

## MACHINE WOODWORKING

### EXAMINATION SCHEME

There will be three papers, Papers 1, 2 and 3 all of which must be taken. Papers 1 and 2 shall be a composite paper to be taken at one sitting.

Paper 1: will consist of forty multiple-choice objective questions all of which are to be answered in 1 hour for 40 marks.

Paper 2: will consist of four short-structured questions. Candidates will be required to answer any three in 1 hour for 60 marks.

Paper 3: will consist of one practical question of 2 hours duration for 100 marks.

A list of materials for the test shall be made available to schools not less than two weeks before the paper is taken for material procurement and relevant preparations.

Paper 3: ALTERNATIVE TO PRACTICAL TEST

The Council may consider testing candidates' ability in practical work as prescribed in the syllabus in the event that materials for the actual practical test cannot be acquired. For this alternative test there will be one question to be answered in 2 hours for 100 marks.

### DETAILED EXAMINATION SYLLABUS

#### Theory Component

| S/NO. | TOPICS                           | NOTES   |
|-------|----------------------------------|---|
| 1.    | Tree growth, structure and types | (a) Common West African trees; characteristics and countries of origin.<br>(b) Tree growth, growth process, tree parts and functions.<br>(c) Wood structure: cross section of a tree. |
| 2     | Properties of timber             | (a) Characteristics of soft and hardwoods.<br>(b) Physical properties of common West African timbers.   |

|     |   |   |
|-----|---|---|
| 3   | Timber Processing:<br>(a) conversion<br>(b) seasoning<br>(c) preservation | (a) Concept of timber conversion.<br>(b) Methods of timber conversion.<br>(c) Common market sizes of timber.<br>(d) Concept of timber seasoning.<br>(e) Reasons for seasoning timber.<br>(f) Methods of seasoning timber, including advantages and disadvantages.<br>(g) Types and characteristics of timber preservatives.<br>(h) Application of timber preservatives. |
| 4   | Timber defects  | Types – natural and artificial defects e.g. knots, shakes, splits, etc.   |
| 5   | General wood machine shop safety  | (a) General machine shop safety habits.<br>(b) Electrical and mechanical safety rules.  |
| 6   | Safety equipment and devices in the wood machine shop                     | Identification and uses of common machine shop safety equipment and devices (e.g. fire extinguisher, first aid box, sand bucket, etc).  |
| 7.  | Safety in the operations of woodworking machines.                         | Specific safety rules guiding the use of each woodworking machine.  |
| 8.  | Wood machine layout   | (a) Principles of machine shop layout.<br>(b) Flow diagram of a machine shop layout.  |
| 9.  | Woodwork machines   | Parts, accessories, uses and maintenance of machines: cross cut saw, circular saw bench, surface planer, thicknesser, jig saw, sander, band saw, tenoner, mortiser, router, spindle moulder, lathe.   |
| 10. | Wood machining  | Machine operations involving crosscutting, ripping, grooving surface planing, shooting, chamfering, bevelling, tapering, sanding, curve cutting, mitre cutting, tenonning, turning, rebating, mortising, shaping, moulding.   |
| 11. | Business opportunities in machine woodworking                             | (a) Identification of business opportunities in Machine Woodworking.<br>(b) Feasibility study of business opportunities in Machine Woodworking.   |
| 12. | Funds sourcing  | Sources of funds – Personal, savings, bank loans, co-operative associations, thrifts, etc.  |
| 13. | Operating and managing a wood machine Shop                                | Setting up and managing a machine shop.   |

### **Practical Component**

Practical activities will include:

Crosscutting;

Ripping;

Shooting, surface planning; thicknessing; curve cutting;

Sanding;

Mortising; tenonning;

machine parts Chamfering; and accessories

Bevelling and tapering;

Grooving;

Mitring;

Moulding;

Turning;

