



# **THE NIGERIAN INSTITUTE OF BUILDING**

## **NATIONAL SECRETARIAT**

**ADPC CAPITAL ESTATE, OPP BRICK CITY BY MOPOL BARRACKS, KUBWA**  
**EXPRESSWAY, KABA DISTRICT, ABUJA**

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### **2019 DECEMBER GRADUATE EXAMINATION** **GE 401: CONSTRUCTION TECHNOLOGY**

#### **INSTRUCTION:**

**ATTEMPT ANY FOUR (4) QUESTIONS**

**TIME: 3 HOURS**

1. The main purpose of Modular Coordination is to achieve the dimensional compatibility between the building dimensions, span, spaces and/or size of components and equipment by using related modular dimensions. Discuss. (20mks)
2. (i) List and explain the functional classification of construction plants and equipment (15mks)  
(ii) State the factors that affect the choice of construction plants in a particular project (5mks)
3. Give a brief account on the construction of the following
  - (i) Sewer (5mks)
  - (ii) Drainage (5mks)
  - (iii) Services in building (5mks)
  - (iv) Tunnels (5mks)
4. Make a clear distinction between the following terms
  - (i) Flexible and rigid pavement (5mks)
  - (ii) Construction plants and equipment (5mks)
  - (iii) Dependent and independent scaffold (5mks)
  - (iv) Dimensional and modular coordination in building (5mks)

5. With diagrams, briefly describe the following temporary works in building
- (i) Scaffold (5mks)
  - (ii) Formwork (5mks)
  - (iii) Shoring (5mks)
  - (iv) Timbering (5mks)
6. (i) List the structural systems in building construction and explain any two of them (10mks)
- (ii) Enumerate the various forms of high rise and explain one of them (10mks)



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## 2019 DECEMBER GRADUATE EXAMINATION GE 402: STRUCTURAL THEORY AND DESIGN 1

TIME: 3 HOURS

### INSTRUCTIONS:

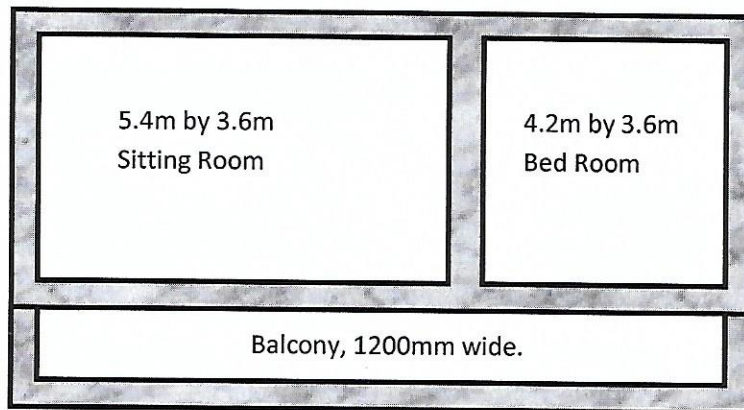
ANSWER **QUESTION 1** AND ANY OTHER THREE (3) QUESTIONS. IN ALL THE QUESTIONS STATE CLEARLY THE CODES OF PRACTICE BEING REFERRED TO.

### QUESTION 1.

Design the residential room and parlour shown in Figure 1 below and detail it stating clearly the code of practice used. Take  $f_{cu}$  as  $25\text{N/mm}^2$  and  $f_y$  as  $410\text{N/mm}^2$ .

Detail your design.

(40marks).



**Note:** Take the walls as load bearing walls and 225mm thick.

### QUESTION 2.

- What do you understand by quality control for a freshly mixed concrete?
- Describe in details slump test for a freshly mixed concrete.

(20marks).

**QUESTION 3.**

- a. Describe the two types of buildings – structurally.
- b. Write in reasonable details the following loading types and state the partial factor of safety applicable for each:
  - i. Dead loads;
  - ii. Live loads;
  - iii. Superimposed live loads and
  - iv. Wind loads.

(20marks).

