NIGERIAN INSTITUTE OF QUANTITY SURVEYORS

The professional construction cost managers.

EXAMINATION REQUIREMENTS
&
SYLLABUS

FOR

THE NIGERIAN INSTITUTE OF QUANTITY SURVEYORS

2021 HARMONIZED PROFESSIONAL EXAMINATIONS

(Test of Professional Competence, Graduateship, Intermediate and Probation)

BY

EDUCATION AND TRAINING COMMITTEE

OCTOBER, 2021

Foreword

The Quantity Surveying profession is quite different to what it was even thirty years back. This is normal for all professions where a commercial revolution has been taking place as engineered by the advent of new technology. It is always encouraging when a profession like ours is looking for continuous improvement and sustains this attitude over a number of years by identifying and exploring new directions and opportunities as presented by modern technology just as we are doing now.

The Nigerian Institute of Quantity Surveyors 2021 harmonized professional examinations syllabus for Test of Professional Competence, Graduateship, Intermediate and Probation examinations follow on from the very successful previous edition. It uses the same format and addresses many of the key issues facing the examination system as it included some course contents that are very vital to the Twenty-First century Quantity Surveyor. I do believe that this syllabus will make a major contribution to the progress and development of our young quantity surveyors in order to provide better and satisfactory services to the clients out there and the academic world.

I must appreciate the Education and Training Committee under the chairmanship of the Institute's Vice President, QS Kene Christopher Nzekwe FNIQS for making sure that this dream comes into reality. Hence, The NIQS 2021 harmonized professional examinations syllabus for Test of Professional Competence, Graduateship, Intermediate and Probation examinations come into effect as from 1st October, 2021.

QS M. ABBA TOR, FNIQS
President,
The Nigerian Institute of Quantity Surveyors (NIQS)

EDUCATION AND TRAINING COMMITTEE MEMBERS (2019-2021)

1. QS Kene Christopher Nzekwe FNIQS - Vice President NIQS and Chairman
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7. QS Bede Ejiekwu FNIQS - Committee Secretary
8. *Mr Ebiloma Ojonimi **DES - Secretariat ETC**

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INTRODUCTION

The idea behind this harmonization exercise is to bring together the 2019 and 2020 syllabi. The 2019 professional examination syllabus introduced specialization/division routes, such as Building Cost Management Division, Engineering Services Cost Management Division, Project Management Division and Civil Engineering Cost Management Division for both TPC and GDE with their corresponding courses like Professional Practice and Procedure, Construction Technology, Contract Administration and Practice and Construction Commercial Management are compulsory for all divisions. Project Management, Measurement of Building Works, Measurement of Engineering Services and Measurement of Civil and Heavy Engineering were allotted to their respective divisions as classified above. Equally, Courses like Project Cost Control, Construction Technology, Law and Construction Commercial Management were made compulsory for all divisions with Project Management, Measurement of Building Works, Measurement of Engineering Services and Measurement of Civil and Heavy Engineering also allotted to their respective divisions as classified above.

Going by the divisions as stated above, it was observed that measurement which is the core of the quantity surveying competence is not given the required priority. For example, there is no measurement of any kind under project management. It therefore becomes necessary for the institute through the Examination Board to revert to the status quo which are for:

TPC Courses

1. Professional Practice and Procedure
2. Construction Technology
3. Project Management and
4. Measurement of Construction Works (Building and Heavy Engineering)

Graduateship Courses

1. Project Cost Control
2. Construction Law
3. Construction Technology
4. Project Management and
5. Measurement of Construction Works (Building and Heavy Engineering)

The Education and Training Committee in working with the rebranding policy of Mr. President also deem it fit to introduce two (2) other examination routes for technicians. This is in the bid to incorporate persons who wish to practice quantity surveying but does not have the prerequisite requirements to become professionals in the field. Going by this, the institute now have four (4) examinations as listed below and in harmonizing the above situations, the committee hereby propose as follows;

TEST OF PROFESSIONAL COMPETENCE

Construction Commercial Management to be subsumed into Professional Practice and Procedure. Others to remain as before as: -

1. Professional Practice and Procedure
2. Construction Technology
3. Contract Administration and Practice
4. Project Management while
5. Measurement of Construction Works
    a. Building Woks
    b. Engineering Services Works
        i. Measurement of Mechanical Services
        ii. Measurement of Electrical Services
        iii. Measurement of Communication, Security & Control Services
        iv. Measurement Systems
        v. Measurement of Civil and Heavy Engineering Works remain as proposed by the Board.

GRADUATESHIP

1. Project Management be merged with Project Cost Control while the following remain as proposed by the Board:
2. Construction Technology
3. Construction Law
4. Project Management and Information Technology
5. Measurement of;
    5.1 Building Works
    5.2 Services
        5.2.1 Application of engineering services works
        5.2.2 Measurement of Mechanical Services
        5.2.3 Measurement of Electrical Services
        5.2.4 Measurement of Communication, Security & Control Services
        5.2.5 Measurement of Transportation Systems
        5.2.6 Measurement of Civil and Heavy Engineering Works

INTERMEDIATE

1. Measurement of Building works
2. Construction Management
3. Project Cost Control
4. Advanced Tendering and Estimating
5. Contract Law and Administration

PROBATION

1. Introduction to Quantity Surveying
2. Principles of Building Management
3. Introduction to Tendering and Estimating
4. Building Construction

Summarily, it is proposed that division/specialization should be introduced after the induction as a Professional Quantity Surveyor. Hence, measurement is generally compulsory as a basic competency required to attain the cooperate membership of the institute.

TEST OF PROFESSIONAL COMPETENCE

1.0 PROFESSIONAL PRACTICE AND PROCEDURE (3 HOUR PAPER)

AIM:

To give the candidate a detailed understanding of the construction industry, quantity surveying professional ethics, office management, quantity surveyor's duties including remuneration, procurement options, claims and impact of information technology on quantity surveying practice.

LINKAGES

This paper is linked with Law, Project Cost Control, Measurement, Project Management, Construction Technology and information Technology.

CONTENTS

SECTION A (30%)

1.1 Principles of Professional conduct and Misconducts. Professional Indemnity Insurance.

1.2 Definition of professional services firms.
Concept of professional services firms, management ideas applicable to professional Firms, how to make professional firms profitable (levels of profitability)

1.3 Management methods, criteria and decision-making relating to the internal organization and economics of Consultancy Firms engaged in the construction Industry. Application of methods, criteria and decision-making techniques on administration of projects.

1.4 Organization of the construction industry. Structures of the construction industry; Inter-relationship among the various consultants and contractors in the construction Industry (Quantity Surveyor, Architect, Project Management Main and subcontractors) Roles played by each of them with client.

1.5 **Consultancy Fee Administration.**

1.5.1 Principle of Fee Calculations and claims.

1.5.2 Negotiation of Fee and Consultancy Agreement

1.5.3 Fee competition and negotiation technique.

1.6 The nature, formation and construction of building and civil engineering contracts Types of Contracts. The functions and inter-relationship of associated documents: Advantages and disadvantages of the various types of Contract systems and procedures.

1.7 A detailed knowledge of the Standard Forms of Building and Civil Engineering contracts and subcontracts including their interpretation and application. Legal differences between nominated/named and domestic contractors. The requirements and responsibilities of the external contractor, domestic contractor and the client as well as their inter-relationship under the contract.

1.8 Drafting of Articles of Agreement for Building and Civil Engineering contracts.

1.9 Tendering procedures and factors which influence the method and the procedure to adopt.

1.9.1 The roles and functions of the Quantity Surveyor in tender invitation, opening, processes and reporting, tender negotiation processes. Methods and Techniques

1.9.2 The detailed requirements of a tender report

1.9.3 Cost reduction and adjustment exercise on projects exceeding budgetary estimates

1.9.4 Tender evaluation, communication with tenderers and preparation of final reports.

SECTION B (30%)

1.10 Financial reports, cash flow forecast, interim valuations, valuation of variations and Architect's instructions, preparation of National and final accounts including claims.

1.11 Fundamental requirement and assessment of fluctuation claims and conduct of site meetings.

1.12 Preparation of financial statements.

1.13 Contractor's insolvency and the quantity Surveyor's roles.

1.14 Value and Investment - methods of valuation, factors affecting demand/value of property, Relationship between value and returns.

1.15 Pricing Techniques and Estimating

Principles and methods for estimating based on user requirements, designs and approximate measurements and quantities.

1.16 **Constituents of all-in-rates: analysis and synthesis of rates in all trades.**

1.17 Understand the concept of pricing and costing.

1.17.1 Pricing of bill: pre-pricing activities (collection of materials, role of consultants, market surveys/research, measure of profitability, risk analysis, cash flow consideration and gearing).

1.17.2 Explain economic considerations and factors relating to use of mechanical plants.

1.17.3 All-in rates: Detailed analysis showing the basis upon which prices of bills of quantities items are compiled.

1.17.4 Building-up of rates for works items starting from Excavations and earthwork, concrete works (including ancillaries), block work, plastering, carpentry work and roofing, plumbing, electrical works, etc.

1.18 Pricing of Preliminaries P.C. Sums including attendances and Day work items and Overheads

1.18.1 Price preliminaries, Prime cost sums including attendances, overheads, day works and plant items.

1.18.2 Calculate cost of variation from day work sheet.

1.18.3 Explain the expenditure of P.C sums and contingency sum allocated in the bill of Quantities.

1.18.4 Preparation of construction resources schedules using SMRS 1 of the NIQS.

SECTION C (40%)

1.19 Application and use of cost analyses and cost checking during design and construction stages.

1.19.1 Cost control and information technology.

1.19.2 Computer technology as a tool in cost management process.

1.20 Life cycle costing - Concept and time value of money. Taxation and life cycle costing. Cost capital allowances.

1.21 Sources of Finance, Developers Budget. Cost Benefit Analyses.

1.22 Land use and value determinants - Town Planning Control and Development, Legal interest in property. Mortgages and Negotiable instruments and their implications to development costs and values.