Cleaning and lubricating

## LIST OF FACILITIES AND MAJOR EQUIPMENT/MATERIALS REQUIRED:

### Machines

| S/NO. | DESCRIPTION                             | MINIMUM QUANTITY REQUIRED |
|-------|---|---------------------------|
| 1.    | Radial Arm CROSS CUTTING Mc             | 2                         |
| 2.    | Circular Saw                            | 2                         |
| 3.    | Surface Planer                          | 2                         |
| 4.    | Thicknesser                             | 2                         |
| 5.    | Band Saw                                | 2                         |
| 6.    | Moticer (Hollow Square Chisel and Chain | 2                         |
| 7.    | Tenoner                                 | 2                         |
| 8.    | Router                                  | 2                         |
| 9.    | Spindle Moulder                         | 2                         |
| 10.   | Wood Turning Lathe                      | 2                         |
| 11.   | Orbital Sander                          | 2                         |
| 12.   | Veneering Press                         | 2                         |
| 13.   | Dimension Saw                           | 2                         |
| 14.   | Powered Saw                             | 2                         |
| 15.   | Jig Saw                                 | 2                         |
| 16.   | Spraying Machine                        | 2                         |
| 17.   | Drill Press – Table Type                | 2                         |
| 18.   | Drill Press – Standing Type             | 2                         |
| 19.   | Cutter Grinding Machine                 | 2                         |
| 20.   | Saw Sharpening Machine                  | 2                         |

### Accessories

| S/NO. | DESCRIPTION  | MINIMUM QUANTITY REQUIRED |
|-------|--|---------------------------|
| 1.    | Circular Saw Blade (rip saw, cross ant saw, combination saw) | 5 each                    |
| 2.    | Mitre Gauge  | 2                         |
| 3.    | Spray Gun  | 2                         |
| 4.    | Morticing Attachments  | Various                   |
| 5.    | Turning Chisels  | Various                   |
| 6.    | Calipers (Outside and Inside)                                | 5                         |
| 7.    | Cutter Blocks and Cutters                                    | 5 each                    |
| 8.    | Oil Can  | 5                         |
| 9.    | Spanners   | 5 sets                    |
| 10.   | Drill Bits   | Various                   |
| 11.   | Grinding Block   | 5                         |
| 12.   | Grease Gun   | 2                         |
| 13.   | Band Saw Blades (6, 12, 18 and 25mm)                         | 5                         |
| 14.   | Mortising Chisels (6, 9, 12, 15, 18 and 25 mm)               | 5 each                    |

|     |  |        |
|-----|--|--------|
| 15. | Setting Pliers                             | 5      |
| 16. | Files (round, flat, triangular half round) | 5 each |
| 17. | Gate saw set                               | 5      |

### **SUGGESTED READING LIST**

| <b>S/NO.</b> | <b>AUTHOR</b>                           | <b>TITLE</b>   | <b>PUBLISHER</b>                         |
|--------------|---|--|--|
| 1.           | John R. Clayton                         | Machine Woodworking                                    | Northwood Publication Ltd                |
| 2.           | J. A. Walton                            | Woodwork in theory and practice (Metric Edition)       | Australasian Publishing Company (London) |
| 3.           | D. M. Shaw                              | Woodwork Design and Practice                           | Hodder and Stoughton, London             |
| 4.           | H. E. King                              | General Certificate Woodwork (3 <sup>rd</sup> Edition) | Harrap, London                           |
| 5.           | D. N. Willacy                           | Woodwork Book 1 and 2                                  | Nelson, Lagos                            |
| 6.           | Nurudeen et all                         | Fundamentals of Woodworking                            | Evans, Lagos                             |
| 7.           | G. W. Brazier and N. A. Harris          | Woodwork   | Bungay, Richard City                     |
| 8.           | J. Fierre and G. Hutchings              | Advanced Woodworking and Furniture Making              |  |
| 9.           | CESAC                                   | Woodwork for Senior Secondary Schools                  |  |
| 10.          | J. N. K. Sackey                         | Woodwork for Senior Secondary Schools                  | Macmillan                                |
| 11.          | Rom Pettit                              | Woodwork Made Simple                                   | W. H. Allen and Co. Ltd. London.         |
| 12.          | John Strefford Guy<br>McMurdo           | Woodwork Technology                                    | Schofield and Sims Ltd.                  |
| 13.          | E. J. Wynter                            | Woodwork   | Longman                                  |
| 14.          | Frank Hilton                            | Craft Technology for Carpenters and Joiners            |  |
| 15.          | John L. Feirer and Gilbert R. Hutchings | Carpentry and Building Construction                    | Glencoe Publishing Company.              |