OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE

HARMATTAN SEMESTER EXAMINATION 2011/2012 SESSION

FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

JULY 2011

BLD 311: - STRUCTURAL ANALYSIS AND DESIGN I

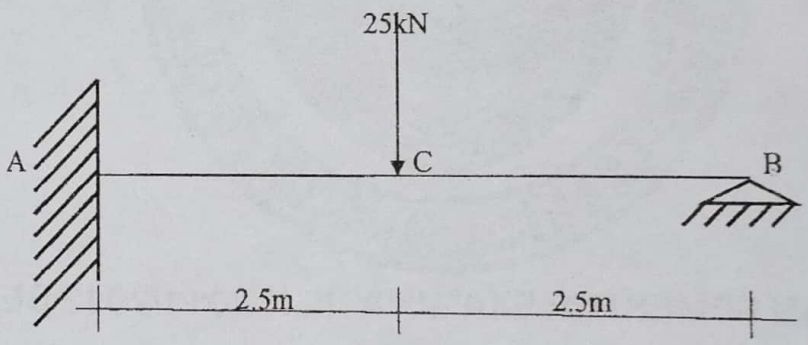
INSTRUCTIONS **TIME ALLOWED: 3Hours**

Answer **ONE** question from **EACH SECTION**.

SECTION A

Question One

A propped cantilever beam of length 5m and cross-section 200mm x 400mm is loaded as shown in the figure below. Use the conjugate beam method to determine the magnitude of load on the prop at end B. Hence, sketch neatly; the shearing force and bending moment diagrams of the beam, marking thereon salient values. Take E = $2x10^4 N/mm^2$.



Question Two

A horizontal girder AB is 9m long and is simply supported at its ends. It carries concentrated loads of 100kN and 80kN at two points 2m and 3m from the two ends respectively. By using the conjugate beam method, determine the support rotations and mid-span deflection of the beam. Take E = 200GPa and I = $15x10^4 cm^4$.

SECTION B

Question Three

A horizontal beam AB is freely supported at A and B, 8m apart and carries a uniformly distributed load of 20kN/m run (including its own weight). A clockwise moment of 180kNm is applied to the beam at a point C, 3m from support A. Calculate by using the Macaulay's method the slope and deflection of the beam at C if EI = $15x10^4 kNm^2$.

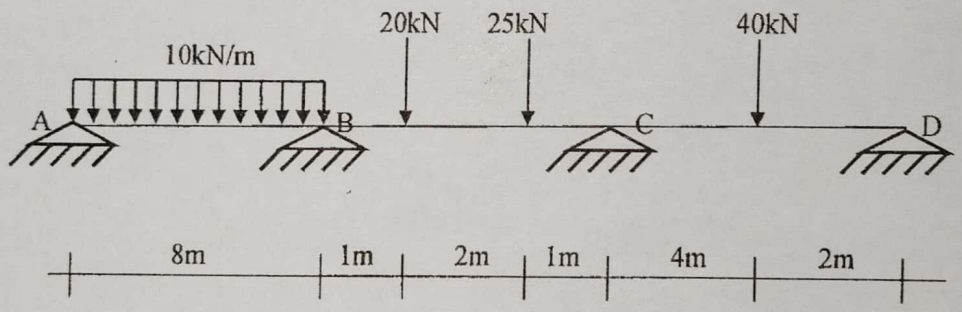
Question Four

A simply supported horizontal beam AB of cross section 200x400mm is 4m long. It carries two concentrated loads of 10kN and 20kN at two points 1m and 2m from the two ends (A and B) respectively. By using the Macaulay's method; find (i) slope at the supports A and B (ii) deflection under the point loads and (iii) location and magnitude of maximum deflection. Take $E = 2x10^4 N/mm^2$

SECTION C

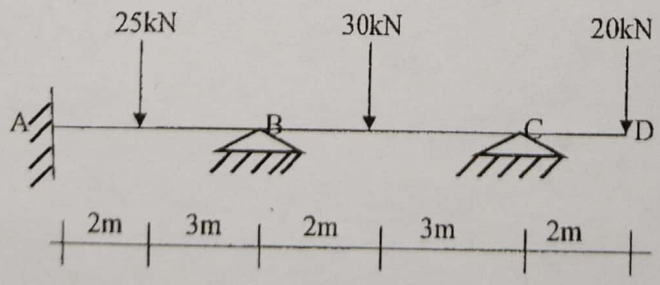
Question Five

The three-span continuous beam shown below has a constant flexural rigidity. Use the Clapeyron's equation to determine the support reactions for the beam.



Question Six

The beam shown below has a constant flexural rigidity. Use the three-moment equation to determine the support reactions for the beam. Hence; draw its shear force and bending moment diagrams.



OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING
HARMATTAN SEMESTER EXAMINATION 2021/2022 SESSION

BLD 307: BUILDING SERVICES AND EQUIPMENT I
B.Sc. Building, Estate Management and Quantity Surveying
December 2022/January 2023

INSTRUCTIONS: Answer and Two Questions in PART A; and
Answer any Two Questions in PART B

TIME ALLOWED: 3 HOURS

PART A

Question One

(a) Reproduce and explain what the figure below means to you? Identify the various components labeled (A–H).

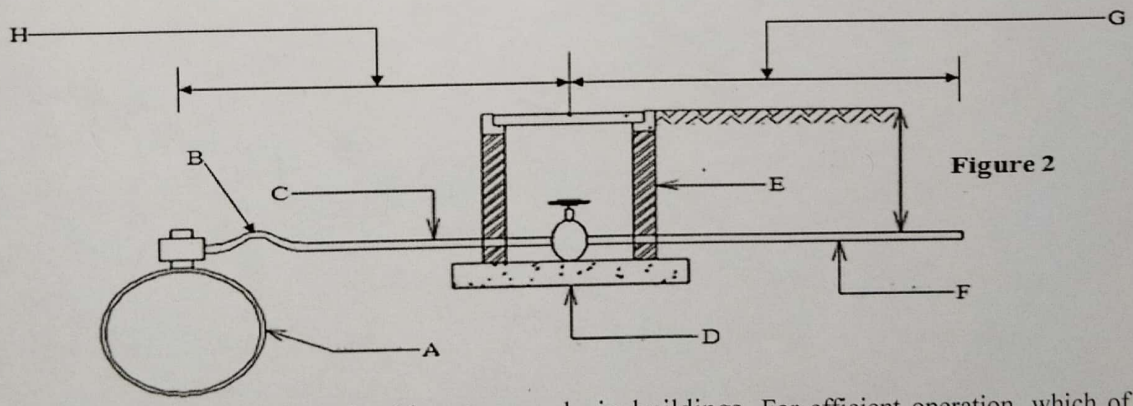


Figure 2

(b) Discuss the methods of cold water supply in buildings. For efficient operation, which of the methods would you consider appropriate for these buildings and why?

(c) Write short note on the following:

(i) Communication pipe (ii) Service pipe (iii) Rising main (iv) Distribution pipe (v) Warning pipe. In each case state the size required.

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT

DEPARTMENT OF BUILDING

HARMATTAN SEMESTER EXAMINATION 2021/2022 SESSION

B.Sc. Building

January 2023

BLD 301: BUILDING CONSTRUCTION AND MATERIALS III

INSTRUCTIONS

- Answer all questions in section A and three (3) questions in section B
- Time allowed: 2 Hours

SECTION A (Answer all questions 20 × 1.5=30marks)

1. A type of plastic that losses rigidity whenever heated and can be moulded repeatedly is called.....
2. One (1) of the purpose of seasoning of timber is.....
3. The chief ingredient of paint is....
4. A type of plastic that undergo a definite change during the moulding process and thus become permanently rigid is called....
5. The liquid medium used in oil paints is ...
6. The base in paint is added to.....
7. The cementing property in cement is mainly due to.....
8. The process of breaking clay lumps and kneading in water to a homogeneous mix is called .....
9. For reinforced concrete construction, the maximum size of coarse aggregate is .....
10. Compaction of fresh concrete can be achieved on site using ..... machine
11. Three (3) areas in building where Polyvinyl chloride (PVC) can be used are ...
12. The rocks formed due to solidification of molten mass laying below or above the earth surface are called.....
13. Granite is an example of ..... rock
14. The densest metal in common use is .....

15. The sedimentary rocks are formed due to....
16. The cementing property in cement is mainly due to .....
17. Marble is an example of..... rock
18. The slump test of concrete is used to measure it's.....
19. Three common standard sizes of standard sandcrete blocks are .....
20. The lightest metal in common use is .....

SECTION B (Answer three questions (30×3=90 marks)

1a. In a tabular format, list the Bogue compounds produced and their chemical compositions during the production of cement and state the percentage of Ordinary Portland Cement in each.

1b. List three (3) building components where metals are used for structural purposes.

1c. Produce typical sectional sketches of a mono and a double pitch roof construction.

2a. Produce in a tabular format four (4) standard timber sizes, names and their unique roles in timber roof trusses.

2b. List four (4) names of commonly used hardwoods in the market.

2c. Produce sectional details of a load and non load bearing walls.

3a. With the aid of sketches, describe two (2) methods of reducing these logs to smaller units.

3b. List two (2) fungi that attack the cellulose tissues of timber.

3c. List two (2) desirable properties of the materials used in timber preservation.

3d. Produce a typical sketch of a waffle floor soffit.

