

**COVENANT UNIVERSITY
NIGERIA**

*TUTORIAL KIT
OMEGA SEMESTER*

**PROGRAMME: BUILDING
TECHNOLOGY**

COURSE: CVE 522

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CVE 522: BUILDING TECHNOLOGY

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Question 1 (a) Itemize steps involved in the production of construction programme in Network Analysis. **(10 Marks)**

Question 2 Itemize steps involved in production of programme in Network analysis

Question 3 (a) Describe the implementation procedure that could be deployed in operations research. **(10 Marks)**

(b) Describe different forms of communication system that could be used on project sites with examples. **(10 Marks)**

Question 4 List and explain four advantages of Network programming.

Question 5 (a) Enumerate basic assumptions in linear programming application.

(10 Marks)

(b) Describe the roles of the following professionals on building projects: (i) Architect (ii) Builder (iii) Structural Engineer (iv) Quantity Surveyor (v) Facility Manager **(10 Marks)**

Question 6 List feature of a good communication system

Question 7 (a) Enumerate stages involved in construction project planning

Question 8 List few records that could be kept on project sites.

Question 9 Describe Pre-tender planning?

Question 10 List different procurement system often used in building works.

Question 11 Describe Pre-contract planning in building construction

Question 12 What are the limitations of Linear programming

Question 13 What are the components Contract planning?

Question 14 Itemize different permits that are obtainable during construction works.

Question 15 Describe the structure of construction industry with relevant illustration.

Question 16 (a) List and describe stages involved in management of building projects from inception to completion **(10 Marks)**

Question 17 Describe different forms of communication system that could be used on project sites with examples

Question 18 Itemize procedure involved in obtaining approval for building works and list statutory authorities that are involved in building projects construction process.

Question 19 Highlight tendering methods that could be used in building projects procurement. **(10 Marks)**

Question 20 List and explain types of procurement system that could be used in construction project delivery **(10 Marks)**

ANSWERS

1. Steps in production of programme includes:

a. List all activities : All the activities in a project can be identified with the aid of the method statement which has been prepared earlier in the planning stage. The activities should correlate with particular trades or sections of the work. For example, excavation work requires laborers, and brickwork to damp-proof-course level requires bricklayers. Roof work can be split into two: roof timbers require carpenters and roof coverings roofers.

b. Sequence all activities :

When the activities have all been listed. The planner then sequences them into a logical and practical order. This involves the production of a logic diagram.

c. Time all activities:

All activities are to be timed and scheduled as appropriate. The time is used to calculate the earlier start time and completion time for all activities.

d. Produce the programme :

e. Production of programme entails interconnecting activities with bubbles and arrows.

Programme can be shown as a network of interrelated activities, highlighting the start and finish times of each activity. There are numerous network programming techniques, but the following two types are traditionally used in the construction industry:

i. Activity-on-the-arrow

ii. Activity-on-the-node (also known as precedence networks).

(b) List and describe nature of Operations research. **(10 Marks)**

FLEXIBILITY: Flexible in adaptability to different scenarios. It changes with different problem.

IDENTICAL TO SCIENTIFIC RESEARCH: It uses similar techniques used in scientific process.

MATHEMATICAL IN NATURE: It uses mathematical processes and function in problem formulation and solution.

HUMAN EFFORT DEPENDENT: It involves human effort in deployment and application.

3. i. Studying past events of operations and determine facts: carefully observing event trends and formulate hypothesis.

ii. Model construction: prepare mathematical model to explain the proposed theories.

iii. Experimental verification: The facts, theories and then prediction.

b)Written: Letters, reports, bills of quantities, specifications, site instructions, British Standards. This method is used when the subject matter is complex, important or likely to have possible legal implications and where a permanent record is required for future reference.

Visual: Films, slides, posters, graph, charts. It includes the project drawings and work programme. These forms of communication often have greater impact upon the receiver. Where messages are complex this form of communication is the most effective.

Oral: When the subject matter may be difficult or disagreeable, the face-to-face communication is appropriate. It is also used in those circumstances when a simple, less important and informal message is to be communicated. The result of this type of method is instant and often generates immediate feedback.

5). i. Assumption of certainty: uncertainty surrounding cost business situation are not included

ii. Assumption of linearity: Capable of being approximated by linear function. Objective function and the constraints must all be linear

iii. Assumption of Continuity: It is assumed that functions are continuous variable.

iii. Single Objectives: An L.P. formulation can only pursue one objective at a time, whereas a practical problem may have multiple objectives.

b) (i) Architect : Designing of Building features and production of iconic figure of the clients space requirements.

(ii) Builder: A builder is someone certified by CORBON and statutorily empowered by law to be responsible for physical construction of building on sites. The management of production system and supervising of artisans and site workers is part of responsibility of a registered builder.

(iii) Structure Engineer: a Structure engineer prepares the structural implications of building, the design of members and its supervision.

(iv) Quantity Surveyor: A registered quantity surveyor produces cost implications of architect design, builders' documents and issues interim certificate according to clients and architect instruction to builder and contractor.

(v) Facility Manager: A facility manager is responsible for marketing of the facility after construction. Facility manager offers the property for sale and manages the portfolio based on client requirements.

