**WOODWORK**

 **SCHEME OF EXAMINATION**

There will be three papers, Papers 1, 2 and 3 all of which must be taken. Papers 1 and 2 will

 be a composite paper to be taken at one sitting.

 **PAPER 1:** Will consist of forty multiple-choice objective questions all of which must be

 answered within 40 minutes for 40 marks.

 **PAPER 2:** Will consist of theory and design paper of two sections, Sections A and B, to be

 taken within 2 hours, 20 minutes.

 Section A: will be short structured questions put into three parts, Part I, II and

 III as follows:

* + - * Part I will be for candidates in Ghana only.
			* Part II will be for candidates in Nigeria, Sierra Leone and The Gambia.
			* Part III will be for all candidates. It will comprise of two questions out of which all candidates will be required to answer one.

 Section B: Will comprise design and drawing questions, all of which must be

 answered within 1 hour 40 minutes for 40 marks.

 **PAPER 3:** Will be a practical test lasting 3 hours. Candidates will be required to make

 a test piece for which the appropriate drawings will be supplied. It will carry

 100 marks.

**CONTINUOUS ASSESSMENT**

A continuous assessment score for the subject shall include marks for assessment of finished projects by the candidates. The products must be left undestroyed for at least six months after the release of results. It is recommended that at least three specific projects be produced during the course by each candidate.

**DETAILED SYLLABUS**

**THEORY AND DESIGN**

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| **S/NO.** | **TOPIC** | **CONTENT** | **NOTES** |
| 1. | General Workshop Safety | (a) Personal safety  precautions. (b) General Workshop safety  regulations.(c) Safety devices and  appliances.(d) Hand tool safety.(e) Machine safety: (i) General machine shop safety; (ii) Safety precautions in  the use of portable  power tools and  machines; (iii) Safety in machines  operations; (iv) Prevention of  mechanical faults.(f) First aid. | Types and usesSafety precautions in carrying, storing, and handling hand tools.Materials and administration. |
| 2. | Hand tools | (a) Types(b) Classification:  geometrical, holding and  supporting, impelling and  percussion, cutting,       boring, abrading and       scraping tools. | To include identification, description and sketching. |
| 3. | Special Purpose Hand tools. | Types and uses:* Planes: spokeshaves rebate Plane, Plough plane, block plane, shoulder plane etc.
* Saws: bow saw, pad/ keyhole saw, coping saw, fret saw.
* Boring bit: expansion bit, forstner bit, countersink bit, auger bit, etc.
* Shapers: scrapers, rasps, surforms, etc.
 | To include identification, description and sketching. |
| 4. | Portable Power tools. | (a) Types: Power drill, jig  saw, spray gun, screw  driver, sanders, router,  power circular saw, etc.(b) Uses. | To include identification, description, care and safe use. |
| 5. | Woodworking machines. | (a) Types: Circular saw,  crosscut saw,  thicknesser, surface  planer, mortiser, lathe,  grinding wheel, drilling         machine, etc.(b) Uses.(c) Safety Precautions. | To include identification, description, care and safe use.To include the use of guards, fences, push sticks, push blocks, gauges etc. |
