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.

TIME ALLOWED: 2Hours

INSTRUCTIONS

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, 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.

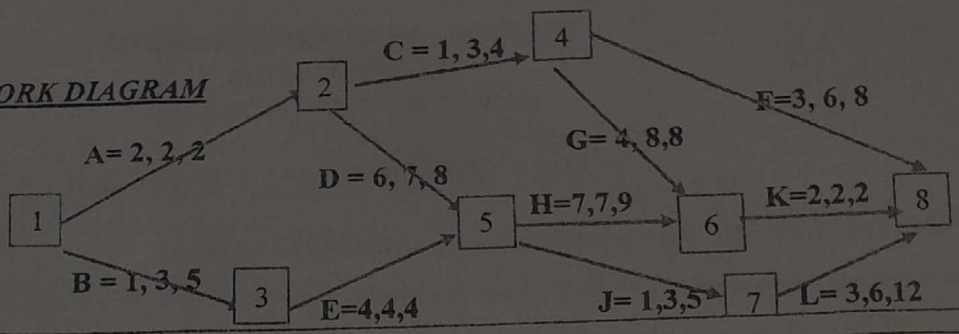
	Hostel 1	Hostel 2	Hostel 3	Hostel 4
A	50	70	90	30
B	40	40	60	70
C	30	80	40	30
D	50	40	80	10

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]**

NETWORK DIAGRAM



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.0382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

Z-TABLE

END

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 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)

The pipe arrangement for gas supply from the ground to the building is almost similar to that of the water supply

↑ 25mm bored services is forced & fault towards the road land to prevent condensation. Individual domestic installation is without an isolation valve and pressure is needed when rarely exceeding 35mm diameto is provided with accessible service pipe

Which function is to control the effect of fire isolate in the building boundary, the primary pipework is terminated and Sometimes the secondary pipework runs after the meter and this stated by case of convinience or appearance.

MERIT
- Periodic inspection without disturbing the household.
- Loss of boyles officers to gain access into the Resident

DEMERIT -
- Prevention of theft or Unauthorised members

-Limitation

Ground cover of 75mm (450mm in public places) is sufficiently shown typically below.

II Underground Cable must be protected with stimulous and some wrappings

III During building our entry for the pipe must be formed in function filled pipe, Clay is used and its covered with bituminous fillings

IV It is acceptable to bury gas pipes in walls screed & floors but wrapped steel must be used to prevent corrosion.

V Plastic pipe must be used whenever gas passes through the wall and the floor.

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.

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**

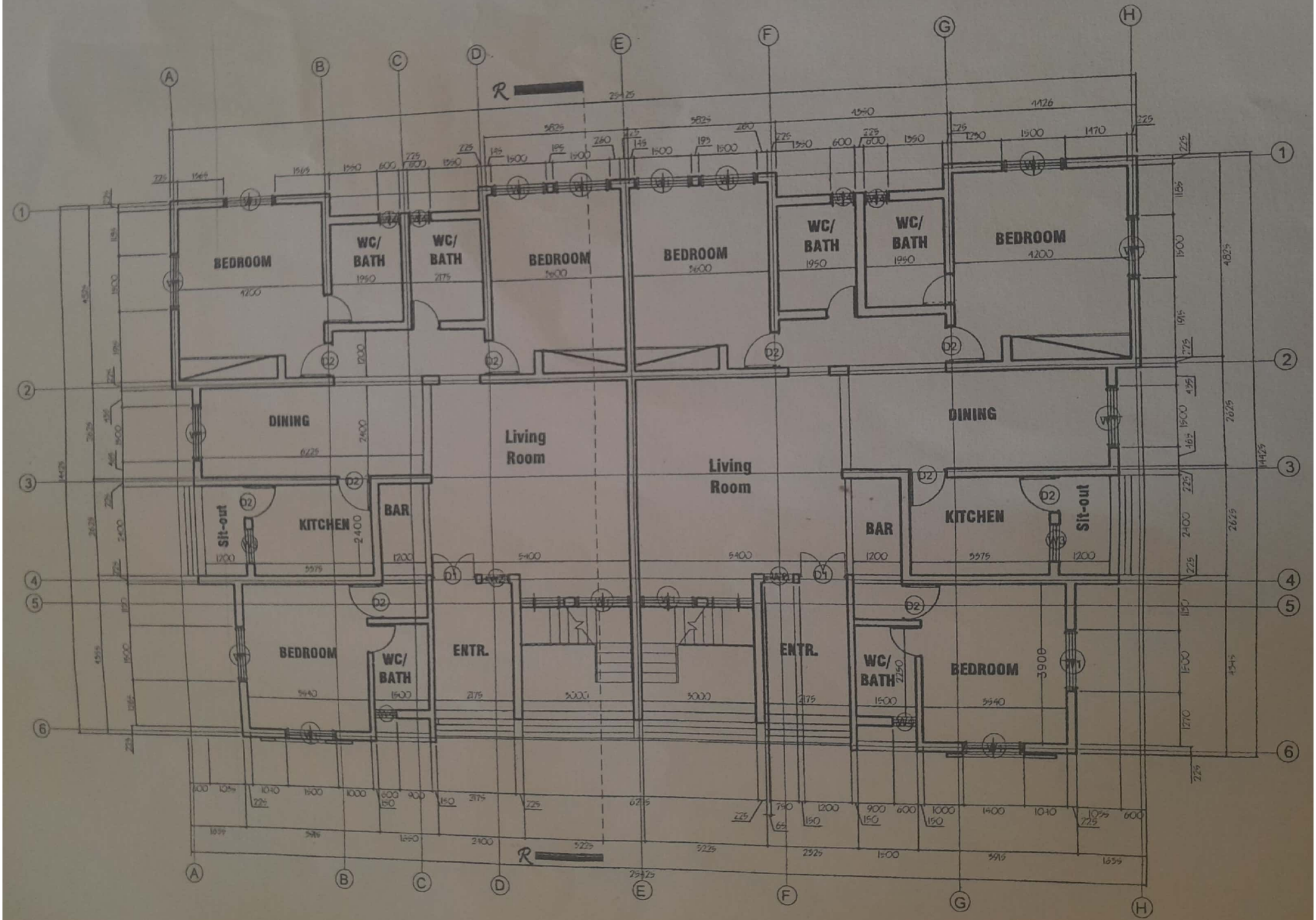
INSTRUCTION: Answer Three Questions only, but Questions 1 and 2 are Compulsory