7) a. Pre-tender planning, Pre-contract planning, Post-contract planning, Pre-construction planning and post construction planning

Construction planning processes can be divided into three stages

9) Between 6 to 8 weeks depending on type of project

-Contractor will prepare a pre-tender report through site visit.

-Visit to site will highlight the following:

- i. Exact location of the site
- ii. Site access
- iii. Detail of services
- iv. Geography of the area
- v. Local knowledge about the site
- vi. Local availability of labour
- vii. Extent of liquidated damages on site

- viii. Availability of material and plant
- ix. Local weather condition
- x. Closeness and condition of adjoining buildings

These information and those from method statement would be used to produce tender document.

- i. 11). If contractor is successful in obtaining the work planning can commence. The following are done at this stage:
 - ii. Preparation of outline programme with a view to converting them to working document which can be used for monitoring and control.
 - iii. Timing of activities is finalized
 - iv. Preparation of detail site layout and formalization of site organization structure.
 - v. Preparation of schedules like plant, labour, and health and safety.

13). This takes place during construction period

- i. Breaking of master programme into weekly, monthly and daily schedules.
- ii. Use of method statement to allocate task.
- iii. Monitoring and control activities.

15). The structure of Construction Industry: Manufacturing :

- i. Design and Construction Teams.
- ii. Composition of Construction Industry.
 - a. Material Production Sector: Steel production reinforcement for concrete works and building accessory,-----refractory, steel company, roofing sheet, galvanize steel, plumbing accessory, e.g Ajaokuta steel rolling mills, Federated steel mills, UTC e.t.c
 - b. Education Sector: Provides Professional qualification, University, College of Education, Polytechnic, Opportunity Industrialization Scheme, Technical education.
 - c. Facility Maintenance Sector: Facility management functions. Facility refers to structures in built environment like house, drainage, dam, high-rise building, road facilities, aerodrome.
 - d. Finance Sector: Commercial banks, Mortgage banks, Construction banks, Ecological Funds, Development bank.
 - e. Property Marketing Sector
 - i. Estate firms
 - ii. Facility marketer
 - iii. Insurance firms
 - iv. Property Free-lance Agent
 - f. Regulatory Sector: Standard organization of Nigeria
 - a. Building/Engineering Institutes e.g.

- b. Nigeria Institute of Building(NIOB),
- c. Council of Registered Builders of Nigeria(CORBON)
- d. Council for Regulation of Engineering in Nigeria(COREN),
- e. Nigerian Institute of Quantity Surveys (NIQS)
- f. Nigerian Institute of Electrical Engineers (NIEE)
- g. Nigerian Institute of Mechanical Engineer(NIME)
- h. Nigerian Institute of Estate Surveyors and Valuers (NIESV)etc

16). a. Outline Project Brief (Feasibility Stage).

- b. Strategy Stage.
- c. Pre-construction stage.
- d. Construction and Fitting-out Stage.
- e. Engineering Service Commission.
- f. Completion and Handover Stage.
- g. Client Commissioning and Occupation Stage.

Outline Project Brief (Feasibility Stage). This stage involve, project feasibility studies, detailed design brief, scheme design as well as fund and investment appraisal. There is seldom if ever a single route available for the achievement of the client's objectives, so the project manager's task is to establish the route which will best meet the Client's need within the constraint that are set. In liaison with the Client, the project manager will discuss the available option and initiate feasibility studies to determine the one to be adopted.

In order that the feasibility studies are effective, the information used should be as full and accurate as possible.

- b. Strategy Stage.
- c. Pre-construction stage.
- d. Construction and Fitting-out Stage.

18). Approval Procedures:

- i. Submission of Application letter containing the request
- ii. Content of the application:
 - ii. Site description,
 - iii. Scope of work
- i. Notices.
- ii. Demolition
- iii. Caveats: Site access restriction

- iv. Contravention notices: Contravention of building regulation e.g Building line, Setbacks e.t.c
- v. Notice of road closure
- vi. Repair of essential road facilities
- vii. Notice Emergency work e.g on occasion of disaster

19). Tendering methods

There are different tendering methods often used in construction project execution. It include the following:

- a. Open tendering method
- b. Selective tendering
- c. Serial Tendering
- d. Negotiated tendering
 - a. Open tendering method: Often used for public projects. This could be done through Newspaper, Television and Radio. The contract is open for all to bid. The most qualified contractor is often picked for the award of the contract.
- iii. Selective tendering: Contractors are often invited on merit and personal invitations. This could be as a result of reputation already built by the contractor.
 - b. Serial tendering: The method is often used for projects that are repetitive in nature.
 - c. Negotiated tendering: Price and basis of award is often on negotiation.

The contractor that can bargain well often secure the contract.

20). **Procurement options**

- i. Procurement can be explained as the combination of activities undertaken by a client in order to get a building constructed. The term is more directly defined as follows: Procurement refers to the choice of contractual arrangements available for selecting a contractor to construct a building.
- ii.Traditional** : The client appoints an Architect or other professional produce the design, then to select the contractor and supervise the works until completion. The contractor generally has no responsibility for design and is selected on a competitive basis.
- iv. **Design and build** : The client appoints a single organisation to carry out both the design and the construction under a single contract.
- v. **Management** : Because of the size and complexity of the project, the client appoints a management consultant to take over the managerial role of the construction project. The contractor works alongside the cost consultants, providing a construction management service. The managing contractor does not undertake either the design or direct construction work.