1.23 Cost in Use / Life Cycle Costing

1.23.1 Concept of cost in use

1.23.2 Present and future payments - concept and time value of money

1.23.3 Maintenance and running cost; Life of building and components including effects of errors in prediction.

1.24 Economics of Building Development

1.24.1 Land acquisition problems

1.24.2 Financial Considerations and Sources of development Finance

1.24.3 Developer's budget.

1.24.4 Choice between building lease or purchase.

1.25 The Building Information Modelling & Green Buildings

1.25.1 The Concept of BIM

1.25.2 Challenges for BIM

1.25.3 Green Building

1.25.4 BIM and the Green Building

1.25.5 International Cost Management Standard (ICMS)

1.26 Value Engineering

1.26.1 Definition
1.26.2 Basic requirements
1.26.3 Structure of a typical value Engineering team
1.26.4 Procedure or phases of value Engineering
1.26.5 Value Management - advantages and disadvantages
1.26.6 Earned value management
1.26.7 Time value management

1. 27 Building Information Modelling and Green Buildings

1.27.1 The Building Information Modelling (BIM)
1.27.2 The Concept of BIM
1.27.3 What is BIM?
1.27.4 Why adopt BIM?
1.27.5 Challenges and Advantages for BIM
1.27.6 Definition & Benefits of Green Building
1.27.7 Green Building and BIM
1.27.8 Relevance of BIM in Sustainability
1.27.9 The Concept of International Cost Management Standard (ICMS)
1.27.10 Aims of ICMS
1.27.11 Use of the Standard
1.27.12 ICMS Framework

2.0 CONSTRUCTION TECHNOLOGY (3HRS PAPER)

NOTES FOR GUIDANCE: Detailed knowledge is required of the technology of building, including the use of plant, methods and operations. For civil engineering works, detailed knowledge and understanding of the problems involved are essential. In matters of Engineering Services, Knowledge appropriate to the functions of the quantity surveyor is required.

Content

- Advanced building works
- Maintenance technology
- Civil engineering works
- Engineering services

2.1 ADVANCED BUILDING WORKS

2.1.1 Basements, multi-storey construction, associated problems of design, construction, excavation and support. Advanced Foundation Types.

2.1.2 Construction methods in industrialized and non-industrialized buildings with special reference to sequencing of erection, accuracy, fit, safety and mechanical plant requirements

2.1.3 High rise buildings, design and construction in steel and concrete, construction joints and curtain walling

2.1.4 Roofing of buildings particularly those with large floor areas

2.1.5 Safety requirements on building sites.

2.2 MAINTENANCE TECHNOLOGY:

2.2.1 Planned and Preventive maintenance; defects and remedial treatments, inspections and reports; dilapidation; conservation.

2.2.2 Dilapidation report for use in assets valuation

2.2.3 Principles, planning and procurement processes in facilities management. Principles and methods of out-sourcing. Packages and Schedules of maintenance

2.3 CIVIL ENGINEERING WORKS

2.3.1 Earthworks, embankments and cuttings and retaining walls

2.3.2 Soil Stabilization

2.3.3 Piling

2.3.4 Roads

2.3.5 Railway

2.3.6 Bridges, underpasses and tunnels

2.3.7 Airfield construction

2.3.8 Simple Tunneling in free air

2.3.9 Pipelines

2.3.10 Marine work, Water Towers and Tanks

2.3.11 Large sewers and drains

2.3.12 Sewage treatment installations

2.3.13 Power stations

2.4 ENGINEERING SERVICES.

2.4.1 Plumbing installations, Boreholes, Water Treatment Plant, Water Distribution and Control;

2.4.2 conditioning: Forms, plant, equipment and installations;

2.4.3 Electrical installations, Generation, Distribution, Heavy-Duty control gear;

2.4.4 Lighting: illumination levels, Data and Design Calculations, Lighting Conductors;

2.4.5 Fire protection, Equipment and systems

2.4.6 Mechanical movement systems, Flow and design criteria, Lateral and vertical systems.
2.4.7 Communication Systems
2.4.8 Acoustics: Sound control, Noise problems and their elimination.
2.4.9 Solar Energy System.

2.5 GREEN BUILDING DEVELOPMENT
2.5.1 Understand the objective and principles of green building development
2.5.2 Understand the technology and practice of green building development\
2.5.3 Skills requirement for green building
2.5.4 Understand the application of green technology in building development
2.5.5 Have a general knowledge of Green building assessment tools

3.0 CONTRACT ADMINISTRATION AND PRACTICE (3HRS PAPER)

- **Contract Administration**
- **Contract practice**

Contract Administration

i. Candidates are required to understand and demonstrate capacity to undertake the role of a surveyor administering a construction contract. Candidates should be aware of the roles and responsibilities of the administrator under the main forms of contract.
ii. They should have a detailed understanding of the contractual provisions relating to the forms of contract that they have administered.
iii. Candidates are required to comprehend the various forms of contract used in the construction industry.
iv. Candidates should have an awareness of all of the main standard forms of contract (Nigeria Construction Industry) and a thorough understanding of contract law, legislation (Public Procurement Act) and the specific forms that they have used

3.1 Candidates will be tested to demonstrate knowledge and understanding of the contractual, legislative and statutory terminology/requirements, of a construction contract as it concerns:
3.1.1 The various standard forms of contract and sub-contract used in the industry
3.1.2 Basic contractual mechanisms and procedures applied at various stages of the contract
3.1.3 The roles and responsibilities of the administrator.

3.2 Implementation of administrative procedures necessary to run a construction contract.

3.2.1 Issuing instructions
3.2.2 Dealing with payment provisions
3.2.3 Managing change procedures
3.2.4 Involvement with dispute avoidance
3.2.5 Dealing with completion and possession issues
3.2.6 Issuing certificates
3.2.7 Issues of claims and claims management.

3.3 Advise on the administrative procedures necessary for the smooth running of a construction contract including document control techniques and systems, meetings and reporting procedures.

3.3.1 Understanding various dispute resolution mechanism and their methods of resolution
3.3.2 Assessing entitlement for extension of time
3.3.3 Assessing entitlement for loss and expense
3.3.4 Advising all parties of their contractual rights and obligations.

3.4 Contract Practice

Candidates are required to comprehend the various forms of contract used in the construction industry. Candidates should have an awareness of all of the main standard forms of contract and a thorough understanding of contract law, legislation and the specific forms that are in use. Demonstrate knowledge and understanding of the various forms of contract used in the construction industry and/or in area of business. Candidates will be tested on:

3.4.1 Basic contract law and legislation
3.4.2 Contract documentation
3.4.3 The various standard forms of contract and sub-contract
3.4.4 When the different forms would be used
3.4.5 Basic contractual mechanisms and procedures at various stages of the contract
3.4.6 Third party rights including relevant legislation and the use of collateral warranties.

3.5 Application of knowledge acquired in the use of the various standard forms of contract at project level, including the implications and obligations that apply to the parties to the contract as it concerns.

3.5.1 Producing contract documentation
3.5.2 Carrying out the contractual mechanisms and procedures relevant to the financial management aspects of your project, such as change procedures, valuations, loss and expense and final accounts
3.5.3 Understanding general contractual provisions such as letters of intent, insurances, retention, bonds, liquidated and ascertained damages, early

possession, practical completion and other common contractual mechanisms.

3.6 Providing evidence of reasoned advice, preparation and presentation of reports on the selection of the appropriate form of contract and warranties for a chosen procurement route. This should include advising on the most appropriate contractual procedure at the various stages of a construction or other contract to cover

3.6.1 Selecting the appropriate form of contract and/or sub-contract for your chosen procurement route

3.6.2 Advising on the most appropriate contractual procedure at the various stages of a contract

3.6.3 Evaluating the appropriateness and implications of proposed contractual amendments.

4.0 PROJECT MANAGEMENT (3 HOUR PAPER)

Content

- Procurement methods
- Construction financing
- Procurement of engineering contracts
- Financing of engineering contracts
- Management theories and principles
- Project management and information technology
- Information technology
- Marketing
- Investment appraisal

4.1 Procurement Methods

Types and process of different procurement methods; Traditional, Design and Build, Management Contracting, Construction Management and Fast Track Systems. Shortcomings of traditional procurement techniques and the emergent need for project and facilities management.

4.2 Construction Financing

4.2.1 Construction financing sources, equity, loans grants, subsidies, investment and taxation allowances, unit trusts, Government funding, programming, budgeting and Control, Sources of finance in both public and private sectors, debt equity swaps, national and international finance, Capital budgeting Including Discounted Cash Flow Techniques.

4.2.2 Principles and operation of Build-Operate and Transfer (BOT) system of project financing.

4.2.3 Construction Economics and Environment

4.3 Procurement of Engineering Contracts

Technological licensing and patenting. Offshore and local sourcing, Turnkey procurement of heavy engineering projects, preliminary definition, performance specification and bidding procedures, Bid evaluation and construction documentation. Roles of the monitoring consultants.

4.4 Financing of Engineering Contracts

Feasibility studies, Contractor versus Client-financing, letter of credit, suppliers Credit Contractor-financing, comparative management and post-construction assistance.

4.5 Management Theories and Principles

4.5.1 Technique and principles of Total Quality Management (TQM), Marking and Process Re-Engineering.

4.5.2 The benefits of these systems over traditional management methods like work-study.

4.5.3 Education and training as a fulcrum of implementing these management processes. Differences and similarities of these systems.