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

JK

DEPARTMENT OF BUILDING
OSAFEMI AWOLOWO UNIVERSITY ILE-IFE

2019/2020 RAIN SEMESTER EXAMINATIONS

BLD 312-PROJECT PLANNING AND CONTROL

INSTRUCTIONS: ANSWER 4 QUESTIONS Time Allowed; 3 HOURS

Question One

a) Provide a list of basic planning techniques for building construction projects for construction projects. Give a brief description of these techniques

b) Why are rigorous planning procedures necessary for construction projects and not so required for regularly manufactured items such as food, clothings, computer sets and cars

c) What are the information a bar chart will provide you

d) What are the advantages and disadvantages of a bar chart

Question Two

Table 1 represents the data for the activity on the arrow network of work being undertaken by a subcontractor. This section of the work has to be completed within 27 weeks in order to phase into the main contractor's work.

Activity	Duration	Sequence	Labour required in No. of men
1	4	Start	2
2	6	1	3
3	9	1	4
4	2	1	4
5	3	2	3
6	8	2	4
7	10	3	2
8	4	7	2
9	9	4	1

5,6,89

a) For the network above, calculate the earliest times and latest times for the start and finish events for all the activities

b) Determine the critical path of the network

c) What are the total and free floats of the following activities 5,8 and 9

Question Three

From table 2 above, the subcontractor wishes to conduct some resource smoothing in order to avoid excessive peaks and troughs in his labour aggregation chart. Prepare two labour charts, one based on all activities starting as early as possible and one starting as late as possible.

Question Four

The construction plan for a house is shown in the figure below, the accompanying table also gives the man-hours required and the team size for each operation. Prepare a line of balance schedule for a contract of 30 houses using a target rate of build of four houses per week and each team working at its natural rate. Assume a minimum buffer time of five days between operations and five eight hour days per week. What is the overall duration of the project and when will the first team of bricklayers (superstructure operations) leave the site?

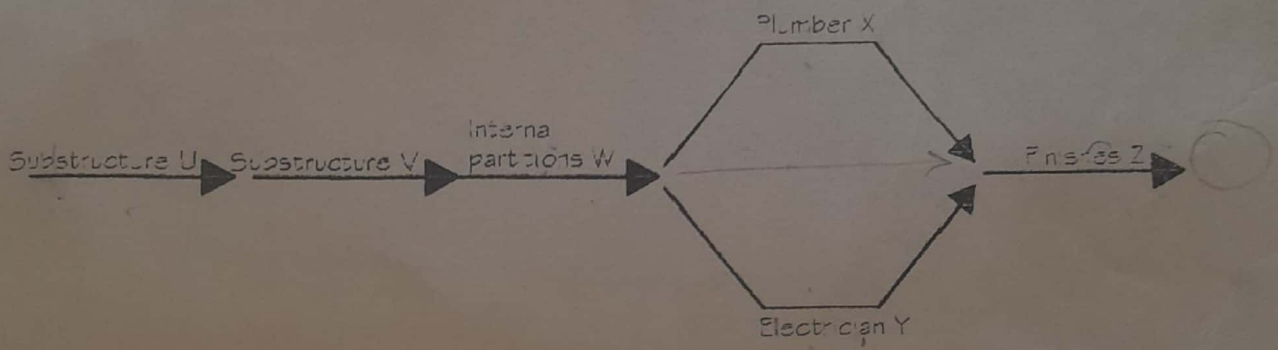


Table of man hours and team size

Operation	U	V	W	X	Y	Z
Man hours per house	120	290	250	40	30	220
Men per team	3	6	4	3	2	5

Question Five

The table below shows a contractor's project budget and profit distribution for a newly awarded contract. The conditions of contract allow interim measurements to be made monthly and payment of the amount certified, less 10% retention, to be paid to the contractor one month later. Half the retention is included in the final certificate on practical completion and the other half is released six months after practical completion.

Determine the monthly net cash flows assuming an average delay of one month between the contractor incurring a cost liability and the outward cash flow. Calculate the interest charges on locked-up capital for an annual interest rate of 12%.

Month	1	2	3	4	5	6	7	8	9	10
Cost of Actual work (#,000)	2	3	4	8	9	9	8	5	4	2
Profit(% of Cost)	6	6	6	6	6	6	6	10	10	10

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)**

BCD/2018/079

OBAFEMI AWOLOWO UNIVERSITY, ILE IFE, NIGERIA.
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
SSC 201: STATISTICAL METHOD AND SOURCES 1
HARMATTAN SEMESTER EXAMINATIONS 2019/2020 SESSION

INSTRUCTIONS: *Attempt **all questions in section A** and any other **three questions in Section B**.

Time Allowed: **2hours 30 minutes ***Show all workings clearly.