**QUESTION 4.**

- a. Describe the three column types in terms of load and moment carrying capacity.
- b. Differentiate between short and long columns stating clearly the Code of Practice or Standard used.

(20marks).

**QUESTION 5.**

Design a simply supported beam 5.5m span and carrying an ultimate load of 45kN/m. Design to  $f_{cu} = 25\text{N/mm}^2$  and  $f_y = 410\text{N/mm}^2$ . Detail the design assuming 600 by 225mm rectangular cross-section.

(20marks).



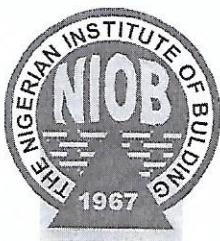
**Table 1:** Areas for bar spacing - slab, foundation, walls, stair etc.

Bar Size (mm)	Spacing of bar in mm								
	100	125	150	175	200	225	250	275	300
8	503	402	335	287	252	223	201	182	168
10	785	628	523	449	393	349	314	285	262
12	1130	905	754	646	566	502	452	411	377
16	2010	1610	1340	1150	1010	893	804	731	670
20	3140	2510	2090	1800	1570	1396	1260	1142	1050
25	4910	3930	3270	2810	2450	2181	1960	1784	1640
32	N R	6430	5360	4600	4020	3574	3220	2924	2680
40	N R	N R	8380	7180	6280	5585	5030	4569	4190

**Note:** Intermediate values can be pro-rated. **N.R** means Spacing not recommended

**Table 2:** Areas for specific bar groups – beams, columns etc.

Bar size (mm)	Numbers of bars									
	1	2	3	4	5	6	7	8	9	10
8	50	101	151	201	252	302	352	402	453	503
10	78	157	236	314	393	471	550	628	707	785
12	113	226	339	452	566	679	792	905	1020	1130
16	201	402	603	804	1010	1210	1410	1610	1810	2010
20	314	628	943	1260	1570	1890	2200	2510	2830	3140
25	491	982	1470	1960	2450	2950	3440	3930	4420	4910
32	804	1610	2410	3220	4020	4830	5630	6430	7240	8040
40	1260	2570	3770	5080	6280	7540	8800	10100	11300	12600



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**DECEMBER, 2019 PROFESSIONAL GRADUATE EXAMINATION**  
**GE 404: BUILDING MAINTENANCE MANAGEMENT II**

**INSTRUCTION: Answer question four (4) and any other three.**

**TIME: 2 HOURS**

**QUESTION ONE**

**25 marks**

- a. The objectives of maintenance are to ensure that building and its services can perform its design functions for the desired period of time with a high degree of reliability. List the main objectives of maintenance of buildings. 7 mark
- b. Explain the various factors which influence the decision to carry out maintenance 12 marks
- c. Define the following terms in the life of a building: 6 marks
  - i. Physical life
  - ii. Functional life
  - iii. Economic life

**QUESTION TWO**

**25 marks**

- a. List sequence of detailed steps for diagnosing building defects / problems. 15 marks
- b. Two of the numerous factors that could initiate the process of deterioration in buildings and its elements are Faulty materials and inappropriate cleaning. Explain each of these factors, giving at least five sub factors of each. 10 marks

**QUESTION THREE**

**25 Marks**

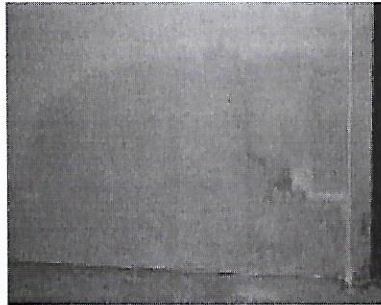
The set of pictures below shows some common building defects. Premised on your knowledge of defects in buildings, you are required to:

- a) Identify each of the defects 5 marks
- b) Explain the probable cause(s) of each of the defects 5 marks
- c) Discuss the appropriate remedies for each of the defects 10 marks
- d) Enumerate the environmental factors that can cause deterioration in buildings 5 marks