4.6 **Project Management and Information Technology**

4.6.1 The use of Computer in project planning and scheduling

4.6.2 Software use in project management, MS project, etc.

4.6.3 CAFGEN - Contract Administration, Form for Windows.

4.7 Information Technology

Use of computer in estimating, cost planning, bills of quantities production, valuations, final accounts preparation, financial reports, work processing, spreadsheets, databases; telecommunications - fax, e-mail, voice mail, electronic tendering, websites, the internet; use of export systems.

4.8 **MARKETING**

4.8.1 Marketing's Role in the Nigerian Economy

a) The meaning of Marketing to Business.
b) Government and Non-profit sectors of the Economy.
c) Marketing management, philosophies and goals of national industry.
d) Corporate marketing systems.

4.8.2 Marketing Role in the Corporation

a) Organizational and environmental analysis of companies, private practices and employers.
b) Strategic planning and marketing process marketing planning and control, marketing information system, marketing organization.

4.8.3 Target Market Analysis

Analysis of marketing environments, consumer markets and buying behaviour, organizational markets and behaviour, market segmentation targeting.

4.8.4 Marketing Mix strategy

a) New product Development, product life cycle, concepts and strategies, product branding, packaging and service strategy, pricing strategy, marketing channel and physical distribution strategy.
b) Retailing and wholesaling strategy, marketing communications, advertising, sales promotions and publicity strategy.
c) Personal selling and sales management strategies.

4.8.5 Marketing of Service, Organizations and persons

a) Services marketing, nature and characteristics of the services business's analysis of construction services business, Differences between marketing professional services and construction services.
b) Organization marketing, Image assessment, image choice, image planning and control.
c) Mission statements as marketing tool.
d) Person marketing; Celebrity Marketing, political Candidate marketing, personal marketing.
e) Location marketing: Domicile marketing, business site marketing, Land investment marketing, vacation. Marketing, nation marketing.

4.8.6 Professional Ethics and Marketing

a) Social criticism of marketing, impact on individual and societal welfare and on other businesses.
b) Citizens and Governmental action to regulate marketing, Enlightened marketing, controlled marketing, professional ethics and marketing.
c) The O.S Registration Board Decree No. 31 of 1986 recommended Standards of Ethical behaviour, the social responsibilities of the O.S profession.

4.8.7 Professional Services and Bidding strategies

a) Bidding for professional services. Fee competition
b) Preparation of Technical and financial reports.
c) Funding agencies bidding processes and procedures. World Bank, IMF, USAID, ADB, APDB etc.

4.9 **INVESTMENT APPRAISAL**

4.9.1 Meaning of Investment appraisal

4.9.2 Investment appraisal techniques

a) Non-discounted technique (payback period)
b) Discounted technique (Net Present Value & Internal Rate of Return)

5.0 MEASUREMENT

5.1 MEASUREMENT OF CONSTRUCTION WORKS (3HOUR PAPER)

NOTE:

CANDIDATES will be allowed to bring into the Exam hall only relevant and approved publications he/she may require for this paper. Textbooks and pre-take off materials will no longer be allowed.

AIM:

To enable the candidate to understand in detail the provisions and application of the **Building and Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®)** to construction works, specification and Contract documentation.

LINKAGES

This paper is closely linked with Construction Technology and Professional Practice and Procedures.

Generally, candidates are expected to have good knowledge of Intermediate Examination syllabus.

Candidates are expected to have a clear understanding of the following:

a) Application of measurement principles to all forms of construction works in accordance with the latest edition of the Nigerian Standard Method of Measurement.
b) Preparation of Bills of Quantities from dimensions including an understanding of abstracting methods and the application of computers for data processing production of document.

c) Purpose and uses of different Bills of Quantities Formats: Trade bills, elemental bills, Operational bills etc.
d) Approximate Bills of Quantities, Schedule of rates etc.
e) Writing of preliminary and preamble items
f) The significance of standard phraseology in Bills of Quantities.
g) Prime Cost' and Provisional Sums.
h) Nominated Suppliers and Nominated Sub-contractors, and the assessment of allowances for associated general attendance items and profit.
i) Preparation, editing and presentation of tendering control information
j) Specification writing
k) Details of items under preliminaries section of Bills of Quantities.
l) Computer aided measurements and tender documentation.
m) (m)Understanding and use of different software and packages available for pre-contract documentation.

Content

- Measurement of Building Works
- Measurement of Engineering Services (Mechanical Installations and Electrical Installation)

5.1.1 Measurement of Building Works

Candidates are expected to have **advanced** knowledge of measurement of Building works comprising residential estates development, high rise commercial properties, sports and recreational facilities.

5.1.2 Measurement of Engineering Services

Candidates are required to demonstrate a clear understanding of the basic principles of planning, design and installation of services in construction works. Importance should be attached to a systematic and logical approach to measurements and suitability of descriptive statements. They should be able to measure and prepare bills of quantities as well as carry out the pricing of the works in accordance with the Building and Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas.

5.1.2.1 Mechanical Installations

a) Firefighting installation Pipe work, appliances, equipment, fittings and builder's work.
b) Air Handing installation identifying whether ventilation supply, ventilation extract, ventilation with heating, (air heated locally or centrally), Air conditioning systems (room/window/split units and

central packaged systems) or foul air extract, air conditioning (air cooling- room/window/split units and central packaged systems) including duct works and associated pipe works.

c) Mechanical Movement Systems
   i Lifts, hoists, escalators, conveyors, etc. and their associated builder works.
   ii Refuse disposal systems
d) Special equipment identifying whether incinerator and flues, kitchen and laundry, equipment.
e) Builder Work
   i. Builder's work associated with plumbing and mechanical installations
   ii. Electrical work associated with plumbing and mechanical installations.

5.1.5.1 Electrical Installation

a) Incoming Services up to but excluding main medium voltage switch gear.
b) Standby equipment
c) Mains installation excluding final sun-circuits
d) Power installation
e) Lighting installation
f) Electrical installation
g) Electric appliances
h) Electric work associated with plumbing and mechanical engineering installation
i) Telephone installation
j) Clock installation
k) Sound distribution installation
l) Alarm system installation
m) Earthing system installation
n) Lighting protection installation
o) Special services identifying whether direct current, extra I low voltage, flame-proof, pressurized installation,
p) Any other installation,
q) Trunking, ducting and cable trays associated with more than one installation.

Measurement shall be in accordance with BESMM 4R.

5.2 MEASUREMENT OF ENGINEERING SERVICES WORKS (3 HRS PAPER)

NOTE: CANDIDATES will be allowed to bring into the Exam Hall only relevant and approved publications he/she may require for this paper. Textbooks and Pre-takeoff materials will not be allowed.

AIM:

To broaden the scope of measurement and detailed description of engineering services construction components. To equip candidates with more advanced engineering services construction technology details to enable them measure and provide cost advice to clients.

LINKAGES:

This paper is closely linked with Engineering Services Construction Technology, Engineering Services Construction Management, Engineering Services Estimating, Information Technology, and Professional Practice and Procedure.

Content

- Application of engineering services works
- Measurement of mechanical services
- Measurement of electrical services
- Measurement of communication, security & control services
- Measurement of transportation systems

5.2.1 SECTION A: APPLICATION OF ENGINEERING SERVICES WORKS

5.2.1.1 The application of measurement principles to all forms of Engineering Services works in accordance with the current latest edition of the Building & Engineering Standard Method of Measurement (BESMM4®).

5.2.1.2 The purpose and uses of: Trade bills, Elemental bills, Operational bills, Sectional bills and Approximate Bills of Quantities, Schedule of Rates, Development and application of Preliminaries/General Items (Conditions), the significance/application of standard phraseology in Bills of Quantities.

5.2.1.3 An understanding of the terms; Prime Cost and Provisional Sums, Nominated Suppliers and Nominated Sub-contractors including the assessment of allowances for associated general attendance items and profit.

5.2.1.4 The preparation of Bills of Quantities from dimensions and the application of standard phraseologies and developing a phraseology library for the production of documentation.

5.2.1.5 Preparation, editing and presentation of tendering and control information. Specification writing, understanding details of items under the preliminaries section of the Bills of Quantities.

5.2.1.6 Computer aided measurements and tender documentation

5.2.1.7 Understanding and use of different software and packages available for pre- contract documentations.

SECTION B: MEASUREMENT OF MECHANICAL SERVICES

AIM:

5.3 Candidates are required to demonstrate an **advanced** and clear understanding of the basic principles of planning, design and installation of mechanical services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are expected to understand the application of pipelines/duct lines, pipeline/duct line ancillaries and pipeline/duct line control equipment across the following installations. Candidates should be able to measure and prepare bills of quantities as well as carryout the pricing of works in accordance with the Building and Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas:

5.3.1 Furniture, Fittings, Equipment and Appliances, Kitchen/Catering equipment, sanitary fittings and appliances.

5.3.2 Rainwater installations, Drainage and sewerage systems disposal and treatment plant, sanitary installation, industrial waste drainage, refuse disposal/chute, incineration plant, swimming pool water treatment systems, etc.

5.3.3 Hot and cold-water supply and distribution pipe work and storage, Boreholes and water treatment systems, Gas supply installation and distribution, fuel oil storage/ distribution installation

5.3.4 Fire-fighting equipment, inlets and appliances, fire hose reel system, dry/wet riser systems, sprinkler system, fire hydrant installations, gas firefighting system, foam fire-fighting installations.