SECTION A: **(40 marks)**

1. Statistics means ..... **(1½ marks)**
2. A fraction of the population that a researcher is interested in is called ..... **(1 mark)**
3. A random variable is a variable whose values are determined by ..... **(1 mark)**
4. The two main branches of statistics are ..... and ..... Statistics **(2 marks)**
5. Sampling is important because **(1 mark)**
6. Parameter is to Population as sample is to ..... **(1 mark)**
7. The figure obtained by joining the midpoints of the top of bars of a histogram is called **(1 mark)**
8. The three categories of tables that help us in the presentation of data are... **(3 marks)**
9. A list containing a set of questions prepared to elicit information from respondents is called..... **(1 mark)**
10. A class interval which at least theoretically has either no upper or lower class limit is referred to as..... **(1 mark)**
11. Define a component bar chart. **(1½ marks)**
12. If the mean, median and mode of a distribution are equal, then, the distribution is said to be ..... **(1 mark)**
13. The relationship between variance and standard deviation is that..... **(1 mark)**
14. Another name for mean of a distribution is..... **(1 mark)**
15. Given that the mean and standard deviation of a given set of data are 64 and 8, then, the coefficient of variation is ..... **(1½ marks)**
16. The geometric mean of 7, 10, 6, 12, 6, 5 and 3 is..... **(1½ marks)**
17. Frequency distribution is defined as..... **(2 marks)**
18. True or False: In a Binomial Distribution, the mean and variance are equal **(1 mark)**.
19. In a Binomial Distribution, if 'n' is the number of trials and 'p' is the probability of success, then the mean value is given by _____ **(1 mark)**
20. A probability distribution is analogous to a frequency distribution. Explain this statement in not more than two (2) sentences. **(2 marks)**
21. Highlight three (3) important conditions that can give rise to binomial distribution. **(3 marks)**
22. An experiment with unpredictable outcome is known as..... **(1 mark)**
23. The probability of obtaining a sum of 10 from the toss of 2 fair dice is **(1 mark)**
24. Given 2 independent events A and B with $P(A) = 0.25$, $P(B) = 0.30$, find $P(A \cup B)$ **(1½ marks)**
25. If $P(E_1) = 3/5$, $P(E_2) = 3/4$ and $P(E_1 \cap E_2) = 2/15$, find $P(E_2|E_1)$ **(1½ marks)**
26. A true hypothesis that is rejected is known as---------- **(1 mark)**
27. A hypothesis that is automatically accepted if the null hypothesis is rejected is called ----- **(1 mark)**
28. In hypothesis testing, when the number of observations is less than 30, we use..... **(1 mark)**
29. Acceptance of false hypothesis is known as---------- **(1 mark)**
30. The acceptance or rejection of an assumption made about an unknown population characteristic is known as..... **(1 mark)**

SECTION B:

Question one **(20 marks)**

(a) Distinguish between cluster sampling technique and multi-stage sampling technique.

(b) Clearly illustrate how the 3-stage sampling technique works.

(c) What are the disadvantages of multistage sampling techniques?

(d) Discuss the setbacks to non-probability sampling technique.

Question two **(20 marks)**

(a) Determine the class boundaries, the absolute frequency, the relative frequency, and cumulative frequencies for the following set of raw data using class interval; of 60-62, 63-65 .....

67 73 71 74 61 68 70 66 73 70 68 67 72 69 71 69 76 70 72 71 77 69 71
74 66 68 70 72 72 70 71 70 64 65 70 69 72 75 66 67 70 72 67 70 71 68
66 73 69 67

(b) Explain any four features of a good frequency distribution table

Question three **(20 marks)**

(a) The score of 50 students in an examination conducted at Tenibegiloju College are given as follows:

65	70	60	46	51	55	59	63	68	53
47	53	72	53	67	62	64	70	57	56
73	56	48	51	58	63	65	62	49	64
53	59	63	50	48	72	67	56	61	64
56	52	49	62	71	58	53	69	63	59

(i) Prepare a grouped frequency table with class interval 45 – 49, 50 – 54, 55 – 59 .....

(ii) Calculate the mean and standard deviation of the distribution.

(iii) Determine the coefficient of variation of the distribution. $\frac{\sigma}{\bar{x}} \times 100$

(iv) What is the shape of this distribution? (Hint: Positively skewed, Negatively skewed, or Normal distribution).

(20 marks)

Question four

In a recent survey, it was found that 25% of Nigerians do not wear a seat belt while driving. Suppose a random sample of ten (10) Nigerians is selected.

(i) What is the probability that six (6) Nigerians do not wear a seat belt while driving?

(ii) What is the probability that four (4) or five (5) Nigerians do not wear a seat belt while driving?

BLD/2018/079

(iii) What is the probability that more than two (2) Nigerians do not wear a seat belt while driving?

(iv) What is the probability that at least eight (8) Nigerians do not wear a seat belt while driving?

(v) What is the probability that less than three (3) Nigerians do not wear a seat belt while driving?

(20 marks)

Question five

(a) Out of every 200 cheques handled by the cashier in a bank, 140 are honoured and 60 dishonoured. Of the 60, 40 are marked for representation and 20 are returned to the drawer. If two cheques are presented to the cashier, what is the probability that:

(i) The two cheques would be honoured

(ii) Only one of the cheques would be honoured

(iii) The two cheques would be dishonoured

(b) Mr. Peter presents a cheque to the cashier, but the cheque is not honoured, what is the probability that it will be requested for representation.

(20 marks)

Question six

(a) With the aid of diagram(s) or example(s), differentiate between the following pairs

(i) Critical region and Acceptance region

(ii) Level of significant and Decision rule

(b) Discuss the steps involved in hypothesis testing

A Lecturer in Department of Economics claims that students in SSC 201 are above average intelligence. A random sample of 50 students IQ score have a mean score of 114.3. Is there sufficient evidence to support the Lecturer's claim at 5% level of significant? The mean population IQ is 101 with a standard deviation of 16.