| 6. | Maintenance | (a) Types: corrective,  routine, predictive and  preventive.(b) Reasons for maintenance(c) Maintenance of hand  tools.(d) Maintenance of  machines. | To include maintenance activities, materials and tools.To include oiling, sharpening, repairing, storing etc.To include cleaning, oiling, servicing, replacing parts etc. |
| 7. | West African Timbers in common use. | (a) Timber growth and  structure.(b) Common West African  Timbers e.g. Iroko  (Odum), abura,  mahogany, obeche  (Wawa), African walnut,  afara, ebony, danta,  emery, shedua,  mansonia, cedar,  afromosia (kokrodua),  avodire, kusia.(c) Characteristics. | Structure to include classification, e.g. soft/hardwoods. Parts and their functionsSurface, working and mechanical qualities, similarities and differences. |
|  |  | (d) Uses | Specific uses. |
| 8. | Timber Conversion | (a) Explanation.(b) Conversion methods:  (i) plain/through and  through/live sawing; (ii)Tangential/back/flat/ rake sawing (iii)Quarter/radial/rift  sawing;(c) Common market sizes:  log, plank, scantling, board, batten, strip/lath,  squares. | Characteristics, advantages and disadvantages of each method.Including, identification description and uses. |
| 9. | Timber seasoning | (a) Explanation.(b) Reasons for seasoning(c) Methods of seasoning:  Natural/open air ,  artificial/kiln, water and  chemical seasoning.(d) Determination of  moisture content: (i) moisture meter  method; (ii) oven dry method. | Advantages and disadvantages of each method.Advantages and disadvantages of each method.Calculation of percentage moisture content. |
| 10. | Timber defects | (a) Explanation of timber        defect.(b) Types of defects(i) natural growth defects;(ii) felling defects;(iii) conversion defects;(iv) seasoning defects;(v) defects caused by  Organisms. | Causes, prevention, remedies, description and sketching. |
| 11. | Timber preservation | (a) Reasons for preserving  timber.(b) Common timber  preservatives(c) Properties of a good  timber preservative(d) Methods of applying  timber preservatives:  brushing, dipping,  spraying etc. | To include specific uses.Advantages and disadvantages of each method. |
| 12. | Manufactured boards |  (i) types; (ii) structure; (iii) characteristics (iv) uses. | To include description and uses.Advantages and disadvantages of each type. |
| 13. | Timber Preparation | (a) Selection of tools and  machines(b) Operational sequence: (i) hand preparation; (ii) machine preparation. | To include practical preparation of stock. |
| 14. | Woodwork joints | Classification:(i) widening joints: simple  butt, dowel, tongued and  grooved, loose tongue,  rebated butt etc.(ii) angle joints: mortise and  tenon, dowelled butt,  dovetails, housing,  halving etc. (iii) framing joints: mortise  and tenon, bridle, plain  mitre, dowelled butt,  halving etc. | To include identification, description, sketching, construction, specific use etc. |
| 15. | Wood finishes and finishing. | Wood finishes: (i) types: fillers, stains,  paints, varnishes,  lacquers, polishes etc. (ii) application of finishes:* surface preparation;
* tools;
* methods: brushing,