5.3.5 Chilled water systems, central refrigeration plant.

5.3.6 Ventilation Systems: Air handling installations–Ventilation supply and extract equipment, supply and extract duct lines and pipelines with associated fittings, general ventilation installation, toilet ventilation installation, kitchen ventilation installation, car park ventilation system, smoke extract/smoke control system.

5.3.7 Air-Conditioning Systems: Air conditioning systems–VAV air-conditioning, Dual duct air-conditioning, Multi-zone air-conditioning, Fan-

coil air-conditioning, and Air-conditioning units (room/window/split units and central packaged systems) including duct works and associated pipe works and fittings.

5.3.8 Insulation, Fire Stopping and Fire Protection

5.3.9 Builders work associated with mechanical services installations

5.4 SECTION C: MEASUREMENT OF ELECTRICAL SERVICES

AIM:

Candidates are required to demonstrate an **advanced** and clear understanding of the basic principles of planning, design and installation of electrical services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are expected to understand the application of control equipment and conduit/cables/ trunking across the following installations. Candidates should be able to measure and prepare bills of quantities as well as carry out the pricing of works in accordance with the Building and Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas:

5.4.1 HV/LV Supply/Public Utility/Distribution. Incoming services up to but excluding main medium voltage switch-

5.4.2 Electricity Generation Plant (Standby equipment

5.4.3 General Lighting and LV Power installation

5.4.4 Uninterruptible Power Supply

5.4.5 Emergency Lighting installation

5.4.6 Street/Area/Floodlighting installation

5.4.7 Earthing system installation

5.4.8 Lightning Protection installation

5.4.9 Insulation, Fire stopping and Fire Protection systems

5.4.10 Conduits, Trunking and cable

5.4.11 Cables and wires

5.4.12 Builder's work associated with electrical installations, including excavating cable trenches, concrete plinths, etc.

5.5 SECTION D: MEASUREMENT OF COMMUNICATION, SECURITY & CONTROL SERVICES

AIM:

Candidates are required to demonstrate an **advanced** and clear understanding of the principles of planning, design and installation of control and technology services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are

expected to understand the application of control equipment and conduit/cables/trunking across the following installations. Candidates should be able to measure and prepare bills of quantities as well as carry out the pricing of works in accordance with the Building and Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas:

5.5.1 Telecommunications, Public Address/Conference Audio facilities
5.5.2 Radio/TV/CCTV installation systems
5.5.3 Data Transmission installation systems
5.5.4 Control Systems
5.5.5 Security Detection & Alarm System installations
5.5.6 Fire Detection & Alarm System installations
5.5.7 Central Control/Building Management System installations including Car Parking Management system
5.5.8 Conduits, Trunking and cable trays
5.5.9 Cables and wires
5.5.10 Insulation, Fire Stopping and Fire Protection systems
5.5.11 Builder's work associated with control and technology installations, including excavating cable trenches, concrete plinths, etc.

5.6 SECTION E: MEASUREMENT OF TRANSPORTATION SYSTEMS

AIM:

Candidates are required to demonstrate **advanced** and clear understanding of the basic principles of planning, design and installation of transportation system services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are expected to understand the application of control equipment and conduit/cables/trunking across the following installations. Candidates should be able to measure and prepare bills of quantities as well as carry out the pricing of works in accordance with the Building and Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas:

5.6.1 Lifts
5.6.2 Escalators
5.6.3 Moving Pavements
5.6.4 Powered Stair lifts
5.6.5 Hoists
5.6.6 Travelling Cradles
5.6.7 Conveyors
5.6.8 Builder's work associated with transportation systems installations

Measurement shall be in accordance with BESMM 4R for industrial engineering

5.7 MEASUREMENT OF CIVIL & HEAVY ENGINEERING WORKS (3 HOURS PAPER)

AIM:

To provide an **advanced** knowledge on the scope of measurement and detailed description of civil and heavy engineering construction components. To equip candidates with general civil engineering construction technology details to enable them measure and provide cost advice to clients.

Content

- Civil works (scope of engineering works and method of measurement)
- Soil stabilization systems
- Tunneling and underpinning
- Marine works
- Road works, bridges, subways and airfield construction
- Railway track work

5.7.1 CIVIL WORKS

5.7.1.1 Scope of Engineering works and Method of Measurement

a) Site investigation, classification of rocks and soils, procedure of investigation, preliminary works, methods of site exploration, testing generally, Geophysical surveys and other techniques, special information and costs

b) Site organization and temporary services, demolition, site offices and general accommodation, material storage and compounds, Temporary services, setting out and safety.

5.7.1.2 Soil Stabilization systems

Pilling, Diaphragm and Retaining wall systems. Sheet pilling, bearing piles, Bored piles, cast-in-place piles, preformed piles, vibrio-floatation and vibrio-replacement, diaphragm walling, retaining walls.

a) General principles of Civil Engineering measurements, works classification, coding and numbering of items Preparation of Bills of Quantities.
b) Principles of Method related charges
c) Management of plant and Machinery

5.7.1.3 Tunneling and underpinning

General considerations, methods of tunneling and underpinning, ventilation and lighting, safety aspects.

5.7.1.4 Marine works

Cofferdams, caissons, underwater foundation construction, sea walls, Docks, jetties and other marine structures, Dredging and Reclamations, canal and River works, Reservoirs and liquid-retaining tanks.

5.7.1.5 Road works, Bridges, Subways and Airfield Construction

5.7.1.6 **Railway track Work**

5.7.2 HEAVY & INDUSTRIAL ENGINEERING

- Scope of Heavy Engineering
- Measurement and Control of engineering projects

5.7.2.1 Scope of Heavy Engineering

Definition of Heavy Engineering, Principles and constituents 01 heavy engineering equipment, facilities, structures and raw materials for: Pharmaceutical Chemicals, Nuclear Energy, Gas Exploration &Production.

Facilities for Oil exploration, production and petroleum refining, power generation, food and drinks, paper milling, steel and non-ferrous metal production, telecommunication, data communication etc.

5.7.2.2 Measurement and Control of engineering projects

Taking off quantities, preparation of bid documents and negotiation of Work packages of all the followings;

a) Construction site services
b) Scaffolding
c) Steelwork
d) Plant
e) Pipework
f) Electrical Work
g) Instrumentation
h) Insulation
i) Protective coverings
j) Sundry items

Measurement shall be in accordance with BESMM 4R

GRADUATESHIP

GRADUATESHIP EXAMINATION
1.0 PROJECT COST MANAGEMENT AND CONTROL (3 HOUR PAPER)

AIM:

i To enable the candidate to understand the techniques of preparing preliminary estimates
ii To stress the importance of time value of money
iii To establish the importance of prudent resource allocation

Content

- Concept of Cost Control-need for Cost Control.
- Approximate estimating; Purpose and types of approximate estimates
- Cost Planning
- Cost -in-use
- Economics of Building Development
- Land use and value determinants

1.1 Concept of Cost Control-need for Cost Control.
1.2 Factors influencing cost-function, technical and aesthetic requirements, Cost implications of design variables. Sources and management of cost information.
1.3 Approximate estimating; Purpose and types of approximate estimates
1.4 Cost Planning
  1.4.1 Cost Planning theories and techniques
  1.4.2 Cost planning principles and the design process.
  1.4.3 Preparation and presentation of Cost plans, cost limits, cost analyses, cost indices.
  1.4.4 Cost control procedure
  1.4.5 Application of computer to cost control work
1.5 Cost -in-use
  1.5.1 Concept of cost -in-use
  1.5.2 present and future payments-concept and time value of money
  1.5.3 Maintenance and running cost; Life of building and component effects of errors in prediction
1.6 Economics of Building Development
  1.6.1 Land acquisition problems
  1.6.2 Financial Considerations and sources of development Finance
  1.6.3 Developer's Budget
  1.6.4 Choice between building, lease or purchase
1.7 Land use and value determinants
  1.7.1 Factors determining land use and value
  1.7.2 Town planning Control and Development

1.7.3 Legal interest in property

1.7.4 Land use planning

Section B (30%)

Content

Pricing Techniques and Estimating

- Constituents of all-in-rates: analysis and synthesis of rates in all trades.
- Pricing of Preliminaries P.C. Sums including attendances and Day work items and Overheads
- Know tender analysis and reports.

1.8 **Pricing Techniques and Estimating**

1.8.1 An overview of the applications and limitations of preliminary estimating methods: Unit, superficial or floor area, storey enclosure and cubic methods, elemental cost model, approximate quantities, etc.

1.8.2 **Constituents of all-in-rates: analysis and synthesis of rates in all trades.**

1.8.2.1 Understand the concept of pricing and costing.

1.8.2.2 Pricing of bill: pre-pricing activities (collection of materials, role of consultants, market surveys/research, measure of profitability, risk analysis, cash flow consideration and gearing).

1.8.3 All-in rates: Detailed analysis showing the basis upon which prices of bills of quantities items are compiled.

1.8.4 Building-up of rates for certain works items in substructure: Excavations and earthwork, concrete works (including ancillaries) and block work.

1.9 **Pricing of Preliminaries P.C. Sums including attendances and Day work items and Overheads**

1.9.1.1 Price preliminaries, Prime cost sums including attendances, overheads, day works and plant items.

1.9.1.2 Explain the expenditure of P.C sums and contingency sum allocated in the Bill of Quantities.

1.9.2 **Know tender analysis and reports.**

1.9.2.1 Understand pricing methods.

1.9.2.2 Know how to analyze tenders.

1.9.2.3 Know how to write tender reports for selected projects such as duplex, high rise building, etc.

2.0 CONSTRUCTION TECHNOLOGY (3-HOUR PAPER)

AIM:

To equip candidates with more advanced Construction Technology to enable them to have adequate knowledge of technology of building, civil engineering and understanding of Engineering Services required for measurement and cost advice to clients.