OBAFEMI AWOLOWO UNIVERSITY

ILE-IFE

HARMATTAN SEMESTER EXAMINATION 2019/2020 SESSION

FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING

B.Sc. Building

MAY 2021

BLD 301: BUILDING CONSTRUCTION AND MATERIALS III

INSTRUCTIONS

Answer Question 1 and three (3) other questions

TIME ALLOWED: 2HOURS

1(a) Bricks are made from clay ranging from loose sandy deposits through soft/plastic surface deposits to hard mud stones, shales etc. Describe the various stages involved in the production of bricks. (5points)

Preparation → moulding → drying → Heating
Digging

(b) In the production of cement during the burning stage, the material is constantly agitated by the action of the rotary kiln with a temperature of 1500°C-1700°C operating to a slope of 1:30. The constituents combine to produce four bogue compounds.

(i) List the compounds produced and their chemical compositions respectively. (4points)

(ii) State the percentage of Ordinary Portland Cement in each. (2points)

(c) Produce a typical plan and sectional diagrams of a three equal flight stair case (6points)

(d) Using a flow chart, produce the production process of the conversion of nylon waste materials into interlocking paving blocks. (4points)

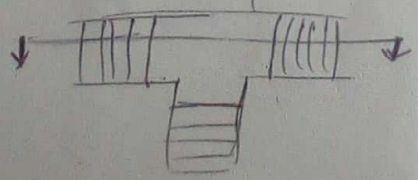
Sele
↓
melt
↓
mouldin
↓
Dry

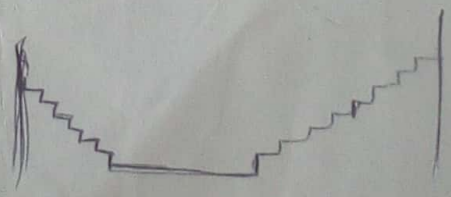
C_3S

C_2S

C_3A

C_4AF





(e) Produce in a tabular format six (6) standard timber sizes, names and unique roles in timber roof trusses (9points)

2 (a)(i) After felling, timber is hauled as logs on wagons or lorries or floated to sawmills where they are converted to standard building materials with specialized saws. With the aid of sketches, describe three methods of reducing these logs to smaller units. (6points)

(ii) List six names of commonly found hardwoods in the market. (3points)

(b) (i) Illustrate the performance of timber when subject to tensile, compressive, shear and bending forces /stresses in relation to the method of loading: parallel or perpendicular to the grain direction. (8points)

(ii) List four fungi that attack the cellulose tissues of timber. (2points)

(c) List four desirable properties of preservation materials for timber (2points)

(d) Produce a typical section of a cellular raft foundation (4points)

3 (a) Explain five common defects in paints. (5points)

(b) There are two fundamental types of plastics: Thermoplastics and Thermosetting. What is the major difference between them. (2points)

(c) Describe the production process and state two uses of the following thermoplastics: (i) Polyethylene (Polythene) (2points)

(ii) Polystyrene (2points)

(iii) Nylon (2points)

(d) List two uses of the following types of thermosetting plastics in building:

(i) Phenol formaldehyde (2points)

(ii) Urea formaldehyde (2points)

(iii) Malamine formaldehyde (2points)

(e) Produce a typical plan and sectional diagram off a beam and slab raft foundation (6points)

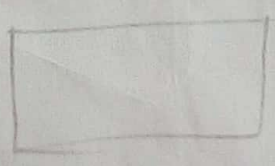
4 a(i) Describe two types of bitumen (2points)

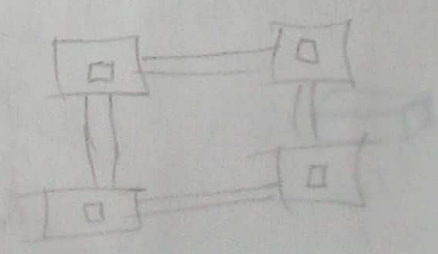
(ii) List six characteristics of bituminous products. (6points)

(b) Describe four methods of quarrying stones. (4points)

(c)Describe three agents leading to decay of natural stones. (3points)

(e) Produce typical and detailed plan and sectional sketches of a normal and wide strip foundations (12points)





BND/2018/079

5 a(i) List six properties normally considered in the selection of metals. (6points)

(ii) Describe the following types of iron ores:

- Magnetite (2points)
- Haematite (2points)

b(i) Produce a typical flow chart of the production process of plastic bricks (4points)

(ii) Produce a flow chart of steel production (4points)

(iii) Produce a plan and sectional sketches of a pad foundation (7points)

OBAFEMI AWOLOWO UNIVERSITY
ILE-IFE, NIGERIA
DEPARTMENT OF MECHANICAL ENGINEERING
FINAL EXAM

Course	MEE 303: Fluid Mechanics 1		
Student's Name			
ID. Number	BU/2018/079		
Day, Date		Finish Time	
Start Time			

Instruction: Answer question one and any other three questions

QUESTION ONE (25 Points)

(a) What are 3 important applications of fluid mechanics to your field of study?

(b) A High school student in Nigeria claimed he designed a ship that can be built for transporting crude oil from Escravos to Lagos through the sea or Lagoon. As a student of Fluid Mechanics, describe three relevant concepts or principles necessary to validate this design.