4a. Discuss briefly two (2) common defects in paints.

4b. What is the major difference between thermosetting and thermoplastics.

4c. Describe briefly the production process and two (2) uses of Polystyrene in building.

4d. Produce typical sectional sketches of a pad and beam and slab foundation.

5a. Discuss briefly (use examples to buttress your points) the following features of sustainable building materials: **Biodegradability and recyclability.**

5b. List two (2) building components where metals are used for non structural purposes.

5c. List two (2) building components where metals are used for mechanical services.

5d. Produce typical sketch of a corner profile board use in setting out building purposes.

DEPARTMENT OF BUILDING
OBAFEMI AWOLOWO UNIVERSITY ILE-IFE
BLD 301 – BUILDING CONSTRUCTION AND MATERIALS III
HARMATTAN SEMESTER EXAMINATION, 2018/2019 SESSION
Instruction: Answer question 1 and three (3) other questions

Time allowed: 2 Hours

TYPE C

SECTION A (To be answered in OMR sheets)

1. The cementing property in cement is mainly due to..... (a) lime (b) silica (c) iron oxide (d) alumina
2. Which of the following statement is correct....? (a) The sand used for making mortar should be fine (b) The rounded grains of sand produce a strong mortar (c) The mortar made with coarse sand is stronger than the one made with fine sand (d) all of the above
3. For reinforced concrete construction, the maximum size of coarse aggregate is limited to (a) 10mm (b) 15mm (c) 20mm (d) 25mm
4. Consolidation of concrete should proceed.... (a) before mixing (b) before placing (c) immediately after mixing (d) immediately after placing
5. The workability of concrete can be improved by..... (a) increasing the quantity of cement (b) increasing the proportion of coarse aggregate (c) increasing the quantity of sand (d) all of the above
6. The maximum water – cement ratio for durable concrete is ... (a) 0.2 (b)0.4 (c) 0.6 (d) 0.8
7. The slump test of concrete is used to measure it's..... (a) consistency (b) tensile and compressive strength (c) impact value (d) homogeneity
8. The process of mixing clay, water and other ingredients to make bricks, is known as (a) tempering (b) pugging (c) kneading (d) moulding
9. The rocks formed due to solidification of molten mass lying below or above the earth surface are called..... (a) aqueous rocks (b) sedimentary rocks (c) metamorphic rocks (d) igneous rocks
10. Granite is an example of (a) aqueous rocks (b) sedimentary rocks (c) metamorphic rocks (d) igneous rocks
11. Igneous rock has ..... (a) crystalline, glossy or fused texture (b) foliated structure which is hard and durable (c) layers of different composition, colour and structure (d) none of the above
12. The sedimentary rocks are formed due to .... (a)solidification of molten mass lying below or above the earth surface (b) gradual deposition of materials like sand, clay, etc., generally by setting water (c) alteration of original structure under heat and excessive pressure (d) none of the above
13. Marble is an example of .... (a) aqueous rock (b) metamorphic rock (c) sedimentary rock (d) igneous rock
14. In the production of cement, silica and alumina are derived from all, except (a) chalk (b) clay (c) shale (d) bauxite
15. In the production of cement, raw materials are homogenized by the following process except (a) crushing (b) grinding (c) bleeding (d) slurring
16. Deciduous trees are (a) hardwood (b) furniture wood (c) softwood (d) plywood
17. The natural cementing and rigidifying material in timber is (a) fibre (b) lignin (c) bark (d) cellulose

18. ..... is a carbohydrate of high molecular weight found in timber (a) extractives (b) lignin (c) balsam fir (d) cellulose
19. ..... is the point when water is driven off the cell cavities of timber until the cavities contain only air and the cell walls are saturated with water (a) relative humidity (b) fibre saturation (c) water saturation point (d) equilibrium moisture content
20. The workability of fresh concrete is expressed through the following (a) consistency (b) mobility (c) compactibility (d) all of the above
21. The chief ingredient of paint is.... (a) thinner (b) drier (c) oil (d) pigment
22. The pigment in paints is mixed to give desired.... (a) smoothness (b) colour (c) appearance (d) durability
23. The purpose of seasoning of timber is to..... (a) change the direction of grains (b) remove voids (c) reduce moisture content (d) all of these
24. The knowledge of iron smelting became common around..... (a) 1200BC (b) 750 BC (c) 500 BC (d) 1500BC
25. The basic constituent of steel is? (a) oxide (b) iron (c) lead (d) copper
26. The liquid medium used in oil paints is ... (a) thinner (b) alcohol (c) linseed oil (d) turpentine
27. The base in paint is added to..... (a) improve the quality of paint (b) make smooth surface (c) hide the surface to be painted (d) all of these
28. The best primer used for structural steel work is..... (a) white lead (b) red lead (c) zinc oxide (d) iron oxide
29. The dry process of mixing is usually employed in the manufacture of Portland cement when the raw material is..... (a) blast furnace slag (b) chalk (c) clay (d) all of these
30. Gypsum is added in the manufacture of Portland cement.... (a) while mixing the raw materials (b) during burning in the rotary kiln (c) at the beginning of grinding the clinker (d) at the end of grinding the clinker into powder
31. The clinker is formed at a temperature of..... (a) 500°C (b) 1000°C (c) 1200°C (d) 1500°C
32. The main constituent of a Portland cement is .... (a) lime (b) alumina (c) iron oxide (d) alkalies
33. The silica content in Portland cement should be ... (a) 10 to 20% (b) 20 to 25% (c) 25 to 40% (d)40 to 60%
34. The amount of gypsum, usually, added in the manufacture of Portland cement is (a) 0.1 to 0.5% (b) 0.5 to 1% (c) 1 to 3% (d) 3 to 5%
35. ..... has high compressive strength and low tensile strength..... (a) cast iron (b) wrought iron (c) steel (d) none of the above
36. ..... has good resistance to corrosion (a) wrought iron (b) cast iron (c) steel (d) none of the above
37. Next to aluminium ..... is the most abundant metallic material in the earth's crust (a) gold (b) copper (c) iron (d) manganese
38. An important iron bearing mineral or iron ore is? (a) limonite (b) hematite (c) magnetite (d) all of the above
39. The first steel rails were produced commercially in (a) Pennsylvania (b) New York (c) England (d) New Delhi
40. The central part of a tree is called..... (a) heart wood (b) pith (c) sap wood (d)cambium layer

BLD 301, 2018/2019 HARMATTAN SEMESTER

SECTION B **(Answer any three questions)**

QUESTION 1a

Produce neat sketches of the following types of slump (a) Normal (b) Shear (c) near zero (d) collapse 10 points

1b. Produce four neat sketches to show steps toward achieving a slump test 10 points

1c. Produce neat and detailed sketches of the plan and section of an independent column footing 10 points

QUESTION 2a

Produce a detail section through a tree trunk. 8 points

2b. Discuss the functions of any of the five (5) parts of a tree identified in 2a 10 points

2c. Sketch neatly the following timber defects (a) knot (b) shake (c) check 6 points

2d. Sketch neatly typical foundation plan and section of a beam and slab raft foundation. 6 points

QUESTION 3a

Discuss diagrammatically only the production of steel 10 points

3b. Describe the term 'forging' as it applies to metal 5 points

3c.Describe briefly, the manufacture of wrought iron. 5 points

3d. Illustrate using schematic diagram the wet process of cement manufacture. 10 points

QUESTION 4a

Discuss (using a table only) Portland cement types and uses 10 points

4b. Discuss (using a table only), the principal compounds of cement, their chemical formula, industry code abbreviation, percentage amount (range) and rate of reaction with water 10 points

4c.In a tabular format, illustrate the behavior of timber subjected to shear and bending moments. 10 points

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

Harmattan Semester Examination 2018/2019 Session
B.Sc. Building, Estate Management and Quantity Surveying
BLD 307: Building Services and Equipment I
August 2019. Time allowed: 2 hours 30 minutes
Instructions: (i) Answer ANY three questions
(ii) Illustrate your answers with appropriate diagrams where necessary

Question One

(a) Discuss the need(s) for the incorporation of means of access in the design of a drainage system.
(b) Analyse the various ways by which means of access can be provided on a drainage system.
(c) Why must a drainage system be properly vented? What does a properly vented drainage system prevent?
(d) What is a soil stack and waste pipe? What kinds of waste are carried by a waste pipe and soil stack? Mention a typical size for a waste pipe and soil stack. **(20 marks)**

Question Two

(a) Explain the reason(s) for the incorporation of traps and water seal in sanitary appliances. List and sketch at least four of such traps.
(b) Research has shown that water seal in a trap can be lost due to various mechanisms. With the aid of good sketches explain at least four mechanisms that can unseal water in a trap and what can be done to prevent this phenomenon.
(c) If the main pressure on the street is not sufficient to supply water to high rise building, discuss at two typical means to boost the pressure. **(20 marks)**

Question Three

In view of the population explosion in Obafemi Awolowo University and low water table at Opa dam the main source of water, it has been decided to augment the present water supply with underground water. If you are the consultant in charge of this project, using appropriate equation and diagrams where necessary;
(a) Explain the procedures to be followed in order to ensure adequate water supply.
(b) If dug-well with mechanical pump installation is part of your recommendations, provide a detailed sketch of the well showing the foot valve, the suction line, delivery line, the pump etc. Which one suction line or delivery line should be given more attention during the installation?
(c) Discuss the merits and limitation of direct and indirect cold water supply systems. **(20 marks)**