LINKAGES

This subject form the core of Measurement, Project Management and Project Cost Control

CONTENTS

- **Building works (30%)**
- **Civil works (40%)**
- **Engineering services (30%)**
  - Mechanical Installations
  - Electrical Installation
  - Communications and Security Systems

2.1 BUILDING WORKS (30%)

2.1.1 Basements, multi-storey construction, associated problems of design, construction, excavation and support. Advanced Foundation Types.

2.1.2 Sequence of erection, accuracy, fit, safety and mechanical plant requirements.

2.1.3 High rise buildings, design and construction in steel and concrete, construction joints and curtain walling.

2.1.4 Roofing of buildings particularly those with large floor areas.

2.1.5 Safety requirements on building sites.

2.1.6 Spot item demolitions, alterations, maintenance, repairs, conversion, extensions etc.

2.1.7 Defects in buildings.

2.1.8 General knowledge of green building development

2.2 CIVIL WORKS (40%)

Site investigation and Exploration, Earthwork design and Groundwater control, External works, Reads and paving, swimming pools, fountains, Water features, sculptural works, Horticultural and landscaping works.

2.3 ENGINEERING SERVICES (30%)

2.3.1 Mechanical Installations

i Rainwater installation, Sanitary Installation, Cold water installation identifying treated water, boosted water, cooling water, chilled water or domestic cold water.

ii Firefighting installations Hose reel system, Dry riser system, Sprinkler system, Co2 system, foam inlets or hand appliances, heated water installation, identifying steam and condensate (high pressure) or domestic hot water.

iii Fuel oil installation, Fuel gas installation, Refrigeration installation which shall be deemed to include Medical and Laboratory installations, (Pneumatic tube installation, Vacuum installation).

iv Refuse disposal installation; Special equipment identifying whether incinerator and flues, Air handling installation identifying whether ventilation supply. Ventilation extract or ventilation with heating (air heated locally or centrally) or foul air extract, air conditioning (air cooling), Automatic control installation Kitchen equipment, laundry equipment etc. Any other installation. Metal work, supports and the like associated with more than one installation.

v Drains Manholes/Inspection chambers, septic tanks and cesspits, soak away pits, sewage systems and treatment plant, drainage pipework and associated builders work.

2.3.2 Electrical Installation

Incoming services up to but excluding main medium voltage switchgear Standby equipment, Mains installation, excluding final sub circuits. Power installation, lighting installation, electric heating installation, Electrical appliances, electrical work associated with plumbing and mechanical engineering installations. Earthing system installation, Lightning protection installation.

2.3.3 Communications and Security Systems

Telephone, intercom Fax, Internet, Email, Close Circuit TV etc.

3.0 CONSTRUCTION LAW (3-HOUR PAPER)

NOTES FOR GUIDANCE: Candidates will be expected to show proficiency in the interpretation and understanding of the general principles of law including:

Content

SECTION A -outline of the law relating to development primarily, town and Country Planning, Public Health, Housing and Highways.

SECTION B -

- Law of Property**:**
- Insolvency, Bankruptcy and Liquidation.
- Insurance law relating to Buildings

3.1 SECTION A (40%)

An outline of the law relating to development primarily, town and Country Planning, Public Health, Housing and Highways.

3.1.1 Nigeria Land-use Act

3.1.2 Litigation, Arbitration and Alternative dispute resolution methods

3.1.3 General principles of Contracts; Formation of contracts, Contracts that are not binding Discharge of contracts and International cases. Special contracts including sales of goods, Agency, Employment, Insurance, etc.

SECTION B (60%)

3.2 Law of Property**:** Rights of the owner and occupier of Land Rights over Land and others. Planning Law. Infringements of patent and copyrights, **trespass** etc. Breach of statutory duty; Rayland vs.

Fletcher, liability for spread of fire; Easements, Restrictive covenants.

3.3 Tort.

Negligence, Nuisance, Vicarious Liability, Remedies and Limitation.

3.4 Company Law.

3.5 Limited liability Companies, Partnership, Corporate Bodies and Trade Unions. Law of sale of Goods; Hire-purchase law.

3.6 Insolvency, Bankruptcy and Liquidation.

3.7 Insurance law relating to Buildings

4.0 PROJECT MANAGEMENT AND INFORMATION TECHNOLOGY (3-HOUR PAPER)

Content

SECTION A -

- Definitions and principles of Project Management
- Project Planning and Scheduling techniques

SECTION B -

- Financial Management
- Finance
- Management Theory

SECTION C -

- Information Technology
- Computer processing Technology
- Components of a Computer
- Packages and application software
- Development Economics
- Value Engineering

SECTION A (30%)

4.1 Definitions and principles of Project Management

4.1.1 Project definition.
4.1.2 The role of the Project Manager from inception to completion.
4.1.3 Project leadership
4.1.4 Project/organizational structures
4.1.5 Project reporting and control
4.1.6 Project risk management
4.1.7 Criteria for success and failure in projects.

4.2 Project Planning and Scheduling techniques

Bar chart, CPM, PERT, line of balance, linear programming and transportation problems, Queuing theory and Simulation

SECTION B (30%)

4.3 Financial Management

Categorization of assets, liabilities and capital, Trading, Profit and loss Accounts, Balance sheet and Interpretation of Published Accounts, Liquidity, Solvency, Convertibility, Security, Cash Flow, Debt Coverage, Financial Ratios, Determinant analysis and prediction of corporate Bankruptcy. Total, Fixed, Variable and Marginal Cost Analysis.

4.4 Finance

Commercial and Merchant Banking, role of the Central Bank of Nigeria, Non-Bank. Financial Institutions. Trustees Investment Act. Companies and Allied Decree 1990. Banking Act. 1969, Money and capital Market, Treasury Bills. Common stock, Raising of Loan and Equity using private placement and the public offer through the Nigerian Stock Exchange.

4.5 Management Theory

4.5.1 General understanding of Management principles and theories.
4.5.2 Project Planning and programming - Bar chart, Critical Path Analysis and other project planning methods.

SECTION C (40%)

4.6 Information Technology

4.6.1 Introduction to information systems and management.

4.6.2 Technological changes in the information systems to date.

4.6.3 Relationship between date and information.

4.6.4 Social and organization impacts of new information systems.

4.7 Computer processing Technology

4.7.1 Introduction to Computer Systems. Analogue, Digital Hybrid I Electronic Computers

4.7.2 The different types of computers; microcomputers minicomputers, super micros, super minis, mainframes, super main frames.

4.7.3 The differences between clone systems and major manufacturers systems (IBM PC Gateway, Packard bell, Apple Macintosh, etc.

4.7.4 The standard computers accessories (digital camera and camcorders, memory sticks and Zip drives etc.)

4.8 Components of a Computer

Hardware, Software, Input, Output and Back-up devices, Systems and application software, Graphic User Interfaces, etc.

4.9 Packages and application software

Principles and introduction to the following applications:

4.9.1 i Word-processing: Microsoft word, WordPerfect.
ii Database: dBase Language, Oracle, dBase IV, Quickens,
iii Spreadsheets: Lotus 123, SuperCalc. 5, Excel, etc.

4.9.2 Graphics: Harvard Graphics, Lotus Freelance

4.9.3 Desktop publishing: Aldus Page Maker, Xerox Ventura

4.9.4 Integrated Packages: Enable, Ability Lotus 1-2-3, MS-Works, MS office (pro).

4.9.5 Computer Aided Design: Auto CAD, Generic CADD, Design -CAD, Con Draw, Auto Sketch.

4.9.6 OS Software: Master Bill, MB3, MB Lite, QS Cad, Estimator, Cost Planner CATO, Wessex system, OS scrip, OS Editor, Os Web.

4.9.7 Project: MS Project.

4.9.8 Management: Contract administration form for CAF GEN windows, M Project.

4.9.9 Current Development in Micro-Computing, current trends in hardware and software Technologies

4.10 Development Economics

Application and use of cost analyses and cost checking during design and construction stages.

4.10.1 Introduction to Commercial Economics
4.10.2 (a) Cost control and information technology.
(b) Computer technology as a tool in cost management process.
4.10.3 Life cycle costing — Concept and time value of money. Taxation and life cycle costing. Cost capital allowances.
4.10.4 Sources of Finance, Investment Appraisal, Developers Budget. Cost Benefit Analyses.
4.10.5 Land use and value determinants — Town Planning Control and Development, Legal interest in property. Mortgages and Negotiable instruments and their implications to development costs and values.
4.10.6 Present and future payment concept and time value of money derived from first principles.
4.10.7 Maintenance and running cost; Life of building and components including errors of prediction.
4.10.8 Economics of Building Development
4.10.9 Land acquisition problems
4.10.10 Financial Considerations and Sources of development Finance.
4.10.11 Developer's Budget
4.10.12 Choice between building lease or purchase
4.10.13 Land use and value determinants
4.10.14 Factors determining land use and value
4.10.15 Town Planning Control and Development
4.10.16 Legal interest in property.
4.10.17 Land use planning

4.11 Value Engineering

4.11.1 Definition
4.11.2 Basic requirements
4.11.3 Structure of a typical value Engineering team
4.11.4 Procedure or phases of Value Engineering Management - advantages and disadvantage
4.11.5 Value Management – advantages and disadvantages
4.11.6 Earned Value Management
4.11.7 Time Value Management

5.0 MEASUREMENT (3HOUR PAPER)

AIM:

To broaden the scope of measurement and detailed description of construction components

LINKAGES:

Construction Technology, Construction Management and Estimating

CONTENTS

SECTION A -

- The application of measurement principles
- The preparation of Bills of Quantities
- The purpose and uses of Bills of Quantities
- Preparation, editing and presentation of tendering and control information.
- Specification writing, details of items under preliminaries section of Bills of Quantities.