(c) **Fill in the gap with suitable word from list of terminologies in the table below.**

i. ----------is a continuously deforming body under the action of shear stress.

ii. When shear stress is directly proportional to velocity gradient, it is assumed the fluid is ----------

iii. The property of a system that depends on mass is called ----------while ---------- --is the property of the system that is not mass dependent.

iv. ----------is the compression stress at a point in a fluid while ----------is a measure of internal energy level of a fluid.

v. The pressure at a point in a static fluid is the same in all direction, this is explained by..... law.

vi. The flow regime in a moving fluid can be laminar or turbulent depending on .....

vii. The equation that relates pressure head, velocity head and elevation head along a streamline is called .....equation

viii. The subject that deals with fluid in motion and the forces on the fluid particles is .....

ix. No slip condition in a moving fluid is described by.....theory

x. Two important forces on fluid element are pressure force and ..... force.

Shear stress	Fluid dynamics	Newtonian	Non-Newtonian	Reynolds number
Mach Number	Intensive	Extensive	Viscous	Density
Laminar flow	Turbulent flow	Pressure	Pascal	Euler
Fluid	Temperature	Bernoulli	Boundary layer	Capillarity

QUESTION TWO (25 Points)

(a) A crane is used to lower weights into the sea (density 1025 kg/m^3) for an underwater construction project as shown in Figure Q-2. Determine the tension in the rope of the crane due to a rectangular 0.4 m x 0.4 m x 0.3 m concrete block (density = 2300 kg/m^3) when it is:

i. Suspended in the air

ii. Completely immersed in water

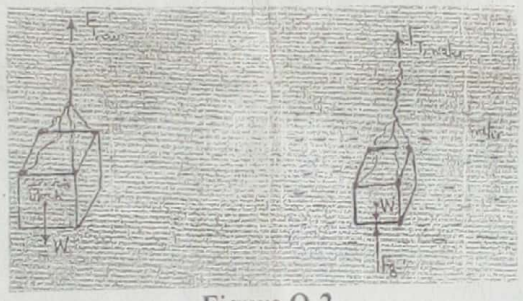


Figure Q-2

QUESTION THREE (25 Points)

(a) Consider flow in a straight conduit. The conduit is circular in cross section. Part of the conduit has a constant diameter, and part has a diameter that changes with distance. Then, relative to flow in that conduit, correctly match the items in column A with those in column B.

A	B
Steady flow	$\partial V_s/\partial s = 0$
Unsteady flow	$\partial V_s/\partial s \neq 0$
Uniform flow	$\partial V_s/\partial t = 0$
Nonuniform flow	$\partial V_s/\partial t \neq 0$

(b) The velocity of water flow in a nozzle is given by the following expression:

$$V = 2t\left(1 - \frac{0.5x}{L}\right)$$

where V = velocity in meter per second, t = time in second, x= distance along the nozzle, and L = length of nozzle in meter. When $x = 0.5L$ and $t = 3$ s, Determine:

i. The local acceleration along the centerline

ii. The convective acceleration if the length of the nozzle is 3 m?

QUESTION FOUR (25 Points)

(a) Describe Bernoulli's equation and identify its applications.

(b) An open tank filled with water and drains through a port at the bottom of the tank as shown in Figure Q-4. The elevation of the water in the tank is 10 m above the drain. The drain port is at atmospheric pressure. Find the velocity of the liquid in the drain port.

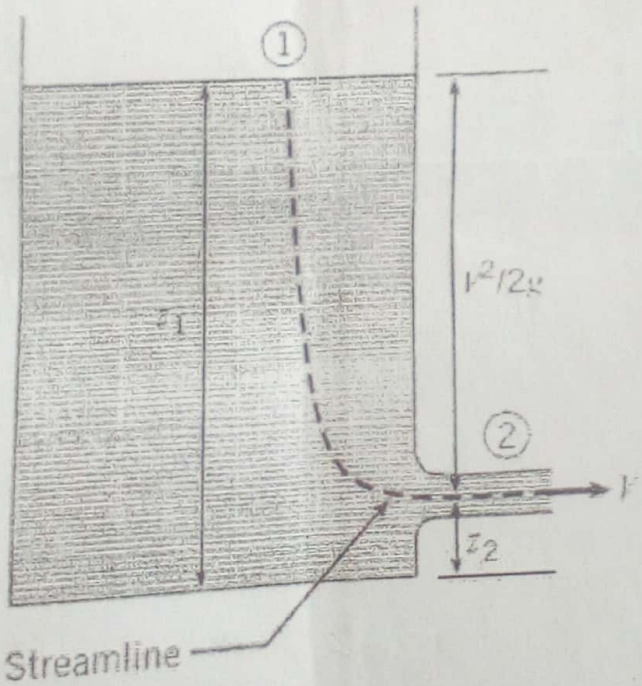


Figure Q-2

OBAFEMI AWOLOWO

DEPARTMENT OF BUILDING

2019/2020 HARMATTAN SEMESTER EXAMINATIONS

BLD303- CONSTRUCTION TECHNOLOGY I

INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS WITH NECESSSARY SKETCHES

Time allowed: 3 Hours

QUESTION ONE

a. If we assume that the oil drilling platforms on the shores of the Niger Delta are standing on pile foundation. How were tests carried out to determine the bearing capacity of the soil stratum where the piles terminated
b. What are the usual tests necessary for determining the features of groundwater on a construction site.
c. How do you determine the safe bearing capacity on typical site for a strip foundation
d. What are the limitations of wash probing and wash boring?.

QUESTION TWO

a. How would you counteract the effect of upthrust at the inception of foundation construction ; show three methods.
a. Show the plan and section of the cofferdam you'll use for the second bridge across Osun river in Osogbo. Explain the whole construction process.
b. Timber cribwork dams are quite useful in construction works, explain its function and construction process.
c. Explain three methods of piling over water.