Question Four

Explain the installation procedures for the following sanitary appliances:
(i) Water closet (ii) Sink (iii) Bath (iv) Basin (v) Urinal Bowls.
(b) The installation of cold water pipelines is to be carried out at a building project located at Modomo area of Ile-Ife. The client has the option of choosing from the following pipes: copper, galvanized steel, lead and PVC. As a service engineer in charge of the project, and based on the known merits and demerits of these pipe materials, advice your client on the choice of a suitable pipe material for the installation. Justify your final choice. **(20 marks)**

Question Five

(a) What purpose does each of the listed control mechanisms serves in a cold water supply system? Illustrate your answers with good sketches where necessary
(i) Elbow (ii) Tee (iii) Pressure relief valve (iv) Check valve (v) Stop valve.
(b) What is the purpose of fitting in pipe systems? List at least two fittings that are used for making/achieving the following:
(i) Connect straight sections of pipe or tube
(ii) Change the direction of pipeline
(iii) Enlarge/reduce pipe size
(iv) Elongate pipeline.
(v) Adapt to different sizes or shapes **(20 marks)**

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE

HARMATTAN SEMESTER EXAMINATION 2017/2018 SESSION

FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT

DEPARTMENT OF BUILDING

B.Sc. Building

AUGUST 2018

BLD 301: BUILDING CONSTRUCTION AND MATERIALS III

INSTRUCTIONS

TIME ALLOWED: $2\frac{1}{2}$ Hours

Answer all questions in SECTION A and two questions in SECTION B

SECTION A **(Answer all questions)**

1. Describe using a detail sketch the process taking place in a cement kiln during the wet manufacturing process. (8 points)
2. List the four major compounds (including their industrial code abbreviations) of Portland cement. (4 points)
3. List any ten (10) common raw materials and compounds used in the manufacture of Portland cement (10 points)
4. In a tabular format, state the uses and standard chemical requirements of the following Portland cement types: I and IA, II and IIA, III and IIIA, IV and V. (10 points)
5. Express the following properties of an aggregate in mathematical terms: (i)specific gravity, (ii) moisture content, (iii) absorption, (iv) surface moisture, (v) bulk specific gravity, (vi) apparent specific gravity, (vii) porosity and (viii) void content) ..... (16 points)
6. Explain (including the unit of measurement) the following terms in relation to the properties of an aggregate: (i) modulus of elasticity, (ii) gradation, (iii) finess modulus, (iv) abrasion resistance, (v) toughness (10 points)
7. Discuss briefly the following properties of fresh concrete: (i) consistency, (ii) segregation, (iii) workability, (iv) bleeding, (v) mixing. (10 points)
8. Describe with sketches two methods of measuring slump (10 points)

9. Sketch neatly the following slump types: (i) near zero, (ii) normal, (iii) shear, (iv) collapse. (6 points)
10. Discuss briefly the following properties of hardened concrete: (i) compressive strength, (ii) tensile strength, (iii)durability, (iv) alkali – aggregate reaction (8 points)
11. Using the data below, determine the moisture content, absorption and free moisture in a sample of fine aggregate if 50kg of the sample is used in the mix design of a concrete. What is the amount of water contributed to the mix by the fine aggregate?

    initial sample weight = 0.8006kg; saturated surface dry weight = 0.7603kg; oven dry weight = 0.7074kg ..... (20 points)

12. Find the volume of voids in a $6m^3$ coarse aggregate, if the bulk density = 1650kg/m^3, the specific gravity = 2.65 and the density of water = 1000kg/m^3 (6 points)

SECTION B **(Answer two (2) questions only)**

13. Discuss briefly three (3) types of bitumen (9 points); list five (5) common defects of bitumen (5 points); produce a sectional detail of a flat roof (6 points)
14. In a tabular format, list two (2) common defects of timber under the following headings; physical, design and biological (6 points); sketch the following timber sawing methods; veneer, rift and tangential (6 points); produce a plan and sectional sketches of a suspended hollow clay pot slab (8 points)
15. Discuss briefly the production methods of cast iron, steel and wrought iron (12 points); produce two sectional details to differentiate between a solid and a beam and slab raft foundations (8 points)

OBAFEMI AWOLOWO UNIVERSITY
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

HARMATTAN SEMESTER EXAMINATION 2017/2018 SESSION

BLD 305 - BUILDING MAINTENANCE II

ANSWER **QUESTION 1** and **THREE** OTHERS TIME: **2HRS**

1. A dilapidated timber framed structure in Sabo is to be refurbished and converted to a shopping complex. Illustrate with neat sketches any TEN types of joints that may be used along the timber bearers, trusses, studs, cladding, joists, doors, windows, and floor boards. **[15 Mks]**

2. Write short notes on **three** of the following terms in relation to building deterioration and maintenance:
   a) Moss Funaria
   b) Electrolytic action
   c) Crypto-florescence
   d) Snecking
   e) Ettringite **[15 Mks]**

3. A 6m long Sandcrete block wall 225mm thick and 3m high separates two adjacent buildings that are 10m apart. The wall runs 1m below the ground level and has a density of 2400kg/m^3. The footing is estimated to weigh 2500kg/m^3. With the aid of a neat and detailed sketch, show ONLY the elevation of the wall incorporating the ideal timber needle sections that could temporarily support the wall if underpinning operations were contemplated. The needles should be assumed at 1500mm centres with a permissible flexural stress of 5N/mm^2. ***Do not show the props.*** **[15 Mks]**

4. Produce a neat sketch that illustrates the technical details of a Raking shore. **[15 Mks]**

5. List in tabular format, any TEN common defects in OAU students' hostels and the corresponding appropriate remedial measures. **[15 Mks]**

6. Determine the ideal sizes for props that should temporarily support one of the 1500mm timber needles carrying a load of 10000N. The left prop is to be 500mm from the load and the right prop 1000mm. The allowable compressive stress [C_p] is 1.5N/mm^2. **[15 Mks]**

END

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE

HARMATTAN SEMESTER EXAMINATION 2017/2018 SESSION

FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT

DEPARTMENT OF BUILDING

B.Sc. Building

AUGUST 2018

BLD 301: BUILDING CONSTRUCTION AND MATERIALS III

INSTRUCTIONS

TIME ALLOWED: $2\frac{1}{2}$ Hours

Answer all questions in SECTION A and two questions in SECTION B

SECTION A **(Answer all questions)**

1. Describe using a detail sketch the process taking place in a cement kiln during the wet manufacturing process. (8 points)
2. List the four major compounds (including their industrial code abbreviations) of Portland cement. (4 points)
3. List any ten (10) common raw materials and compounds used in the manufacture of Portland cement (10 points)
4. In a tabular format, state the uses and standard chemical requirements of the following Portland cement types: I and IA, II and IIA, III and IIIA, IV and V. (10 points)
5. Express the following properties of an aggregate in mathematical terms: (i)specific gravity, (ii) moisture content, (iii) absorption, (iv) surface moisture, (v) bulk specific gravity, (vi) apparent specific gravity, (vii) porosity and (viii) void content) ..... (16 points)
6. Explain (including the unit of measurement) the following terms in relation to the properties of an aggregate: (i) modulus of elasticity, (ii) gradation, (iii) finess modulus, (iv) abrasion resistance, (v) toughness (10 points)
7. Discuss briefly the following properties of fresh concrete: (i) consistency, (ii) segregation, (iii) workability, (iv) bleeding, (v) mixing. (10 points)
8. Describe with sketches two methods of measuring slump (10 points)

9. Sketch neatly the following slump types: (i) near zero, (ii) normal, (iii) shear, (iv) collapse. (6 points)
10. Discuss briefly the following properties of hardened concrete: (i) compressive strength, (ii) tensile strength, (iii)durability, (iv) alkali – aggregate reaction (8 points)
11. Using the data below, determine the moisture content, absorption and free moisture in a sample of fine aggregate if 50kg of the sample is used in the mix design of a concrete. What is the amount of water contributed to the mix by the fine aggregate?

    initial sample weight = 0.8006kg; saturated surface dry weight = 0.7603kg; oven dry weight = 0.7074kg ..... (20 points)

12. Find the volume of voids in a $6m^3$coarse aggregate, if the bulk density = 1650kg/m^3, the specific gravity = 2.65 and the density of water = 1000kg/m^3 (6 points)

SECTION B **(Answer two (2) questions only)**

13. Discuss briefly three (3) types of bitumen (9 points); list five (5) common defects of bitumen (5 points); produce a sectional detail of a flat roof (6 points)
14. In a tabular format, list two (2) common defects of timber under the following headings; physical, design and biological (6 points); sketch the following timber sawing methods; veneer, rift and tangential (6 points); produce a plan and sectional sketches of a suspended hollow clay pot slab (8 points)
15. Discuss briefly the production methods of cast iron, steel and wrought iron (12 points); produce two sectional details to differentiate between a solid and a beam and slab raft foundations (8 points)

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE

FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

Rain Semester Examination — January, 2019
Session: 2017/2018
B.Sc. Building
BLD 310: Design of Concrete Structures 1 — **TIME ALLOWED: 3 Hrs**

INSTRUCTION: Answer Three Questions only, but Questions 1 and 2 are Compulsory

Question 1

Design the slab at 1-2/A-E using the following details: the overall slab depth is 175 mm; floor and ceiling loads is 1.5KN/m^2; f_{cu} = 25N/mm^2; f_y = 250N/mm^2. Take the service stress to be 167N/mm^2 and EI as constant. Use the moment distribution method to analyse the slab.