spraying, dipping, etc.  | To include:(i) properties, characteristics         and uses of each.To include:(i) stages and tools for each        method.(ii) Safety precautions. |
| 16. | Wood abrasives | (a) Meaning(b) Grades: coarse, medium  and fine.(c) Selection and uses. | Identification, selection and uses.To include specific application of each grade. |
| 17. | Wood adhesives | Types:(a) protein: animal, casein(b) synthetic resins: urea,  phenol and melamine  formaldehydes, epoxyl  resins, polyvinyl acetate  (PVA).(c) contact/rubber based | To include characteristics, uses, preparation and application and safety precaution during application. |
| 18. | Wood fittings and fasteners | (a) Fittings: e.g. hinges,  locks, handles, bolts,  catches, etc.(b) Fasteners: Nails, screws,  bolts and nuts, corrugated  fasteners etc. | To include identification, description, sketching, uses, application, fixing etc.To include identification, description, sketching, uses, application, fixing etc. |
| 19. | Non-wood materials | Types: Glass, plastics, rubber,  ceramics, metal,  leather, etc. | To include identification, description, characteristics, uses and other types of each.  |
| 20. | Veneers and Veneering | (a) Veneers: Types Production.(b) Veneering: (i) Methods: hammer,                  press. (ii) Tools: veneer                    hammer,  pressing iron,  cramps, caul,                            etc. | To include identification, description and uses.To include the processes for each method.To include identification, description, sketching and uses. |
| 21. | Wood shaping and bending. | (a) Shaping: Rounding,  moulding, bevelling,  chamfering, tapering,  carving, etc.1. Bending: Solid, laminated
 | To include identification, description, sketching, processes, techniques, tools and machines, properties of wood suitable for each. |
| 22. | Design and Drawing | (a) Concept of design;(b) Design fundamentals and  processes;(c) Free hand sketching;(e) Working drawings;(f) Cutting list and bill of  materials;(g) Basic draftsmanship  skills. | Working drawings in the First and Third Angle orthographic projections. Indication of cutting correct sectional representation of the materials are assential. |
| 23. | Project Design and Construction. | (a) Identification and  analysis of given design  problems.(b) Designing to solve the  problems.(c) Estimating the cost of the  design.(d) Constructing to meet the  design specification. | Design problems should arise from customer needs, market survey, situation analysis, etc.To include evaluating the product to meet design purpose and specification. |
| 24. | Upholstery  | (a) Upholstery work.(b) Hand tools and machines: needles, pair of scissors,  hammer, webbing  stretcher, sewing  machine, buttoning  machine.(c) Materials e.g. for framing,  stuffing/padding,  covering, decorating.(d) Processes and techniques:  framing, padding,  covering, finishing,  decoration, etc. | To include description, types and parts.Identification, description, sketching, care and uses.To be applied in constructing upholstery project. |
| 25. | Wood turning | (a) The wood lathe: Parts and  accessories.(b) Turning tools: chisels,  gouges, calipers, etc.(c) Turning operations: face  plate turning, turning  between centres and  boring.(d) Suitable wood for turning:  abura, ebony, mahogany,  etc.(e) Projects: vase, bowl,  candle holder, etc. | Identification, description, sketching, care, uses and safe use.To include identification and specific use.To include description and actual turning. |
| 26. | Wood carving and sculpture | (a) Carving: incise and relief.(b) Sculpture: Production of  simple ornaments.(c) Tools e.g. chisels,  gouges, knives, files, etc. | To include description, identification, application and processes.To include identification, sketching and uses. |
| 27. | Surface Decoration | Types: inlaying, veneering,  marquetry, lamination,  laminated plastics,  mouldings, etc. | Identification, description, processes, techniques and application. |
| 28. | Mass Production | (a) Concept and principles.(b) Processes: Market  survey, design,  production, quality  assurance,  sales/marketing,  management,  procurement, cost  estimation, tooling up for  production. | To include mass production terms, e.g. templates, fixtures, trial run, departments, section, prototype, quality control, etc.Basic knowledge of the concepts required. |
|  | **FOR CANDIDATES IN NIGERIA/ SIERRA LEONE/THE GAMBIA ONLY** |
| 29. | Entrepreneurship in Woodworking. | (a) Types of business  organisation e.g. sole  proprietorship,  partnership, cooperatives etc.(b) Business opportunities in Woodworking: e.g.  merchandizing, spray  painting, upholstery  work, wood turning.(c) Business plans: format  and content.(d) Sources of fund e.g.          gifts,  personal savings, loans,  inheritance, cooperatives  etc. | To include characteristic advantages and disadvantages.To include sample plans.To include benefits and the risks. |

**SUGGESTED READING LIST**

1. Woodwork in Theory and Practice – John A. Walton, Australian Publishing

 Company.

2. Woodwork Design and Practice – David M. Shaw – Hodder and Stoughton

3. Woodwork by G. N Green

4. Basic Principles of Woodwork Design and Drawing – Emmanuel A. Nnenji

 Aranke woods

5. Practical Upholstery – C. Howes F.A. M.U

 Evans Brothers Limited, London.

6. General Certificate Woodwork by H. E. King

7. Fundamentals of Woodworking by Nurudeen et all

8. Woodwork by G. W. Brazier and H. A. Harris

9. Advance Woodworking and Furniture Making by J. Fierre and G. Hutchings

10. Woodwork for Senior Secondary School by CESAC

11. Woodwork for Senior Secondary School by J. N. K. Sackey, G. Manu and R. Y. Baafi

12. Woodwork Made Simple by Tom Pettit

13. Woodwork Technology by John Strefford Guy McMurdo

14. Woodwork by E. J. Wunter

15. Woodwork Technology by J. K. N. Sackey

16. Woodworker’s Pocket Book by Charles H. Hayford

17. Collins complete woodworker’s Manual by Jackson Albert and Day David