, Drills and drill bits and drilling etc.

3. WORKSHOP MACHINERIES AND THEIR OPERATION.

Lathe & accessories, fixing of Job and Tools on Lathe, various operations on Lathe. Taper Turning and purpose, Knurling tool, type and uses. Importance of welding in chemical plants and equipments. Safety pre-cautions in the gas welding. Welding tools, welding terms and their definitions. Welding methods and types. Common gases used in welding. Hard facing, brazing, their necessity and types.

4. ENGINEERING MATERIALS

Metals and Non-metals, properties, Ferrous and Non-ferrous metals. Alloys and their uses. Oxidation, Reduction and Corrosion. Definition, type, properties and uses of P.V.C.

5. CHEMICAL ANALYSIS

Laboratory preparation, properties and uses of Aliphatic hydro carbons like methane, Ethylene, Acetylene etc. preparation, properties and uses of Alcohol and Acids, preparation, properties and uses of Carbohydrates, Definition of sugar and uses. Action of acids and base on metal alloys. Volumetric analysis. Qualitative and Quantitative analysis. Determination of Flash point.

6. MAGNETISM AND ELECTRICITY

Molecular Theory of Electrons, Ohms Law and its Application in Electric Circuits. Magnets and their property, uses and types. Electric magnetic effects, Faraday's Laws of Electrolysis. Cells and Battery.

7. COMMON MECHANICAL ALIGNMENTS.

Construction, working and uses of various types of valves. Types of Gears, uses, advantages and disadvantages of gears; Different types of pumps, construction and uses of pumps. Checking alignment of shafts and coupling of motors, correcting alignment, use of dial gauges, types of bearings, care, lubrication and maintenance of bearings.

8. FLOW MEASUREMENTS

Various Flow heads and Flow meters, like venture meter, orifice meter and Rota meter. Determination of viscosity of a liquid capacity curve of centrifugal pumps, vs. capacity curve of a gear pump, Determination of Reynolds's number at different velocities, Determination of friction losses in a straight pipe, calculation of over all heat transfer coefficient for shell and tube heat exchange.

9. LEVEL MEASUREMENT

Operations of mixer settler, spray extraction tower, multistage compressor. Calibration of Bourdon tube. Pressure gauge, Manometer, Bellow type pressure gauge, vacuum gauges, mercury in glass thermometer, Bi-metallic thermometer, Resistance Thermos — couple, and Resistance Thermometer.

10. Definitions of precipitation, Demoralization process, sewage waste, water treatment, Air pollution Recorders and controllers.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.