SECTION B -

- Measurement of Building Works

SERVICES -

- Application of engineering services works
- measurement of mechanical services
- measurement of electrical services
- measurement of communication, security & control services
- measurement of transportation systems

SECTION A (25%)

5.1 The application of measurement principles to all forms of construction works in accordance with the latest edition of the Nigerian Standard Method of Measurement

5.1.1 The preparation of Bills of Quantities from dimension including an understanding of abstracting methods and the application of computer for data processing and production of documentation.

5.1.2 The purpose and uses of Trade bills, elemental bills, Operational bills and Approximate Bills of Quantities, Schedule of rate, Writing of preliminary and preamble items, the significance of standard phraseology in Bills of Quantities.

5.1.3 An understanding of the terms Prime Cost and Provisional Sums, Nominated Suppliers and Nominated Sub-contractors including the assessment of allowances for associated general items and profit.

5.1.4 Understanding of tendering and control information.

5.1.5 Specification writing, details of items under preliminaries section of Bills of Quantities.

SECTION B (35%)

5.2 Measurement of Building Works

5.2.1 Site preparation and temporary works, underpinning, basements, foundations and substructures in level and uneven sites.

5.2.2 External and internal walling in concrete. Sandcrete blocks. Curtain walling or other similar systems, brick, blocks, face work in brick slips, stone and glass blocks.

5.2.3 Floors in steel, concrete or Timber.

5.2.4 Stairs and ramps in Timber, concrete and steel

5.2.5 Roofs in Timber, concrete and metal construction. Roof's coverings, roof linings and roof lighting.

5.2.6 Framed and unframed steel work and casings

5.2.7 In -situ concrete frames, pre-cast concrete components, pre-stressed concrete.

5.2.8 Proprietary cladding

5.2.9 Windows and doors in timbers and metal, associated openings including frames and accessories.

5.2.10 Fittings and Fixtures; Wardrobes, shelving, pelmets, Dado railings,

5.2.11 skirting, architraves, Linings, kitchen cabinets and workshops

5.2.12 Metal work generally; Burglary proofing Hand-railing, Embellishments, etc.

5.2.13 Internal and external finishes and decoration

5.2.14 Glazing work

5.2.15 External works, Roads and paving, swimming pools, Fountains, water features, sculptural works. Horticultural and landscaping works.

5.2.16 Spot items

5.2.17 Renovation, alteration, and demolition works.

5.2.18 Measurement and principles of rehabilitation works.

5.3 SERVICES (40%)

AIM:

Candidates are required to demonstrate a clear understanding of the basic principles of planning, design and installation of mechanical and electrical services in

Construction works. Importance should be attached to a systematic and logical approach of measurements and suitability descriptive statements. Candidates should be able to measure a prepare bills of quantities as well as carry out the pricing of works accordance with the Building and Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas.

a) Water supply generally, hot and cold-water production a distribution pipe work and storage design.
b) Planning sanitary accommodation, sanitary, plumbing ClJ appliances.
c) Drainage and sewerage systems disposal and treatment plant.
d) Heating and Ventilation systems, equipment, heat sources, fuel distribution and transmission media, heat emission fuels, thermal insulation, Natural and mechanical Ventilation, fans and equipment Choice of systems.
e) Gas supply installation and distribution Equipment.
f) Electrical services including installation, wiring in single phase installation, earthing and sub-circuits.
g) Electrical fittings, equipment and control gear (H) Artificial lighting layouts.

SECTION A:

5.3.1 APPLICATION OF ENGINEERING SERVICES WORKS

5.3.1.1 The application of measurement principles to all forms of Engineering Services works in accordance with the current latest edition of the Building & Engineering Standard Method of Measurement (BESMM4®).

5.3.1.2 The purpose and uses of: Trade bills, Elemental bills, Operational bills and Approximate Bills of Quantities, Schedule of Rates, Development and application of Preliminaries/General Items (Conditions), the significance/application of standard phraseology in Bills of Quantities.

5.3.1.3 An understanding of the terms Prime Cost and Provisional Sums, Nominated Suppliers and Nominated Sub-contractors including the assessment of allowances for associated general attendance items and profit.

5.3.1.4 The preparation of Bills of Quantities from dimensions and the application of standard phraseologies and developing a phraseology library for the production of documentation.

5.3.1.5 Preparation, editing and presentation of tendering and control information,

5.3.1.6 Specification writing, understanding details of items under the preliminaries section of the Bills of Quantities. Computer aided measurements and tender

5.3.1.7 Understanding and use of different software and packages available for pre- contract documentations

Measurement shall be in accordance with BESMM 4R.

SECTION B:

5.3.2 MEASUREMENT OF MECHANICAL SERVICES

AIM:

Candidates are required to demonstrate a clear understanding of the **basic principles** of planning, design and installation of mechanical services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are expected to understand the application of pipelines/duct lines, pipeline/duct line ancillaries and pipeline/duct line control equipment across the following installations. Candidates should be able to measure and prepare bills of quantities as well as carryout the pricing of works in accordance with the current edition of the Building & Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas:

5.3.2.1 Furniture, Fittings, Equipment and Appliances, Kitchen/Catering equipment, sanitary f2ittings and appliances.

5.3.2.2 Rainwater installations, Drainage and sewerage systems disposal and treatment plant, sanitary installation, industrial waste drainage, etc.

5.3.2.3 Hot and cold water supply and distribution pipe work and storage, Boreholes and water treatment systems, Gas supply installation and distribution, fuel oil storage/ distribution installation.

5.3.2.4 Fire-fighting equipment, inlets and appliances, fire hose reel system, dry/wet riser systems, sprinkler system, fire hydrant installations, CO_2 system, foam fire-fighting installations.

5.3.2.5 Chilled water systems, central refrigeration plant.

5.3.2.6 Ventilation Systems: Air handling installations–Ventilation supply and extract equipment, supply and extract duct lines and pipelines with associated fittings, general ventilation installation, toilet ventilation installation, kitchen ventilation installation.

5.3.2.7 Air-Conditioning Systems: Air-conditioning systems–VAV air-conditioning, Dual-duct air-conditioning, Multi-zone air-conditioning, Fan-coil air-conditioning, and air-conditioning units (room/window/split

units and central packaged systems) including duct works and associated pipe works and fittings.

5.3.2.8 Insulation, Fire Stopping and Fire Protection systems

5.3.2.9 Builder's work associated with mechanical services installations

5.3.3 **SECTION C: MEASUREMENT OF ELECTRICAL SERVICES**

AIM:

Candidates are required to demonstrate a clear understanding of the basic principles of planning, design and installation of electrical services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are expected to understand the application of control equipment and conduit/cables/trunking across the following installations. Candidates should be able to measure and prepare bills of quantities of works in accordance with the current edition of the Building & Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas:

5.3.3.1 HV/LV Supply/Public Utility/Distribution. Incoming services up to but excluding main medium voltage switch-gear

5.3.3.2 Electricity Generation Plant (Stand by equipment)

5.3.3.3 General Lighting and LV Power installation

5.3.3.4 Uninterruptible Power Supply

5.3.3.5 Emergency Lighting installation

5.3.3.6 Street/Area/Flood lighting installation

5.3.3.7 Earthing system installation

5.3.3.8 Lightning Protection installation

5.3.3.9 Insulation, Fire stopping and Fire Protection systems

5.3.3.10 Conduits, Trunking and cable trays

5.3.3.11 Cables and wires

5.3.3.12 Builder's work associated with electrical installations, including excavating cable trenches, concrete plinths, etc.

5.3.4 **SECTION D: MEASUREMENT OF COMMUNICATION, SECURITY & CONTROL SERVICES**

AIM:

Candidates are required to demonstrate a clear understanding of the basic principles of planning, design and installation of control and technology services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are expected to understand the application of control equipment and conduit/cables/trunking across the following installations. Candidates should be

able to measure the works in accordance with the current edition of the Building & Engineering Standard Method of Measurement 4th Edition - Revised (BESMM 4®) in the following areas:

5.3.4.1 Telecommunications, Public Address/Conference Audio facilities
5.3.4.2 Radio/TV/CCTV installation systems
5.3.4.3 Data Transmission installation systems
5.3.4.4 Access Control Systems
5.3.4.5 Security Detection & Alarm System installations
5.3.4.6 Fire Detection & Alarm System installations
5.3.4.7 Central Control/Building Management System installations
5.3.4.8 Conduits, Trunking and cable trays
5.3.4.9 Cables and wires
5.3.4.10 Insulation, Fire Stopping and Fire Protection systems
5.3.4.11 Builder's work associated with control and technology installations, including excavating cable trenches, concrete plinths, etc.

5.3.5 **SECTION E: MEASUREMENT OF TRANSPORTATION SYSTEMS**

AIM:

Candidates are required to demonstrate a clear understanding of the basic principles of planning, design and installation of transportation system services in construction works. Importance should be attached to a systematic and logical approach of measurement and suitability of descriptive statements. Candidates are expected to understand the application of control equipment and conduit/cables/trunking across the following installations. Candidates should be able to measure and prepare bills of quantities of works in accordance with the current edition of the Building & Engineering Standard Method of Measurement 4th Edition - Revised (BESMM4®) in the following areas:

5.3.5.1 Lifts
5.3.5.2 Escalators
5.3.5.3 Moving Pavements
5.3.5.4 Powered Stair lifts
5.3.5.5 Hoists
5.3.5.6 Travelling Cradles
5.3.5.7 Conveyors
5.3.5.8 Builder's work associated with transportation systems installations

Measurement shall be in accordance with BESMM 4R.