QUESTION THREE

a. Explain the two broad causes of settlement of buildings and necessary antidotes.
b. Where piles will be inappropriate because of need for rooms below ground level, state and show three alternative construction methods.
c. Explain articulation in buildings on moving grounds
d. What are the dominant features of a pneumatic caisson

QUESTION FOUR

a. Explain the pillar and stall mining workings and its ground movement effects.
b. Explain longwall mining and its subsidence effects
c. How do you make previously mined site useable for a new skyscraper.
d. Show the constructional details of a buoyancy raft foundation constructed as a caisson.

QUESTION FIVE

a) Explain the following; i) The general principles of buoyancy ii) The general principles of basement box foundation
b) Show the construction details of a buoyant foundation built with precast concrete panels
c) Explain three methods of piling over water
d) How do you construct a 40m deep diaphragm retaining wall.

OBAFEMI AWOLOWO UNIVERSITY
ILE-IFE, NIGERIA
DEPARTMENT OF BUILDING

HARMATTAN SEMESTER EXAMINATION 2019/2020
BLD 305 - BUILDING MAINTENANCE I

Answer Question 1 and THREE others ***The maximum scores are given in parenthesis***

1. (a) Produce a cross section diagram of the 2/3-bedroom building surveyed for the practical sessions. *(5pts)*
   (b) Sketch any 10 Types of timber joints and indicate the specific spot each could be used in the 2-3 BR building above where there is need for repairs. *(10pts)*

2. In a single detailed diagram demonstrate how a raking shore may be combine with a flying shore. *(15pts)*

3. (a) Show with single line diagrams the pattern of settlement cracks expected at the ***middle*** and ***any end*** portions of:
   i. A framed structure
   ii. A load bearing wall structure *(8pts)*
   (b) State three stages necessary for the repair of cracks in walls or floors. *(3pts)*
   (c) List any four materials that may be used for the sealing of cracks. *(4pts)*

4. With diagrams and specifications **only**, show any 3 ways in which rising dampness may be checked in an existing building in a site with menacing ground water. *(15pts)*

5. Illustrate with a detailed diagram how underpinning operations may be executed with the aid of dead shores. *(15pts)*

6. Explain, define, or illustrate any FIVE of the following:
   a) Ettringite
   b) Crypto-florescence
   c) Building Maintenance
   d) Building standard parameters
   e) Driving Rain Index
   f) Grinning of paint work
   g) Post completion deterioration agencies *(3pts each)*

END

BLD/2017/022

5 a(i) List six properties normally considered in the selection of metals. (6points)

(ii) Describe the following types of iron ores:

- Magnetite (2points)
- Haematite (2points)

b(i) Produce a typical flow chart of the production process of plastic bricks (4points)

(ii) Produce a flow chart of steel production (4points)

(iii) Produce a plan and sectional sketches of a pad foundation (7points)

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.

Instructions: (i) Answer **ANY** three questions — Time allowed: 2 hours 30 minutes
(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 contro! 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, ILLE-IFE, NIGERIA
FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT
DEPARTMENT OF BUILDING
Harmattan Semester Examination 2019/2020 Session

B.Sc. Building, Estate Management and Quantity Surveying
BLD 307: BUILDING SERVICES AND EUIPMENT I
Instructions: Answer **Two Questions** from **each section** **Time Allowed:** 3 hours

SECTION A

Question One

a. Reproduce the diagram shown below; identify the components labeled *(A–H)* and explain what the diagram means to you

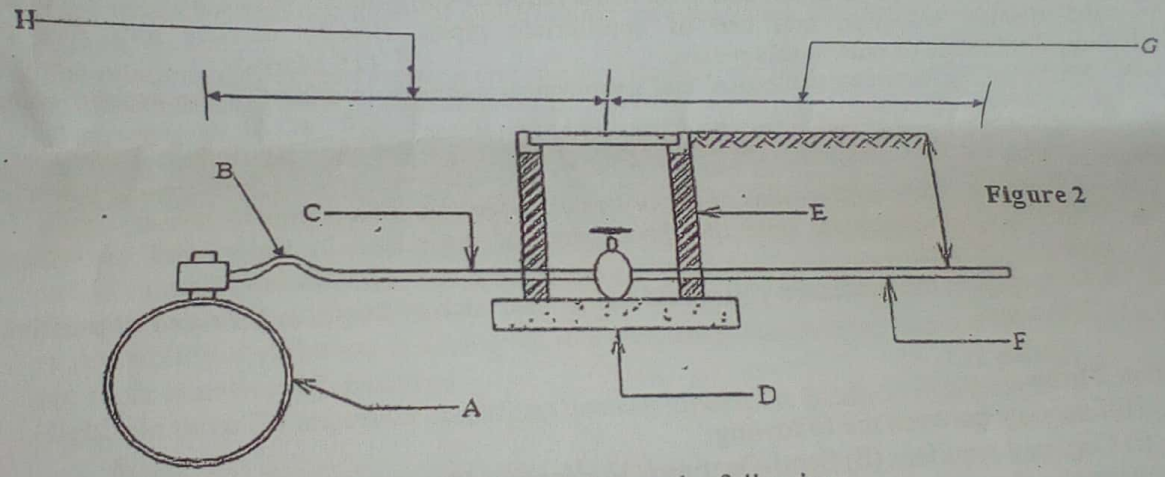


Figure 2

b. With the aid of neat sketches, write short notes on the following:
   (i) Direct cold water system
   (ii) Indirect cold water system.

c. Differentiate between the following:
   i. Valves and taps
   ii. Water main and service pipe
   iii. Supply pipe and distribution pipe. (30 marks)

Question Two (30 marks)

a. Enumerate various sources of water used for drinking/domestic purpose.
b. Explain the relevance of dam and intake chamber in water treatment.

