-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- **0064316** **-Session-1986-87**

-Superclass- **XL**

-Title- **PLATING AND ETCHING OF PRINTED CIRCUITS**

-DESCRIPTION-

Type and Purpose

A specialist module intended to introduce the skills necessary for cathode/anode copper plating, electroless plating of copper and gold and cathodic plating of copper, tin/lead and nickel.

Preferred Entry Level

Standard Grade Science at Grade 5 or better.

Learning Outcomes

The student should:

1. know and apply the principles of electroplating;
2. identify listed chemicals and relate their use to the job requirement;
3. prepare etchants and apply to listed plated materials;
4. produce double sided PCB's to given specifications;
5. know and apply the appropriate techniques for working with toxic and hazardous chemical solutions.

Content/ Context

Corresponding to the Learning Outcomes:

1. identifies the elements required for electroplating e.g. anode, cathode, strength and composition of solution throwing power, efficiency of electrodes, electrolytic chemicals, temperature requirement and any agitation or additives which might be required. Suitability of containers and any relevant toxity elements which might arise.

Use of manufacturers information, limited to the identification of individual solutions and their known variables.

2. identify elements from a standard periodic table by name and symbol and be able to relate their atomic mass to a standard solution concentrate;

   The meaning of pH (or pOH) readings from test papers and/or meters to determine the acidity or otherwise of the solutions.

   Methods of preparation of a number of dilute solutions, both acidic and alkaline using concentrates in liquid and solid form;

3. uses of weighing mechanism and of volumetric flasks. Preparation test solutions for titration using suitable laboratory glassware. Awareness of possible hazards in use or abuse of solutions;

4. methods of using abrasives and/or chemicals, photopolymers, positive and negative phototools, etch resistant inks on base laminate materials;

5. operating conditions, need for constant sample testing of solutions and the normally accepted rules for remedying the acidity alkalinity, of the above solutions.

Suggested Learning and Teaching Approaches

This module must be taught in a chemical laboratory environment and therefore safety is an element which must be emphasised throughout.

At all times examples of the skills being taught should be shown in practice.

The correct use of measuring instruments should be stressed in achieving Learning Outcomes 3, 4 and 5. Learning Outcome 2 can be achieved by reference to a standard chemistry text.

Assessment Procedures

All learning outcomes must be validly assessed.

The student must be informed of the tasks which contribute to summative assessment. Any unsatisfactory aspects of performance should, if possible, be discussed with the student as and when they arise.

Acceptable performance in the module will be satisfactory achievement of the performance criteria specified for each learning outcome.

The following abbreviations are used below:

LO Learning Outcome
IA Instrument of Assessment
PC Performance Criteria

LO1 IA(1)Short answer item test

PC The student displays adequate knowledge of the content.

IA(2) Plated laminates.

PC The student produces a series of test pieces in which:

(a) the plating is evenly distributed;

(b) there is no burning of the plating;

(c) the plating reaches the required thickness.

LO2 IA Short answer item test.

PC The student displays adequate knowledge of the content.

LO3 IA A series of prepared solutions.

PC The student consistently produces the solutions for given applications in which:

(a) the choice of chemicals is appropriate;

(b) the complete etch is achieved in the shortest possible time;

(c) the materials are utilised economically.

LO4 IA Manufactured P.C.B's.

PC The student produces a series of P.C.B's in which:

(a) track width and separations are consistent with specification;

(b) plating thickness is consistent with specification;

(c) undercut and overhang is minimal;

(d) there is concentricity of drilling.

LO5 IA(1)Short answer item test.

PC The student displays adequate knowledge of the content.

IA(2) Observation checklist.

PC The student consistently;

(a) wears appropriate safety clothing;

(b) transports chemicals in the approved manner;

(c) uses apparatus correctly;

(d) behaves in a manner appropriate to the environment;

(e) avoids spillage of chemicals;

(f) neutralises chemicals in the approved manner.