5.3.6 SECTION F: MEASUREMENT OF CIVIL AND HEAVY ENGINEERING WORKS (3 HOUR PAPER)

AIM:

To provide a **general** knowledge on the scope of measurement and detailed description of civil and heavy engineering construction components. To equip candidates with general civil engineering construction technology details to enable them measure and provide cost advice to clients.

CONTENT

CIVIL WORKS, HEAVY & INDUSTRIAL ENGINEERING

- Scope of Heavy Engineering
- Measurement and Control of engineering projects

5.3.7 CIVIL WORKS (30%)

5.3.7.1 Scope of Engineering works and Method of Measurement

a) Site investigation, classification of rocks and soils, procedure of investigation, preliminary works, methods of site exploration, testing generally, Geophysical surveys and other techniques, special information and costs

b) Site organization and temporary services, demolition, site offices and general accommodation, material storage and compounds, Temporary services, setting out and safety.

5.3.7.2 Soil Stabilization systems: Pilling, Diaphragm and Retaining wall systems. Sheet pilling, bearing piles, Bored piles, cast-in-place piles, preformed piles, vibrio-floatation and vibrio-replacement, diaphragm walling, retaining walls.

a) General principles of Civil Engineering measurements, works classification, coding and numbering of items Preparation of Bills of Quantities.

b) Principles of Method related charges

c) Management of plant and Machinery

5.3.7.3 Tunneling and underpinning: General considerations, methods of tunneling and underpinning, ventilation and lighting, safety aspects.

5.3.7.4 Marine works

5.3.7.5 Cofferdams, caissons, underwater foundation construction, sea walls, Docks, jetties and other marine structures, Dredging and Reclamations, canal and River works, Reservoirs and liquid-retaining tanks.

5.3.7.6 Road works, Bridges, Subways and Airfield Construction

5.3.7.7 Railway track Work

5.3.8 HEAVY & INDUSTRIAL ENGINEERING

5.3.8.1 **Scope of Heavy Engineering**

Definition of Heavy Engineering, Principles and constituents of heavy engineering equipment, facilities, structures and raw materials for: Pharmaceutical Chemicals, Nuclear Energy, Gas Exploration &Production.

Facilities for Oil exploration, production and petroleum refining, power generation, food and drinks, paper milling, steel and non-ferrous metal production, telecommunication, data communication etc.

5.3.8.2 **Measurement and Control of engineering projects**

Taking off quantities, preparation of bid documents and negotiation of Work packages of all the followings;

a) Construction site services
b) Scaffolding
c) Steelwork
d) Plant
e) Pipework
f) Electrical Work
g) Instrumentation
h) Insulation
i) Protective coverings
j) Sundry items

Measurement shall be in accordance with BESMM 4R.

INTERMEDIATE

INTERMEDIATE EXAMINATION

1.0 MEASUREMENT OF BUILDING WORKS (3 HOUR PAPER)

AIM:

To broaden the knowledge and scope of measurement and detailed description of construction components and to know the duties and the relationship between the quantity surveyor and other members of the design and construction team.

LINKAGES:

Building Technology, Construction Management and Estimating

CONTENTS

SECTION A – (40%)

- Duties of a quantity surveyor and the relationship between the quantity surveyor and other members of the design and construction team
- Purposes of preparing a bill of quantities
- Specification writing

SECTION B – (60%)

- Measurement of Building Works

1.1 SECTION A – (40%)

1.1.1 Duties of a Quantity Surveyor

1.1.1.1 Summaries the duties which the quantity surveyors are expected to perform

1.1.1.2 Compare and contrast between the work of consulting Quantity Surveyor and the Quantity Surveyor employed by a construction firm

1.1.1.3 Describe the relationship between the quantity surveyor and,

a. The architect
b. Consultant civil/structural engineer
c. Other specialist engineer
d. The site agent

1.1.2 Purposes of preparing a bill of quantities

1.1.2.1 Produce a bill of quantities using the method of abstracting

1.1.2.2 Produce a bill of quantities using the method of billing direct

1.1.2.3 Describe accurately the method of preparing a bill of quantities using the cut and Shuffle method

1.1.2.4 State what items of work are normally covered by the preliminary section of the bill

1.1.3 Specification writing

1.1.3.1 State purpose and uses of specification

1.1.3.2 State sources of information for writing specification

1.1.3.3 Write specifications on the following:

a. Excavation and earthwork
b. Blocks
c. Cement
d. Aggregate
e. Concrete
f. Timber, etc.

1.1.3.4 Write typical preamble and specification clauses for incorporation into a bill

1.2 SECTION B – (60%)

1.2.1 Take off quantities for works involved in Finishes: Plastering/ rendering and Painting and decoration.

Measurement shall be in accordance with BESMM 4R.

PAPER II - PRINCIPLE OF ENGINEERING MEASUREMENT (3 HOUR PAPER)

AIM:

To understand the scope of engineering works

CONTENTS

1 Learning the basics of Engineering works
2 Materials used in Engineering Works
3 General Principles of measurement of Engineering Works

1.3 Learning the basics of Engineering works

1.3.1 Explain the various constituents of civil Engineering works including Earth Works

1.3.2 Explain the various aspects of electrical Installation

1.3.3 Explain the various aspects and constituents of Mechanical and heavy Engineering

1.4 Materials used in Engineering Works

1.4.1 Mention the materials in used in engineering works

1.4.2 Describe briefly the materials in general use, Materials for filling and explosives

1.5 General Principles of measurement of Engineering Works

1.5.1 Explain general principles of Engineering measurement using the BESMM4R including work classification, coding and numbering of items, preparation of bills of quantities

1.5,2 Explain principles of methods related charges, measurement of plant and machinery

1.5.3 Explain SMM for civil Engineering and Industrial Engineering Contracts

Measurement shall be in accordance with latest BESMM 4R.

2.0 CONSTRUCTION MANAGEMENT (3 HOURS PAPER)

AIM:

i. To make the candidate understand the nature and scope of construction industry and to understand the principles of approximate estimating and various methods and uses of approximate estimates
ii. Understand need for role of the QS during the design stage

Contents

- Nature and scope of construction industry
- Principles of approximate estimating
- Cost implications of constructional methods
- Role of the QS during the design stage

2.1 Nature and scope of construction industry

2.1.1 Explain the nature of construction industry, emphasizing on its scope of activities. 2.1.2 Mention some characteristics of its product, such as buildings, bridges, etc.

2.2 Principles of approximate estimating

2.2.1 Explain the purpose and forms of approximate estimating techniques.

2.2.2 Describe the various approximate estimating techniques:

a. Unit method
b. Cubic method
c. Superficial or floor area method
d. Storey enclosure method

e. Approximate quantities

2.2.3 Explain the situation and occasions where each of the methods can be used

2.3 Cost implications of constructional methods

2.3.1 Explain various constructional methods

2.3.2 Discuss the effect of this on construction

2.3.3 Explain the effect of site condition on project cost

2.3.4 Explain the effect of use of plant and market conditions on construction cost

2.4 Management and the management process

2.4.1 Explain the meaning of management and management functions of forecasting, planning, organizing, motivating, controlling, communication, leadership, decision-making and coordinating

2.4.2 Explain the following areas of relevance to the construction industry in the management process:

a. General Manager
b. Finance
c. Design
d. Development
e. Marketing
f. Production
g. Maintenance
h. Personnel
i. Office
j. Purchasing

2.4.3 Explain the major process of management as outlined by Fayol and others

2.5 Role of the QS during the design stage

2.5.1 Explain the role of the QS during the design stage of project.

2.5.2 Explain initial estimate as the first step in cost control.

2.5.3 Explain cost control during execution of project.

2.5.4 Use RIBA design terminology to explain various stages of construction project which must be controlled.

3.0 PROJECT COST CONTROL (3 HOUR PAPER)

AIM:

i. To introduce the candidate to understand the techniques of preparing preliminary estimates
ii. To stress the importance of time value of money
iii. To establish the importance of prudent resource allocation

Content

- Concept of Cost Control-need for Cost Control
- Cost implications of design variable
- Nature of cost and cost-in-use as applied to construction projects
- Principle of cost control

3.1 Concept of Cost Control-need for Cost Control

3.1.1 Explain concept of cost-in-use.
3.1.2 Mention and explain cost in-use terminology.
3.1.3 Explain the following:
a. Initial cost
b. Running cost
c. Maintenance cost
d. Replacement cost
3.1.4 Define and explain:
a. Fixed cost
b. Variable cost
c. Full cost
d. Marginal cost

3.2 Cost implications of design variable

3.2.1 Define design variables.

3. 2.2 Explain the concept of cost as related to the construction industry

3. 2.3 Explain the effect of the following design variable on cost of construction:
(a) Plan shape,
(b) Size of project
(c) Perimeter/ floor area ratios
(d) Storey height
(e) Total height of building.