c. If water supplies to your building either from public water main or from the underground well contains the following underlisted characteristics:
(i) Tasty (ii) Brown in colour (iii) Smelling (iv) Contained Total Solid Particles
(v) Suspended Solid Particles
Succinctly explain the cause(s) and what can be done to improve these characteristics in order to make the water portable? (illustrate your answers with appropriate equations). (30 marks)

Question Three (30 marks)

a. What is portable water? What other words could be used to describe portable water?
b. Explain briefly the basic treatment systems of raw water at town/municipal level to make it portable.
c. Discuss various types of household level water treatment to make raw water portable.
d. List various components of cold water supply system. Enumerate basic parameters that need to be removed for water used for drinking purpose. (30 marks)

SECTION B

Question One

a. Water transmission to urban and rural areas requires compliance with some provisions in the design, selection and use of appropriate pipes. Briefly discuss any five (5) considerations of note in this regard. (15 Marks)

b. Differentiate between geological and geophysical methods involved in the ground water exploration process. (20 marks)

Question Two

a. Discuss the likely implications of impurities of water on the consumers.
b. Using typical examples, state the three forms of impurities in water, and give three examples of each. (10 Marks)
c. Briefly explain the processes you would use to treat each of the three forms of impurities in 2(b) above.

Question Three

a. Differentiate between the following:
(i) Confined Aquifer (ii) Semi-Confined Aquifer (iii) Unconfined Aquifer (9 marks).
b. Write shortly on the design and layout of storm drainage system in an urban environment. (15 marks)
c. Write briefly on the process that ensures continuous occurrence of water in the environment. (11 Marks)

BLD/2016/013

DEPARTMENT OF BUILDING

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE.2018/2019 RAIN SEMESTER EXAMINATIONS

BLD 309

INSTRUCTIONS: ATTEMPT ALL QUESTIONS IN SECTION A, ONE IN SECTON B AND ONE IN SECTION C

TIME ALLOWED: 3 HOURS

SECTION A

QUESTION ONE

1. State Castigliano's First and Second theorems
2. Using Castiagliano's energy theorem, analyse the frame in Fig. 1
3. Refer to Fig. 2, use Castiagliano's Second theorem to compute the deflection at D and the slope of the beam at B. sketch the deflected shape of the beam system AE (EI is constant).

SECTION B

4. Solve the frame in Fig. 3 using slope deflection method.
5. Analyse the beam in Fig. 4 using moment distribution method.

SECTION C

6. A continuous beam ABCD 20m long is supported at B and C and fixed at A and D. the spans AB, BC and CD are 6m, 8m and 6m respectively. The span AB carries a uniformly distributed load of 2KN/m, the span BC carries a central point load of 20KN and span CD carries a point load of 10KN at a distance of 3m from C. during loading, the support B sinks by 1cm. analyse the beam completely using Clapeyron's method and draw the Shear Force Diagram and bending Moment Diagram ($E = 2.0 \times 10^3$ KN/cm^2 and $I = 30{,}000$ cm^4). All spans have equal moment of inertia.
7. Calculate the vertical and horizontal deflections at joint 4 as shown in Fig. 5 ($A = 500$mm^2 and $E = 200 \times 10^6$ KN/m^2)

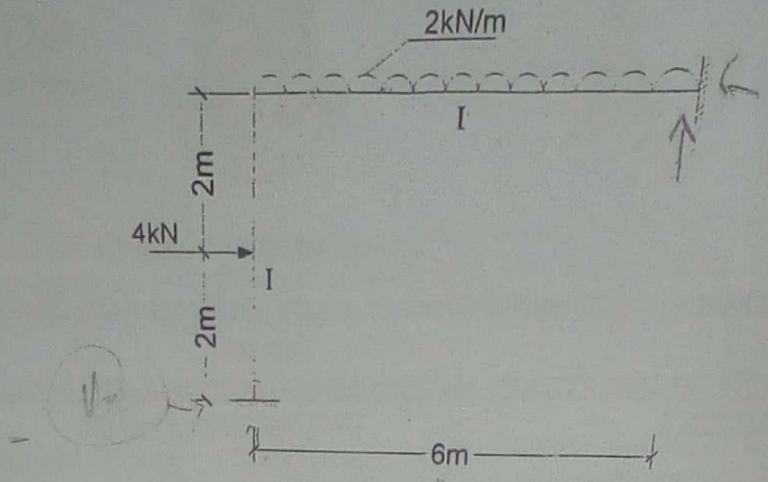


FIG. 1

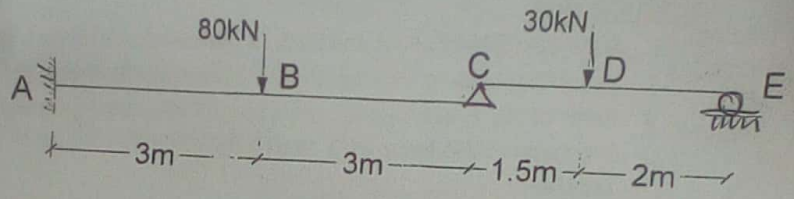


FIG. 2

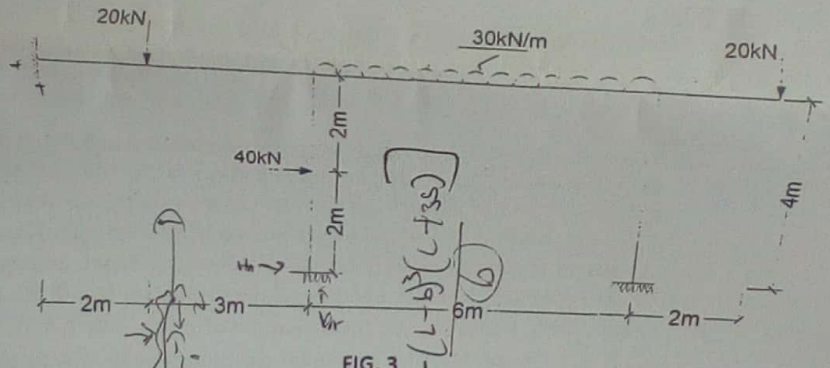


FIG. 3

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ESTION FOUR

A. Explain in your own words what you understand by influence line for bending moment. How does it differ from the bending moment diagram.