Question 2

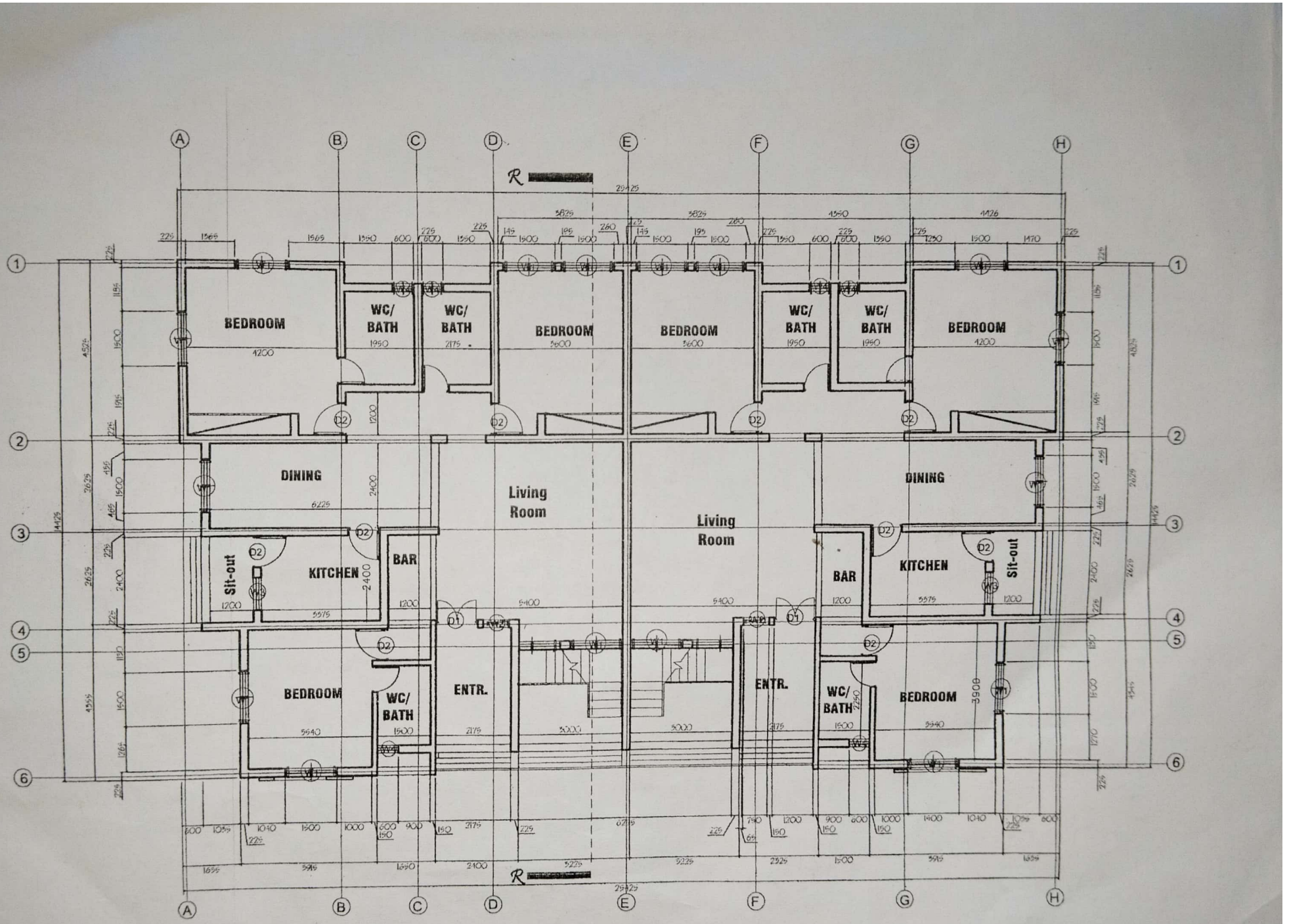
Use the moment distribution method to analyse and design the beam @ 2/A-E. The beam dimensions are: b = 230 mm, overall depth = 450 mm. Take f_y = 250 N/mm^2, f_{yv} = 250 N/mm^2 and f_{cu} = 25 N/mm^2. Use the maximum support moment, span moment and maximum shear force for your design.

Question 3

A four span slab of 2.2 m each supports a live load of 2.5 kN/m^2. The slab is finished with 40mm sand/cement screed. The overall slab depth is 200 mm, take f_{cu} = 25N/mm^2, f_y = 250 N/mm^2 and service stress of 167 N/mm^2. Design the slab.

Question 4

A rectangular reinforced beam has a shear force of 265kN. The beam is 0.25m wide and 0.55m deep and it is reinforced by 4-25 diameter bars at an effective depth of 0.5m. Assuming the concrete grade is 30, determine the appropriate shear reinforcement for the beam. Take f_{yv}=250N/mm^2


BEDROOM
WC/ BATH
WC/ BATH
BEDROOM
BEDROOM
WC/ BATH
WC/ BATH
BEDROOM
DINING
Living Room
Living Room
DINING
Sit-out
KITCHEN
BAR
BAR
KITCHEN
Sit-out
BEDROOM
WC/ BATH
ENTR.
ENTR.
WC/ BATH
BEDROOM

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA.
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

BLD 304: Construction Technology II — RAIN SEMESTER 2013/2014 EXAMINATION
INSTRUCTIONS: Answer questions 1-4 and any other one — TIME ALLOWED: 3 HOURS

1. Show the details of the following building elements and components: (i) a longitudinal section through a plate girder. (ii) Cross sectional cut of castellated girder. (iii) The plan and flange section of the connection between a small stanchion and a bigger stanchion. (iv) A section for a typical core structure for a 10-storey building. (v) The plan and a section of a gusseted base. (80 points)

2. (a) Why is stanchion splicing important? Illustrate the constructional and structural details of a suitable base for a stanchion transferring high bending moment.
(b) Solid and hollow circular stanchions have the same radius in all directions and occupy less floor space than any other equally strong stanchions. What are the main disadvantages of hollow stanchions in multi-storey buildings? Illustrate the process of splicing and connecting solid circular stanchions to base plates.
(c) Illustrate the features of a stanchion that can be used in multi-storey buildings where very tall and relatively large stanchions are required. (55 points)

3. (a) Differentiate between plate floor and flat slab floor structure using transverse sections showing the column layouts and three floors each.
(b) Illustrate the constructional details of the element required for lifting and fixing lift slab floors.
(c) There are different types of precast floors that can be used to eliminate shuttering and reduce construction time. However, for a multi-storey building where greater area is required to be covered, lesser unit weight of floor is required and grooves is required for aesthetic at the floor soffit. Illustrate the constructional details and showing the sectional details of two types of precast floor structures that can be used for this multi-storey building. (55 points)

4. (a) Describe multi-storey buildings in terms of construction methods and structural systems.
   (b) Illustrate the layout and constructional details of framed multi-storey building with 4-upper floors using (i) steel (ii) reinforced concrete; showing the column-column, column-beam, beam-beam, and column-foundation details of the stanchions.
   (c) Discuss the various challenges in the design and construction of multi-storey buildings and practical methods of solving them. (55 points)

5. (a) Highlights the benefits and limitations of plain monolithic concrete wall and cross wall construction as forms of wall construction. Buttress your points with a well-detailed illustration of both types of wall construction.
   (b) Illustrate 3-methods of constructing tall walls to address the inherent structural problems in the design of tall walls.
   (c) Illustrate the design of a retaining wall that will not overturn, overstressed construction materials, and overstressed the soil. What are those conditions that can cause a retaining wall to overturn? (55 points)

6. (a) illustrate the difference between the construction processes of the following; (i) escalator and walkalator (ii) septic tank and cesspool (iii) wall cladding and facing systems.
   (b) Illustrate the plan and cross-section of a 3-way space frame to be constructed in (i) a roof space of 60m x 30m using a 600mm x 600mm square module. (ii) a roof space of 120m x 60m using a hexagonal module of 600mm on each side.
   (c) Illustrate the layout and erection processes of a suitable roof structure for a factory building requiring a clear height of 3.7m and a clear span of 6.5m. (55 points)

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

Rain Semester Examination 2017/2018 Session
B.Sc. Building, Estate Management and Quantity Surveying
BLD 308: Building Services and Equipment II
January 2019. Time allowed: 2 hours 30 minutes
Instructions: (i) Answer **ANY** three questions
(ii) Illustrate your answers with appropriate diagrams where necessary

Question One

Your company has been chosen to design the supply and distribution of electricity for the on-going project at the Redeemer University, Ede. Using line diagrams **only**, show how electrical power can be distributed to the following consumers:
(a) a consumer on single phase supply
(b) a consumer on three phase supply
In all cases, discuss the function(s) of each of the appurtenances.
(c) If the electrical installation in one of the buildings consists of the following loads: 15Nr-60 W lamp, 8Nr-40 W lamp, 2Nr-2.5 kW electric water heater, 3 Nr-2 HP air conditioner, determine the number of final sub-circuit to be used in the installation. The floor area is 370m^2.
(d) Enumerate the various final sub-circuits necessary for distributing electrical loads in these buildings
(e) List the type and size of cable that can be used to carry out the following electrical loads in the building: lighting load, socket outlet to portable electrical load and fixed appliance. **(30 marks)**