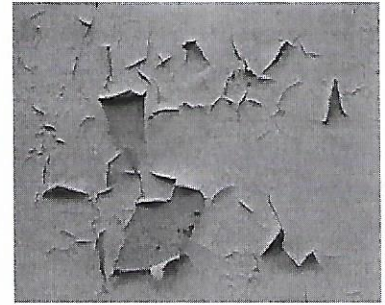




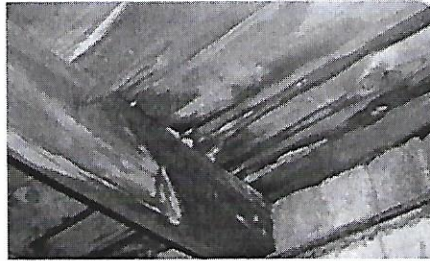
Defect A



Defect B



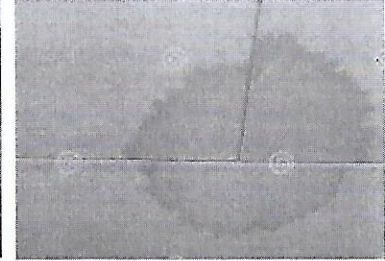
Defect C



Defect D



Defect E



Defect F

#### QUESTION FOUR

**25 Marks**

- A. Figure 1 shows three defective buildings labelled; A, B and C. Based on your knowledge of building maintenance,
- Explain the type of defects in each of the buildings, 5 marks
  - Enumerate the probable cause(s) of the defects in each of the buildings 5 marks
  - Explain in a comprehensive manner, the remedial measure options for buildings A and B 5 marks
  - Suggest the most appropriate remedy for each of the defects in building C, stating the correct sequence by which the remedy should be carried out. 10 marks

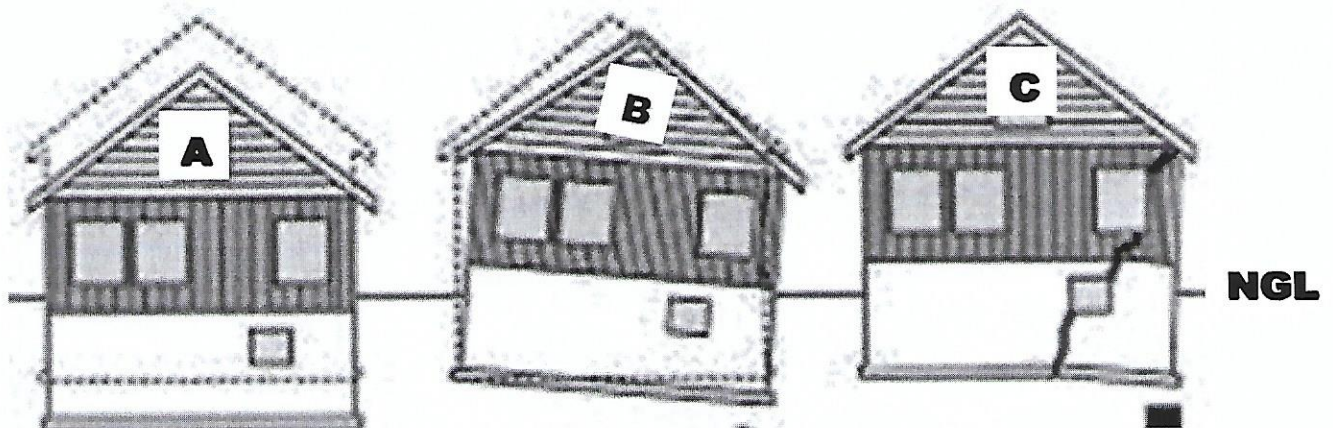


Fig. 1: Defective buildings

**QUESTION FIVE****25 Marks**

Each of the elements in a building are prone to defects. From your knowledge of building maintenance, explain;

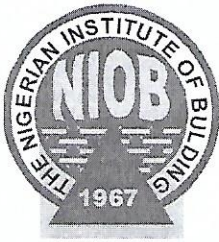
- a) Common defects in foundation of buildings 5 marks
- b) Probable causes of defects in building foundation 5 marks
- c) Appropriate remedy for a defective building foundation and support with detailed diagram 10 marks
- d) Describe with the aid of diagram the required support when carrying out repair work in building foundation. 5 marks