3.3 Nature of cost and cost-in-use as applied to construction projects

3.3.1 Explain concept of cost-in-use

3.3.2 Mention and explain cost in-use terminology

3.3.3 Explain the following:

a. Initial cost

b. Running cost

c. Maintenance cost

d. Replacement cost

3.3.4 Define and explain:

a. Fixed cost

b. Variable cost

c. Full cost

d. Marginal cost

3.4 Principle of Cost Control

3.4.1 Define cost control.

3.4.2 Explain historical development of cost control process.

3.4.3 Explain the need for cost control.

3.4.4 State the main aims of cost control

4.0 ADVANCED TENDERING AND ESTIMATING (3 HOUR PAPER)

AIM:

i. To enable the candidate appreciate the buildup for preliminary items

ii. To enable the candidate know factors affecting tender prices

Content

- Pricing of attendance on nominated subcontractors
- Factors affecting tender prices
- Pricing of items in Bill of Quantities

4.12 Pricing of attendance on nominated subcontractors

4.1.1 Explain the factors involved in pricing general and special attendance on subcontractors

4.13Factors affecting tender prices

4.2.1 Explain the various factors affecting tender price

4.2.2 Availability of materials, availability of labour, location of site, height of building etc.

4.3 Pricing of items in Bill of Quantities

4.3.1 Buildup unit rates for:

a. Surface excavation,
b. Trenches and isolated holes,
c. Earthwork support to simple excavations,
d. Basement excavation, disposal of spoil hardcore.
e. Concrete to strip foundations, ground floor slab, including formwork and reinforcement
f. Walls in common and facing bricks and block work

5.0 CONTRACT LAW AND ADMINISTRATION (3-HOUR PAPER)

AIM

The Candidate should be able to understand the statutory Acts, Edicts, Decrees, and Bye-Laws etc.

Content

- Understanding basic terms in Law
- The simple Building regulations and planning Laws
- Branches and sources of Law and the various schools of Law
- The legislation process and power separation
- General principles of constitutional and administrative Law

5.1 Understanding basic terms in Law

5.1.1 Define the following:

a. Statutory act
b. Decrees
c. Edicts
d. Bye-laws
e. Regulations

5.1.2 Explain the importance of each of them, their promulgation process and their jurisdiction.

5.4 The simple Building regulations and planning Laws

5.4.1 State the various Acts and statutes applicable to the erection of buildings

5.4.2 Explain the sources of plans and Hierarchy of plans

5.3 Branches and sources of Law and the various schools of Law

5.3.1 State and describe schools of Law i.e.:

a. Analytical school.
b. Historical school.
c. Sociological school.
d. Maximum theory of law.
e. Natural law school

5.3.2 State sources of Law i.e. statutory, common law

5.3.3 State branches of law i.e. criminal, civil and tort

5.4 The legislation process and power separation

5.4.1 Explain the doctrine of separation of powers, its advantages and disadvantages

5.4.2 State the functions of different arms of government

5.5 General principles of constitutional and administrative Law

5.5.1 Define the term "constitution"

5.5.2 Describe and distinguish the different kinds of constitutions i.e

a. Written as opposed to unwritten constitution
b. Flexible as opposed to rigid constitutions
c. Federal as opposed to unitary constitutions

5.5.3 Describe and distinguish between:

a. Presidential system of government
b. Parliamentary (cabinet, west minister system of government)

PROBATION

PROBATION EXAMINATION

1.0 INTRODUCTION TO QUANTITY SURVEYING (3 HOUR PAPER)

AIM:

i. To enable the Candidate understand the History of Quantity Surveying
ii. To Understand the duties and functions of a quantity Surveyors
iii. To know the BESMM4R and Understand in detail the concept of measurement

Content

- History of Quantity Surveying
- Duties and functions of a quantity Surveyors
- Understanding the BESMM4R
- Concept of Measurement of Building Works

1.1 History of Quantity Surveying

1.1.1 Explain the history of the profession from its root in Britain
1.1.2 Explain the history of the profession in Nigeria
1.1.3 State the various professional bodies in the world
1.1.4 State the body regulating the practice of the profession in Nigeria

1.2 Duties and functions of a quantity Surveyors

1.2.1 Summarize the duties which a Quantity Surveyor is expected to perform
1.2.2 Identify the duties of other professionals involved in building project

1.3 Understanding the BESMM4R

1.3.1 Identify various works section heading and their unit of measurement
1.3.2 Apply the standard method of measurement of building works
1.3.3 Determine where and when to use the various units of measurement

1.4 Concept of Measurement of Building Works

1.4.1 Calculate the volume of various shapes
1.4.2 Illustrate how they are related to building
1.4.3 Calculate the areas of various shapes
1.4.4 Explain how they are related to building
1.4.5 Calculate the centre line girth of building
1.4.6 Explain the importance of centre line girth in measurement

2.0 PRINCIPLES OF BUILDING MEASUREMENT (3 HOUR PAPER)

AIM:

i. Have knowledge on the measurement of Block wall, Roof Construction and Roof Covering, Doors and Windows.

Content

- The application of measurement principles
- The purpose and uses of different type of Bills of Quantities
- Preliminaries section of Bills of Quantities.
- Measurement of Building Works

2.1 The application of measurement principles to all forms of construction works in accordance with the BESMM4R

2.2 The purpose and uses of Trade bills, elemental bills, Operational bills and Approximate Bills of Quantities.

2.3 Writing of preliminary and preamble items, the significance of standard phraseology in Bills 01 Quantities and details of items under preliminaries section of Bills of Quantities.

2.4 Measurement of Building Works

2.4.1 Site preparation and temporary works, foundations and substructures in level and uneven sites

2.4.2 External and internal walling in concrete. Sandcrete blocks

2.4.3 Roof Construction and covering in Timber, concrete and metal construction

2.4.4 Windows and doors in timbers and metal, associated openings including frames and accessories.

Measurement shall be in accordance with BESMM 4R.

3.0 INTRODUCTION TO TENDERING AND ESTIMATING (3 HOUR PAPER)

AIM:

i. To enable the candidate to understand the Terminologies in Tendering and Estimating
ii. To enable the candidate appreciate contract activities during the tender process
iii. To enable the candidate understand the basic principles and scope of estimating

Content

- Terminologies in Tendering and Estimating
- Type of contracts and contract activities during tender process
- Basic principles and scope of estimating
- Constituent parts of unit-rates
- Difference between prime cost, overhead costs and profits

3.1 Terminologies in Tendering and Estimating

3.1.1 Define the following terms: Provisional sums, dayworks, Overheads and profit, Tender analysis, Cost Price, Pre-tender, Tender, Rate, Amount, Conditions of contract, Client, Tender documents, etc.

3.2 Type of contracts and contract activities during tender process

3.2.1 Define the following type of contracts with relevant examples:

a. Reimbursable contract
b. Package deal contract
c. Management contract
d. Measure and value contract

3.2.2 State the information obtained from the following sources:

a. Technical reports, including site visits
b. Bill of quantities.
c. Standard form of building contract conditions.
d. Architectural drawings, lists, schedules and specifications.
e. Codes of practice relating to estimating.
f. Labour and plant performance data.
g. Manufacturer and supplier's specifications and quotations
h. Subcontractors requirements and quotations
i. Working rule agreement condition
j. Liaison with parties generally

3.2.3 Explain the purpose of pre-tender liaison meetings

3.2.4 Use information obtained in 2.2 for preliminary planning, statement of method, plant and equipment schedule, staffing requirements, including subcontractors, material supply, and cash flow.

3.3 Basic principles and scope of estimating

3.3.1 Explain techniques of approximate estimating by the use of the following methods;

a. Storey enclosure
b. Costing
c. Superficial
d. Lump or spot prices

3.4 Constituent parts of unit-rates

3.4.1 Explain the elements of prime cost under:

a. Material elements - delivery, unloading, storing, handling and waste.
b. plant elements (applied to unit rate): hiring, with associated charges and running costs, builders own plant, including capital cost, depreciation, insurance licenses and running cost.
c. Labour element - builders own labour, all in labour rate, labour - only subcontractors.

3.4.2 Compare rates based on different analysis e.g.:

a. Builders own labour V-subcontractors labour.
b. Builders own plant V-hired plant.
c. Builders own unit rate V-subcontractors or suppliers all-in quotations e.g. plumbing, finishes.

3.5 Difference between prime cost, overhead costs and profits

3.5.1 Define:

a. Prime cost.
b. Project overheads.
c. General overheads.
d. Special risks and consideration.

3.5.2 Explain the meaning of gross and net profit in a tender

3.5.3 Outline the methods by which the various costs and profit may be allowed for a tender

4.0 BUILDING CONSTRUCTION I (3-HOUR PAPER)

AIM:

To equip candidates with knowledge and understanding of the nature and scope of the construction industry and to enable them have an appreciable knowledge of technology of building, and building services.

Content

- Building works (60%)
- Building Maintenance (40%)

4.1 BUILDING WORKS (60%)

4.1.1 Explain the methods of excavation
4.1.2 List the tools used in manual method of excavation
4.1.3 Describe the plants and equipment used in excavation
4.1.4 Explain the different methods of earthwork support to trenches in different types of soils
4.1.5 Define the term foundation
4.1.6 Explain the importance of foundation to building structure
4.1.7 List types of soil and how they affect choice of foundation
4.1.8 Illustrate by simple calculation the area of concrete foundation
4.1.9 Describe the different types of foundation and their application
4.1.10 Explain damp proofing course (DPC) and damp proof membranes (DPM) in building
4.1.11 Describe the processes of the rising and seepage of ground and underground water
4.1.12 Explain the importance of DPC and DPM in sub-structural works
4.1.13 State the functions of DPC and DPM
4.1.14 Explain the principle of tanking in basement works
4.1.15 Explain the process of laying damp- proof materials in use
4.1.16 Identify the various damp-proof materials in use
4.1.17 Explain anti-termite treatment and its uses in foundation works
4.1.18 Explain blinding and its uses
4.1.19 Explain hardcore and its importance
4.1.20 Explain the process of de-watering and its importance in foundation works

4.2 BUILDING MAINTENANCE (40%)

4.2.1 Define maintenance

4.2.2 Define the terms used in repair and maintenance of buildings and related facilities

4.2.3 Explain reasons for various maintenance of building

4.2.4 Classify maintenance

4.2.5 State the types of defects in brick, sand crate, block, stone and timber walls respectively

4.2.6 Explain the remedies for the defects in 4.2.5 above