Question Two

(a) Define the term "Earthing" and explain the reason(s) for providing earthing to electrical installations.
(b) List the two types of earth electrode commonly used in building electrical services and explain the rationale for adding common salt (sodium chloride) into the ground during the installation of earth electrode.
(c) Draw a neat sketch of the meter board and the distribution board showing clearly how the cables enter the meter and leave the distribution board.
(d) Explain the causes of the following electrical phenomena: (i) excess-current and overload (ii) electric shock (iii) earth-leakage current (iv) short-circuit. Analyse how appliances, equipment and the occupants of a building can be adequately protected against the phenomena.
(e) Explain the difference between running and stating current. **(30 marks)**

Question Three

(a) Fire is very important in our daily life and can be deadly and devastating. Discuss
(b) As part of the efforts of governments at various levels to improve the falling standard of education in Nigeria, a public library has been earmarked for Ile-Ife
(i) Advice on the various ways by which the passive control of fire could be exploited in preventing fire outbreak in the library
(ii) Recommend appropriate portable and fixed fire-fighting equipment that could be used on electric fire in the library
(c) List three goals of fire protection of buildings.
(d) Explain the term "Diversity factor" as it is used in building electrical services and provide reason(s) for its application.
(e) Outline the main stages of fire outbreak in a building. What factor(s) may restrict the development of fire outbreak? **(30 marks)**

Question Four

(a) Succinctly explain how the gas pipeline located on the street can be connected to a building requiring gas supply. Recommend appropriate location for the metering system and provide reason(s) for your choice.
(b) Discuss the precautionary measures you would take to ensure safety of the gas installation.
(c) Using line diagram only, show how the gas will be distributed to the various appliances requiring gas within the building.
(d) Discuss the various tests and purging you would conduct on the installations to ensure safe operation.
(e) There are two main types of gas which could be used for the installation: town gas or natural gas. Provide reasons why you would prefer natural gas to town gas. **(30 marks)**

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

2017/2018 RAIN SEMESTER EXAMINATION

BLD 304: CONSTRUCTION TECHNOLOGY II January 2019

B.Sc. Building and Quantity Surveying **Time allowed:** 3 Hrs

INSTRUCTIONS: (i) Answer **ALL questions** in **SECTION A**
(ii) Answer **Question 3** and any one of 4 and 5 in **SECTION B**
(iii) Both sections must be answered in separate booklets
(iv) Provide neat sketches where applicable
(v) Keep your work neat, logical and orderly

SECTION A

Question 1

(a) List and discuss the five functional requirements of a roof.

(b) List and discuss the types of materials that could be used for roof structures.

(c) Discuss the variable factors affecting the choice of roof types.

(d) Discuss the principal factors influencing the choice of materials for roof construction.

Question 2

(a) Describe the functional requirements of stairs.

(b) With the aid of neat sketches, identify the different types of stairs.

(c) Produce a neat sketch of any typical stair and label ALL parts.

SECTION B

Question 3

A client, Chief K. A. Owonifaari, desires to build a multi-storey structure of 10 upper floors as a 5-star hotel to be located in Victoria, Island, Lagos. As a construction technology expert, you have been engaged for this project. Write a recommendation for this project to cover the following; (i) appropriate frame type (ii) the basis for your choice (c) materials of choice and basis, and (d) description of elements of the proposed frame.

Question 4

(a) In a steel framed structure, connections are inevitable. Mention any two possible ways of achieving connections.

(b) Enumerate the types of stanchion bases you know. Using neat diagrams, show these bases and describe their peculiarity.

(c) Using well-labelled diagrams, show the following;

(i) Beam-to-stanchion connections (ii) Beam-to-beam connections (iii) Any 3 types of welds (iv) the 3 forms of welded splices for stanchion.

Question 5

(a) Describe the factors influencing the choice of upper floors in buildings.

(b) Using neat and well-labelled diagrams, you are required to show the following;

(i) Prestressed T-beam floor (ii) flat slab floor showing drop panel (iii) filler joist floor

(c) Discuss how provision for services can be ensure in floor construction. Discussion should be supported with labelled diagrams.

(d) Enumerate possible movements that could occur in a building structure and how they can be controlled.

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING
Rain Semester Examination 2018/2019 Session

B.Sc. Building, Estate Management and Quantity Surveying
BLD 308: Building Services & Equipment II
DECEMBER 2019 Time Allowed: 2 hours 30 minutes
Instructions: (i) Answer any **three** questions

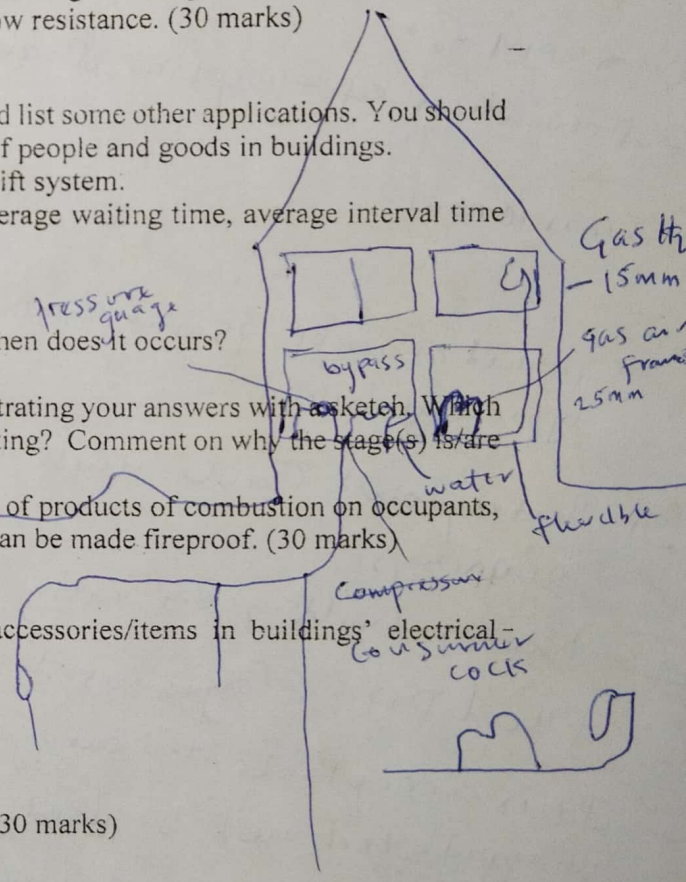
Question One
(a) Sketch a typical power supply system.
(b) Using line diagram only including all accessories and equipment to be used, show how electrical power can be distributed from supplier's electric poles on the street to domestic buildings. State the types and sizes of cables that can be used to carry out the installations.
(c) Explain by means of a neat sketch the reason(s) for providing earthing in buildings' electrical installations. Discuss why the connection to earth must have a low resistance. (30 marks)

Question Two
(a) Describe the essential features of an electric lift installation and list some other applications. You should also introduce briefly examples of other systems for movement of people and goods in buildings.
(b) Discuss the factors that affect the performance of an electric lift system.
(c) Define the relationship between a lift round trip time, the average waiting time, average interval time and the 5-minute capacity of the system. (30 marks)

Question Three
(a) State the goals of fire safety design. What is flash over and when does it occurs?
(b) identify the causes of fire outbreaks in buildings.
(c) Enumerate the main stages of a fire outbreak in buildings illustrating your answers with a sketch. Which one(s) among these stages is/are more critical in terms of firefighting? Comment on why the stage(s) is/are very critical.
(d) In the event of fire outbreaks in buildings, discuss the effects of products of combustion on occupants, wood, steel and concrete. Explain how these building materials can be made fireproof. (30 marks)

Question Four
Explain the need(s) and importance of the following listed accessories/items in buildings' electrical installations:
(a) Consumer Control Unit (CCU)
(b) Distribution Fuse Board (DFB)
(c) Earth Electrode (EE)
(d) Miniature Circuit Breaker (MCB).
(e) Neutral and earth wires in a three phase distribution system. (30 marks)

Question Five
(a) Describe the procedures for gas installations in a building. Explain the merits, demerits and limitations of installing meters outside and within the building.
(b) Discuss the precautionary measures you would take to ensure safety of the installations.
(c) Explain the reasons for choosing natural gas over town gas in buildings' gas installations. (30 marks)



OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE
FACULTY OF ENV. DESIGN AND MAN.
B.Sc (Building) Degree Examination
RAIN SEMESTER 2009/2010 SESSION
BLD 306 – BUILDING MAINTENANCE II

Instruction: ***Answer TWO questions from each section*** **Time: 2 hrs**
Use separate booklets for each section

SECTION A

1. Enumerate five items each that would be included in the long term, annual, and daily planning in a maintenance organisation. (15marks).

2. (a) Discuss **five** factors militating against effective maintenance management in most organisations. (10marks).
(b) Discuss the functions of a maintenance manager in an organisation (5marks).

3 Prepare a schedule of dilapidation for an underpinning operation to 20m length of defective wall. The survey report shows that the foundation is in good condition but requires a new depth to a firm soil of higher bearing capacity. The existing 225mm foundation wall bears on a footing 450mm deep and 675mm wide. The new 225mm foundation wall bears on a footing 750mm below the existing footing. A working space of 325mm should be provided. The footing is 150mm thick concrete 1:3:6 concrete mix ratio mortar 1:4 mix ratio. (15marks).