**QUESTION SIX****25 Marks**

The rate of defects in buildings can be accelerated or retarded, depending on some essential considerations ranging from building design through building operations and maintenance. Explain, in relation to defects in buildings:

- a. Faulty design 5 marks
- b. Faulty construction 5 marks
- c. Faulty materials 5 marks
- d. Inappropriate cleaning 5 marks
- e. Misuse of building 5 marks





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**DECEMBER, 2019 PROFESSIONAL GRADUATE EXAMINATION**  
**GE 405: COMPUTER APPLICATION IN BUILDING**

**INSTRUCTION:**

**TIME: 3 HOURS**

**ANSWER ANY FIVE (5) QUESTIONS**

**QUESTION 1**

Technology has made it possible for construction sites to be easily located, construction activities managed remotely and production process hastened. Discuss how ICT evolution has played a major role in this.

**QUESTION 2**

The work of a Builder is wide and varied. To perform optimally in this 21st century, a Builder requires the practical working knowledge of some basic software for word processing, presentation, AEC drawing and project planning. Briefly highlight those relevant applications.

**QUESTION 3**

In 1998, the Construction Task Force in the UK published a report on **Rethinking Construction** which is generally referred to as Egan report. Part of the report highlighted information loss and fragmentation of the construction industry as one of the major factors affecting the optimal performance of the construction industry. As a critical stakeholder, discuss how ICT has been used to solve the challenge.

**QUESTION 4**

In a fast paced world especially on the need for quick completion of buildings to reduce housing deficit, what potentials do automation of the construction process presents to us as professionals?

**QUESTION 5**

What does Building Information Modeling entail?

### **QUESTION 6**

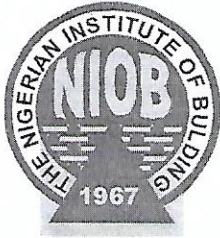
Builders' Practice Software was developed to prepare PQMP, PHSP, and BAMAR. What is PQMP, PHSP and BAMAR.

- (a) Define Project Quality
- (b) How do you ensure Project Quality Assurance as enshrined in the template?
- (c) Identify the colour codes and their meanings in PQMP Template?

### **QUESTION 7**

In Project Health and safety Plan template identify the important features of emergency response plan?

- (a) Who is qualified to be appointed as Safety Coordinator?
- (b) Where are the two locations of the first aid boxes on site?
- (c) Who are those that constitute accident investigation committee on site?



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**DECEMBER, 2019 PROFESSIONAL GRADUATE EXAMINATION**  
**GE 406: ENTREPRENEURSHIP DEVELOPMENT**

**INSTRUCTIONS:**

**TIME: 2HOURS**

Answer any four (4) questions. All questions carry equal marks.

- 1(a) List any ten (10) agencies in Nigeria that can support a builder to go into business. (15 marks)
- (b) Discuss the role of SMEDAN in the formation of SMEs in Nigeria. (10 marks)
- 2(a) What are the benefits a builder stands to enjoy through self – employment? (15 marks)
- (b) What are the demerits of being in paid wage employment? (10 marks)
- 3(a) Define entrepreneurship. (5 marks)
- (b) State the five (5) emerging technological advancements that a builder as an entrepreneur must pay attention to. (10 marks)
- (c) State the five (5) steps to owning an enterprise. (10 marks)
- 4(a) As a builder you are expected to write a business plan for the enterprise you want to start, state the major headings that your business will consist of. (15 marks)
- (b) Enumerate the things that will ensure the success of the above business. (10 marks)
- 5(a) What are the two (2) sources of business financing? (5 marks)
- (b) Discuss the factors lending institutions will consider before granting your loan application. (20 marks)
6. Write short notes/Define the following: (25 marks)
  - (i) SWOT
  - (ii) SMART
  - (iii) Enterprise
  - (iv) Entrepreneurship
  - (v) Entrepreneurship Education
  - (vi) Market Opportunity.