B. Two loads 4kN and 12kN respectively separated by a distance of 6m, crosses a bridge of span 50m from the left to right with the smaller load leading. Calculate the position and magnitude of the maximum bending moment on the bridge.

C. Three axle loads 30kN, 60kN and 60kN respectively pass over a bridge of 40m span. The horizontal distances between the axles taken in order are 5m and 10m. Find the greatest bending moment produced by the loads.

D. A bridge of 60m span weights 7kN/m. It is traversed from left to right by a uniformly distributed load 30kN/m of 70m length. What is the magnitude of the maximum positive shear force that would occur at the left hand quarter point? What would be the magnitude of the maximum bending moment on the span?

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DEPARTMENT OF BUILDING

FACULTY OF ENVIRONMENTAL DESIGN AND MANAGEMENT

BSc. BUILDING 2019/2020 HARMATTAN SEMESTER EXAMINATIONS

BLD 309 - THEORY OF STRUCTURES

INSTRUCTIONS: ATTEMPT THREE QUESTIONS IN ALL TIME ALLOWED: 3 HOURS

QUESTION ONE

Use Clapeyron's theorem to:

A. Determine the moments at the support of a continuous beam ABCD pinned at A and simply supported at B and C. The beam has a self-weight of 10kN/m and a point load of 100kN at the mid-point of AB. AB= 10m, BC= 12m and CD= 6m

B. Determine the reactions at supports of a continuous beam ABCDE simply supported on four supports A, B, C and D. It carried a UDL of 10 KN/m over its entire length and concentrated loads of 200kN and 100kN at mid-point of BC and at D respectively. AB = 15m, BC = 20m, CD = 9m and DE = 4m

QUESTION TWO

A. Analyse the continuous beam ABCD using the slope deflection method.

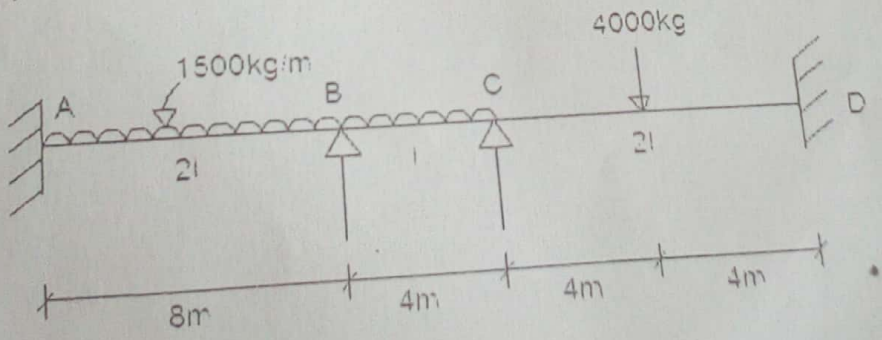

Fig. 2a

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B. A beam of 25m length is simply supported at the left end and at 20m from that end. A uniformly distributed load of 1kN/m extends over the entire span. Determine the deflection midway between the supports

QUESTION THREE

A. Analyse the frame in Fig. 3a below by moment distribution method.

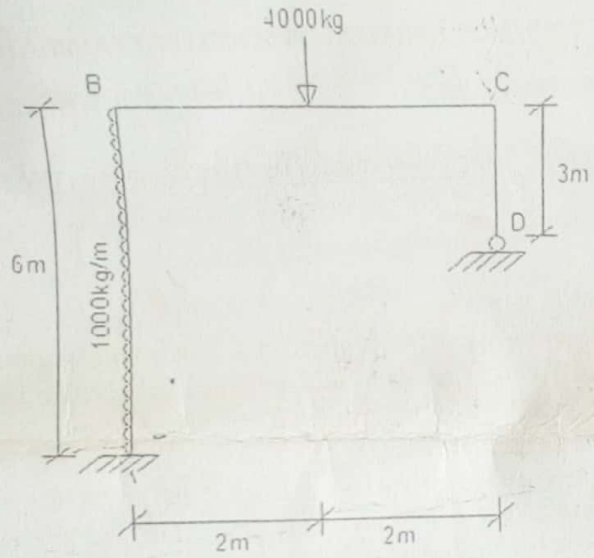

Fig. 3a

B. From Fig. 3b below, Support B sinks by 8mm. Calculate the bending moment at A, B, C and D. (E=180kN/mm²)

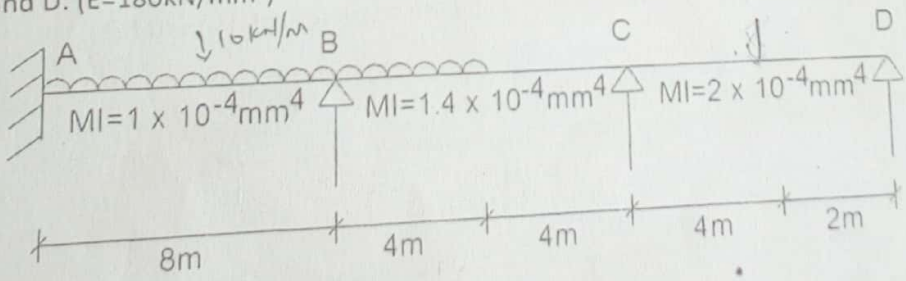

Fig. 3b