SECTION B

4 Given the cost figures in the table below, use the assignment algorithm to determine the highest and lowest possible costs of completing the maintenance operation contemplated.

	A	B	C	D	E
1	80	150	90	60	110
2	30	30	70	40	60
3	100	80	120	160	140
4	20	110	70	210	60
5	150	130	120	90	100

(15marks)

5 The cost of moving maintenance operatives from cities A, B, C, and D to sites I, II, and III are given in the cells below. If the quantities shown outside the cells represent the constraints (available and required operatives respectively), determine the optimal transportation cost.

	A	B	C	D
	4	2	3	1
7				
	3	3	5	7
11				
	5	4	7	4
15				
	4	8	9	12

(15 marks)

6 (a) State the mathematical formula for
I. The present value of N1 per annum
II. The amount of N1 per annum (4marks)

(b) Express in mathematical form,
(i) The objective function of a transportation problem
(ii) The relationship between the failure rate and the MTBF of an item
(iii) The Standard Deviation of a PERT model (6marks)

(c) An organisation operating a 75G scheme sets the Target Time for an operation at 13hrs. If the hourly wage rate is N100.00, what would a 90 rated operative earn on the task? (5marks)

OBAFEMI AWOLOWO UNIVERSITY
ILE-IFE, NIGERIA
DEPARTMENT OF BUILDING
RAIN SEMESTER EXAMINATION 2019/2020
BLD 306 - BUILDING MAINTENANCE II

INSTRUCTION: Answer Question 1 and THREE others **Time: 2hrs**

Note that a Z-score table is included

1. Based on a recent building surveying exercise, explain using hypothetical figures where necessary, the difference between a schedule of dilapidations and a maintenance frequency chart. **[12mks]**

2. (a) A 75R female operative painted $1m^2$ of a fence in 100 seconds during a time study exercise. Estimate the standard time to reflect only the operative's rating and personal allowance. **[6mks]**

   (b) State:
   i. The objective function of a transportation model
   ii. Any FOUR assumptions necessary to solve a transportation problem
   iii. The mathematical ratio expressing the failure rate of an item

   [6mks]

3. The rehabilitation of each of the four students' hostels is expected to run for 8 weeks within the long vacation. To deal with the time constraint, each contractor is to handle just one hostel and that work is to commence simultaneously. Tenders have been received from four maintenance contractors [A, B, C, and D] and their quotations in ₦ Million are given below.

	Hostel 1	Hostel 2	Hostel 3	Hostel 4
A	50	70	90	30
B	40	40	60	70
C	30	80	40	30
D	50	40	80	10

   Using the assignment model and the information provided in the table, determine how the projects should be allocated optimally and also what should be the minimum cost of the project in Million Naira. **[12mks]**

4. (a) Show mathematically that ₦ 1.00 reserved for maintenance works today will at the end of "n" years, amount to ₦ $(1 + i)^n$, given an interest rate (i). **[6mks]**
   (b) Prove that at an operating interest rate (i), the present value of ₦ 1.00 earmarked to be spent each year on maintenance operations perpetually translates to $1/i$. **[6mks]**

5. From the network overleaf, what is the probability of completing the project in 20 days? [A – L = Activities with durations in order of optimistic, most likely, and pessimistic times; the events are numbered 1-8] **[12mks]**

OBAFEMI AWOLOWO UNIVERSITY
ILE-IFE

RAIN SEMESTER EXAMINATION 2010/2011 SESSION

FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

NOVEMBER, 2011

BLD306: BUILDING MAINTENANCE.

INSTRUCTIONS TIME ALLOWED: 2Hours

SECTION A.(Answer Q1 and any other) SECTION B.(Answer Q3 and TWO OTHERS)

Reg.Number:.....

Name/Dept.:.....

SECTION A (Answer question one (1) and one other).

1. Prepare a schedule of dilapidation for an underpinning operation to a 30 length of defective wall, the survey report show that the foundation is in good condition but requires a new depth to a firm soil of higher bearing capacity. The225mm foundation wall bear on a footing 550mm deep and 675mm wide. The new 225mm foundation wall bears on a footing 750mm below the existing. A working space of 325mm should be provided. The footing is 150mm thick concrete 1;3;6 concrete mix ratio. mortar 1;4 mix ratio.

(15 marks).

2. Enumerate five (5) items each that would be included in the long –rang, annual, and daily planning in a maintenance organisation.

(15 marks).

3 In not more than half a page each write short notes on the following;

(a) Measured term contract (3marks).

(b) Cost reimbursement contract. (3marks).

(c) Service level agreement contract. (3marks)

(d) Term contract. (3marks)

(e) Illustrate a centralised maintenance management organisation structure (3marks)

SECTION B

ANSWER QUESTION **THREE** AND **TWO** OTHERS USE A SEPARATE BOOKLET

Q 3 Determine the rate of interest at which the decision to replace an item costing N200, 000.00 (Two hundred thousand Naira) with a mean life of 20 years, would have the same economic significance as repairing it every FIVE years over the same period, each time at an estimated cost of N50, 000.00 (Fifty thousand Naira).

(15marks)

Q 4 (a) Given an interest rate " i " show what N1.00 on maintenance annually will amount to in 1 year, hence " n " years.

(6 **marks)**

(b) If 50% of an item is observed to fail on the 2nd year and the remaining 50% on the 3rd year, prepare a FIVE- year maintenance profile for the item.

(9 **marks)**

Q 5 (a) Express as a model, the objective function of a transportation problem.

(5 **marks)**

(b) State the mathematical expressions for the MEAN and STANDARD DEVIATION in a PERT analysis.

(6 **marks)**

(c) State the formula for TARGET TIME estimate in a bonus scheme.

(4 **marks)**

Q 6 (a) Prepare an initial feasible solution to the material allocation problem below, using the transportation algorithm.

(5 marks)

4	3	5	1	50
7	4	4	5	70
3	3	2	4	30
40	55	35	20	

(b) Perform an optimality test on the initial feasible solution above.

(6 marks).

(C) Determine the critical route and the maximum quantity to move.

(4 marks)

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE
FACULTY OF ENV. DESIGN AND MAN.
B.Sc (Building) Degree Examination
RAIN SEMESTER 2009/2010 SESSION
BLD 306 – BUILDING MAINTENANCE II

Instruction: *Answer TWO questions from each section* **Time: 2 hrs**

Use separate booklets for each section

SECTION A

1. Enumerate five items each that would be included in the long term, annual, and daily planning in a maintenance organisation. (15marks).

2. (a) Discuss **five** factors militating against effective maintenance management in most organisations. (10marks).
   (b) Discuss the functions of a maintenance manager in an organisation (5marks).

3 Prepare a schedule of dilapidation for an underpinning operation to 20m length of defective wall. The survey report shows that the foundation is in good condition but requires a new depth to a firm soil of higher bearing capacity. The existing 225mm foundation wall bears on a footing 450mm deep and 675mm wide. The new 225mm foundation wall bears on a footing 750mm below the existing footing. A working space of 325mm should be provided. The footing is 150mm thick concrete 1:3:6 concrete mix ratio mortar 1:4 mix ratio. (15marks).

SECTION B

4 Given the cost figures in the table below, use the assignment algorithm to determine the highest and lowest possible costs of completing the maintenance operation contemplated.

	A	B	C	D	E
1	80	150	90	60	110
2	30	30	70	40	60
3	100	80	120	160	140
4	20	110	70	210	60
5	150	130	120	90	100

(15marks)

5 The cost of moving maintenance operatives from cities A, B, C, and D to sites I, II, and III are given in the cells below. If the quantities shown outside the cells represent the constraints (available and required operatives respectively), determine the optimal transportation cost.

	A	B	C	D
	4	2	3	1
7				
	3	3	5	7
11				
	5	4	7	4
15				
	4	8	9	12

(15 marks)

6 (a) State the mathematical formula for
   I. The present value of N1 per annum
   II. The amount of N1 per annum (4marks)

(b) Express in mathematical form,
   (i) The objective function of a transportation problem
   (ii) The relationship between the failure rate and the MTBF of an item
   (iii) The Standard Deviation of a PERT model (6marks)

(c) An organisation operating a 75G scheme sets the Target Time for an operation at 13hrs. If the hourly wage rate is N100.00, what would a 90 rated operative earn on the task? (5marks)

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

Rain Semester Examination 2017/2018 Session
B.Sc. Building, Estate Management and Quantity Surveying
BLD 308: Building Services and Equipment II
January 2019.
Time allowed: 2 hours 30 minutes

Instructions: (i) Answer **ANY** three questions
(ii) Illustrate your answers with appropriate diagrams where necessary

Question One

Your company has been chosen to design the supply and distribution of electricity for the on-going project at the Redeemer University, Ede. Using line diagrams **only**, show how electrical power can be distributed to the following consumers:
(a) a consumer on single phase supply
(b) a consumer on three phase supply
In all cases, discuss the function(s) of each of the appurtenances.
(c) If the electrical installation in one of the buildings consists of the following loads: 15Nr-60 W lamp, 8Nr-40 W lamp, 2Nr-2.5 kW electric water heater, 3 Nr-2 HP air conditioner, determine the number of final sub-circuit to be used in the installation. The floor area is 370m^2.
(d) Enumerate the various final sub-circuits necessary for distributing electrical loads in these buildings
(e) List the type and size of cable that can be used to carry out the following electrical loads in the building: lighting load, socket outlet to portable electrical load and fixed appliance. **(30 marks)**

Question Two

(a) Define the term "Earthing" and explain the reason(s) for providing earthing to electrical installations.
(b) List the two types of earth electrode commonly used in building electrical services and explain the rationale for adding common salt (sodium chloride) into the ground during the installation of earth electrode.
(c) Draw a neat sketch of the meter board and the distribution board showing clearly how the cables enter the meter and leave the distribution board.
(d) Explain the causes of the following electrical phenomena: (i) excess-current and overload (ii) electric shock (iii) earth-leakage current (iv) short-circuit. Analyse how appliances, equipment and the occupants of a building can be adequately protected against the phenomena.
(e) Explain the difference between running and stating current. **(30 marks)**

Question Three

(a) Fire is very important in our daily life and can be deadly and devastating. Discuss
(b) As part of the efforts of governments at various levels to improve the falling standard of education in Nigeria, a public library has been earmarked for Ile-Ife
(i) Advice on the various ways by which the passive control of fire could be exploited in preventing fire outbreak in the library
(ii) Recommend appropriate portable and fixed fire-fighting equipment that could be used on electric fire in the library
(c) List three goals of fire protection of buildings.
(d) Explain the term "Diversity factor" as it is used in building electrical services and provide reason(s) for its application.
(e) Outline the main stages of fire outbreak in a building. What factor(s) may restrict the development of fire outbreak? **(30 marks)**

Question Four

(a) Succinctly explain how the gas pipeline located on the street can be connected to a building requiring gas supply. Recommend appropriate location for the metering system and provide reason(s) for your choice.
(b) Discuss the precautionary measures you would take to ensure safety of the gas installation.
(c) Using line diagram only, show how the gas will be distributed to the various appliances requiring gas within the building.
(d) Discuss the various tests and purging you would conduct on the installations to ensure safe operation.
(e) There are two main types of gas which could be used for the installation: town gas or natural gas. Provide reasons why you would prefer natural gas to town gas. **(30 marks)**

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

2017/2018 RAIN SEMESTER EXAMINATION

BLD 314: STRUCTURAL ANALYSIS AND DESIGN II January 2019

B.Sc. Architecture **Time allowed:** 2½ hrs

INSTRUCTIONS: (i) Answer **Questions 1** and any other **two** questions
(ii) Provide neat sketches where applicable
(iii) Keep your work neat, logical and orderly
(iv) Indicate **appropriate units** in all your calculations

Question 1

(a) Mention any **five** elements of a building.

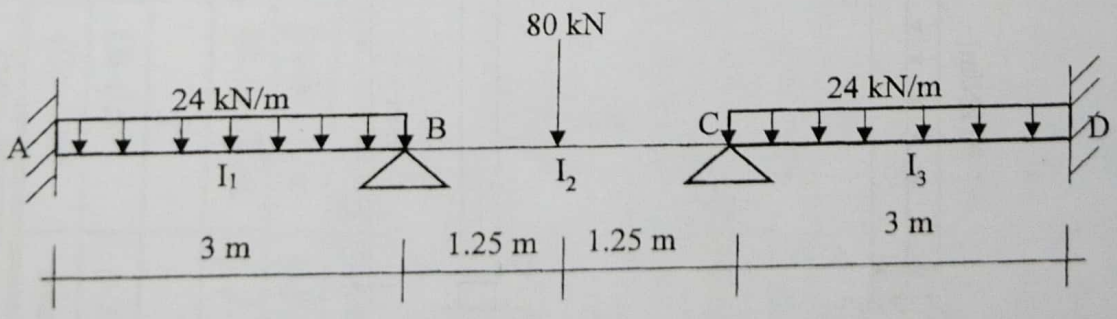
(b) What is a reinforced concrete? Mention the **three** objectives of reinforced concrete design.

(c) State the **three** design methods and differentiate between **any two** of the methods.

(d) Explain the following terms as they relate to reinforced concrete works:

(i) Concrete mixing
(ii) Quality control
(iii) Admixtures
(iv) Water-cement ratio
(v) Design stresses

(e) Using the Hardy Cross moment distribution method, draw the shear force and bending moment diagrams for the beam shown below. Take $I_1 = 4 \times 10^9$ mm^4, $I_2 = 8 \times 10^9$ mm^4, $I_3 = 4 \times 10^9$ mm^4 and E = 2.5 × 106 kN/m^2.

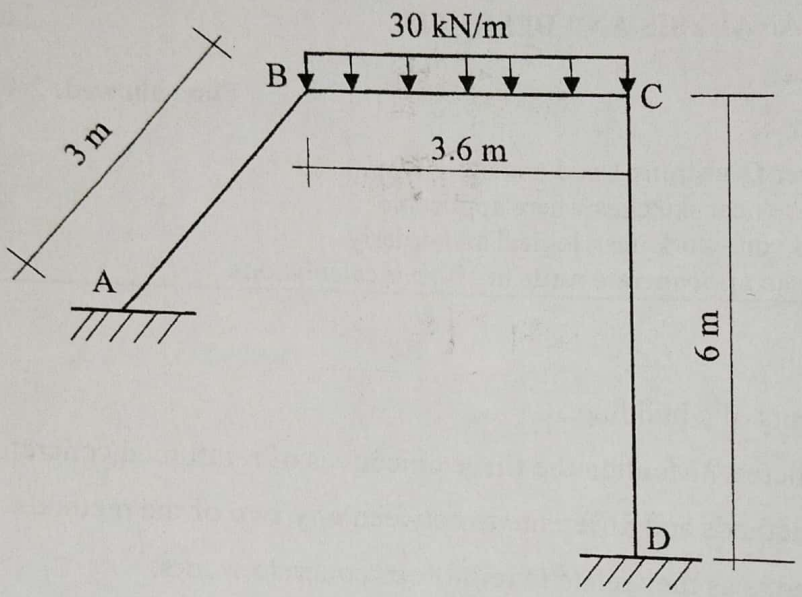


Question 2

A continuous girder of uniform section rests on four supports at the same level, forming three equal spans of 3.5 m each. The girder carries a uniformly distributed load of 65 kN/m along its entire length and two columns carrying a dead load of 30 kN each at distances 2.0 m from the left outer support and 1.5 m from the right outer support. Analyse the beam by using the slope-deflection method. Take E = 200 GN/mm^2 and I = 1.67 × 10^9 mm^4.

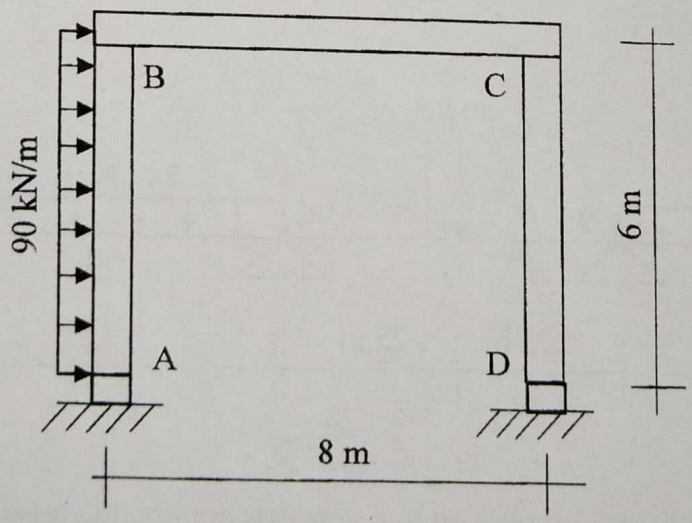
Question 3

By using the slope-deflection method of analysis, determine the moments at each joint of the frame shown below. EI is constant for each member.



Question 4

Determine the moments at each joint or support of the frame shown below using the Hardy Cross moment distribution method. There are fixed connected at B and C and fixed supports at A and D. EI is the same for each member.



OBAFEMI AWOLOWO UNIVERSITY
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

HARMATTAN SEMESTER EXAMINATION 2017/2018 SESSION

BLD 305 - BUILDING MAINTENANCE II

ANSWER **QUESTION 1** and **THREE** OTHERS TIME: **2HRS**

1. A dilapidated timber framed structure in Sabo is to be refurbished and converted to a shopping complex. Illustrate with neat sketches any TEN types of joints that may be used along the timber bearers, trusses, studs, cladding, joists, doors, windows, and floor boards. **[15 Mks]**

2. Write short notes on **three** of the following terms in relation to building deterioration and maintenance:
   a) Moss Funaria
   b) Electrolytic action
   c) Crypto-florescence
   d) Snecking
   e) Ettringite **[15 Mks]**

3. A 6m long Sandcrete block wall 225mm thick and 3m high separates two adjacent buildings that are 10m apart. The wall runs 1m below the ground level and has a density of 2400kg/m^3. The footing is estimated to weigh 2500kg/m^3. With the aid of a neat and detailed sketch, show ONLY the elevation of the wall incorporating the ideal timber needle sections that could temporarily support the wall if underpinning operations were contemplated. The needles should be assumed at 1500mm centres with a permissible flexural stress of 5N/mm^2. ***Do not show the props.*** **[15 Mks]**

4. Produce a neat sketch that illustrates the technical details of a Raking shore. **[15 Mks]**

5. List in tabular format, any TEN common defects in OAU students' hostels and the corresponding appropriate remedial measures. **[15 Mks]**

6. Determine the ideal sizes for props that should temporarily support one of the 1500mm timber needles carrying a load of 10000N. The left prop is to be 500mm from the load and the right prop 1000mm. The allowable compressive stress [C_p] is 1.5N/mm^2. **[15 Mks]**

END

DEPARTMENT OF BUILDING
OBAFEMI AWOLOWO UNIVERSITY ILE-IFE
BLD 301 – BUILDING CONSTRUCTION AND MATERIALS III
HARMATTAN SEMESTER EXAMINATION, 2018/2019 SESSION
Instruction: Answer question 1 and three (3) other questions

Time allowed: 2 Hours

SECTION A (To be answered in OMR sheets) **TYPE B**

1. The main constituent of a Portland cement is .... (a) lime (b) alumina (c) iron oxide (d) alkalies
2. The silica content in Portland cement should be ... (a) 10 to 20% (b) 20 to 25% (c) 25 to 40% (d)40 to 60%
3. The dry process of mixing is usually employed in the manufacture of Portland cement when the raw material is..... (a) blast furnace slag (b) chalk (c) clay (d) all of these
4. Gypsum is added in the manufacture of Portland cement.... (a) while mixing the raw materials (b) during burning in the rotary kiln (c) at the beginning of grinding the clinker (d) at the end of grinding the clinker into powder
5. The clinker is formed at a temperature of..... (a) 500°C (b) 1000°C (c) 1200°C (d) 1500°C
6. The amount of gypsum, usually, added in the manufacture of Portland cement is (a) 0.1 to 0.5% (b) 0.5 to 1% (c) 1 to 3% (d) 3 to 5%
7. Next to aluminium ..... is the most abundant metallic material in the earth's crust (a) gold (b) copper (c) iron (d) manganese
8. An important iron bearing mineral or iron ore is? (a) limonite (b) hematite (c) magnetite (d) all of the above
9. The first steel rails were produced commercially in (a) Pennsylvania (b) New York (c) England (d) New Delhi
10. ..... has high compressive strength and low tensile strength..... (a) cast iron (b) wrought iron (c) steel (d) none of the above
11. ..... has good resistance to corrosion (a) wrought iron (b) cast iron (c) steel (d) none of the above
12. The process of mixing clay, water and other ingredients to make bricks, is known as (a) tempering (b) pugging (c) kneading (d) moulding
13. The rocks formed due to solidification of molten mass lying below or above the earth surface are called..... (a) aqueous rocks (b) sedimentary rocks (c) metamorphic rocks (d) igneous rocks
14. Granite is an example of (a) aqueous rocks (b) sedimentary rocks (c) metamorphic rocks (d) igneous rocks
15. Igneous rock has ..... (a) crystalline, glossy or fused texture (b) foliated structure which is hard and durable (c) layers of different composition, colour and structure (d) none of the above
16. The sedimentary rocks are formed due to .... (a)solidification of molten mass lying below or above the earth surface (b) gradual deposition of materials like sand, clay, etc., generally by setting water (c) alteration of original structure under heat and excessive pressure (d) none of the above
17. Marble is an example of .... (a) aqueous rock (b) metamorphic rock (c) sedimentary rock (d) igneous rock

18. The purpose of seasoning of timber is to..... (a) change the direction of grains (b) remove voids (c) reduce moisture content (d) all of these
19. The chief ingredient of paint is.... (a) thinner (b) drier (c) oil (d) pigment
20. The pigment in paints is mixed to give desired.... (a) smoothness (b) colour (c) appearance (d) durability
21. The liquid medium used in oil paints is ... (a) thinner (b) alcohol (c) linseed oil (d) turpentine
22. The base in paint is added to..... (a) improve the quality of paint (b) make smooth surface (c) hide the surface to be painted (d) all of these
23. The best primer used for structural steel work is..... (a) white lead (b) red lead (c) zinc oxide (d) iron oxide
24. The knowledge of iron smelting became common around..... (a) 1200BC (b) 750 BC (c) 500 BC (d) 1500BC
25. The basic constituent of steel is? (a) oxide (b) iron (c) lead (d) copper
26. In the production of cement, silica and alumina are derived from all, except (a) chalk (b) clay (c) shale (d) bauxite
27. In the production of cement, raw materials are homogenized by the following process except (a) crushing (b) grinding (c) bleeding (d) slurring
28. Deciduous trees are (a) hardwood (b) furniture wood (c) softwood (d) plywood
29. The natural cementing and rigidifying material in timber is (a) fibre (b) lignin (c) bark (d) cellulose
30. ..... is a carbohydrate of high molecular weight found in timber (a) extractives (b) lignin (c) balsam fir (d) cellulose
31. ..... is the point when water is driven off the cell cavities of timber until the cavities contain only air and the cell walls are saturated with water (a) relative humidity (b) fibre saturation (c) water saturation point (d) equilibrium moisture content
32. The workability of fresh concrete is expressed through the following (a) consistency (b) mobility (c) compactibility (d) all of the above
33. The cementing property in cement is mainly due to..... (a) lime (b) silica (c) iron oxide (d) alumina
34. Which of the following statement is correct....? (a) The sand used for making mortar should be fine (b) The rounded grains of sand produce a strong mortar (c) The mortar made with coarse sand is stronger than the one made with fine sand (d) all of the above
35. For reinforced concrete construction, the maximum size of coarse aggregate is limited to (a) 10mm (b) 15mm (c) 20mm (d) 25mm
36. Consolidation of concrete should proceed.... (a) before mixing (b) before placing (c) immediately after mixing (d) immediately after placing
37. The workability of concrete can be improved by..... (a) increasing the quantity of cement (b) increasing the proportion of coarse aggregate (c) increasing the quantity of sand (d) all of the above
38. The maximum water – cement ratio for durable concrete is ... (a) 0.2 (b)0.4 (c) 0.6 (d) 0.8
39. The slump test of concrete is used to measure it's..... (a) consistency (b) tensile and compressive strength (c) impact value (d) homogeneity
40. The central part of a tree is called..... (a) heart wood (b) pith (c) sap wood (d)cambium layer

BLD 301, 2018/2019 HARMATTAN SEMESTER

SECTION B **(Answer any three questions)**

QUESTION 1a

Produce neat sketches of the following types of slump (a) Normal (b) Shear (c) near zero (d) collapse 10 points

1b. Produce four neat sketches to show steps toward achieving a slump test 10 points

1c. Produce neat and detailed sketches of the plan and section of an independent column footing 10 points

QUESTION 2a

Produce a detail section through a tree trunk. 8 points

2b. Discuss the functions of any of the five (5) parts of a tree identified in 2a 10 points

2c. Sketch neatly the following timber defects (a) knot (b) shake (c) check 6 points

2d. Sketch neatly typical foundation plan and section of a beam and slab raft foundation. 6 points

QUESTION 3a

Discuss diagrammatically only the production of steel 10 points

3b. Describe the term 'forging' as it applies to metal 5 points

3c.Describe briefly, the manufacture of wrought iron. 5 points

3d. Illustrate using schematic diagram the wet process of cement manufacture. 10 points

QUESTION 4a

Discuss (using a table only) Portland cement types and uses 10 points

4b. Discuss (using a table only), the principal compounds of cement, their chemical formula, industry code abbreviation, percentage amount (range) and rate of reaction with water . 10 points

4c.In a tabular format, illustrate the behavior of timber subjected to shear and bending moments. 10 points

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

Harmattan Semester Examination 2018/2019 Session
B.Sc. Building, Estate Management and Quantity Surveying
BLD 307: Building Services and Equipment I
August 2019. Time allowed: 2 hours 30 minutes
Instructions: (i) Answer **ANY** three questions
(ii) Illustrate your answers with appropriate diagrams where necessary

Question One

(a) Discuss the need(s) for the incorporation of means of access in the design of a drainage system.
(b) Analyse the various ways by which means of access can be provided on a drainage system.
(c) Why must a drainage system be properly vented? What does a properly vented drainage system prevent?
(d) What is a soil stack and waste pipe? What kinds of waste are carried by a waste pipe and soil stack? Mention a typical size for a waste pipe and soil stack. **(20 marks)**

Question Two

(a) Explain the reason(s) for the incorporation of traps and water seal in sanitary appliances. List and sketch at least four of such traps.
(b) Research has shown that water seal in a trap can be lost due to various mechanisms. With the aid of good sketches explain at least four mechanisms that can unseal water in a trap and what can be done to prevent this phenomenon.
(c) If the main pressure on the street is not sufficient to supply water to high rise building, discuss at two typical means to boost the pressure. **(20 marks)**

Question Three

In view of the population explosion in Obafemi Awolowo University and low water table at Opa dam the main source of water, it has been decided to augment the present water supply with underground water. If you are the consultant in charge of this project, using appropriate equation and diagrams where necessary;
(a) Explain the procedures to be followed in order to ensure adequate water supply.
(b) If dug-well with mechanical pump installation is part of your recommendations, provide a detailed sketch of the well showing the foot valve, the suction line, delivery line, the pump etc. Which one suction line or delivery line should be given more attention during the installation?
(c) Discuss the merits and limitation of direct and indirect cold water supply systems. **(20 marks)**