MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY

DIPLOMA IN CIVIL ENGINEERING

BCECD 217: SOIL MECHANICS I

Date: 8/12/2015 **Time: 8:30 – 10:30 AM**

INSTRUCTIONS:

- ***This paper comprises of five questions***
- ***Question one is compulsory and carry 30 marks***
- ***Answer any other two questions***

1. a) Describe three types of soils according to mode of formation. (6 marks)

   b) With sketches describe the three types of clay structures. (6 marks)

   c) Derive an expression to show that (5 marks)

   $$n = \frac{e}{1+e}$$

   d) Describe briefly how to determine liquid limit in laboratory. (13 marks)

2. a) Describe the following terms (6 marks)

   i) Liquid limit

ii) Plastic limit
iii) Shrinkage limit

b) Give two importance of soil classification. (4 marks)

c) Derive an expression to show that (10 marks)

$\gamma_{sat} = \frac{Gs+e}{1+e} = \gamma_w$

3. a) In its natural condition a soil sample has a mass of 2290g and a volume of $1.15x10^{-3}m^3$. After being completely dried in an oven and mass of the sample is 2035g.The value of G_s for the soil is 2.68.Determine the bulk density, unit weight, water content; void ratio, porosity, degree of saturation and air content. (15 marks)

b) Explain briefly how soil compaction is done in a laboratory. (5 marks)

4. a) With a sketch explain how to determine coefficient of permeability in laboratory. (10 marks)

b) Derive an expression to show that (10 marks)

$\gamma_d = \frac{Gs}{1+WGs} \gamma_w$

5. a) Describe with a sketch the tri-axial test method of determining shear strength of soils (15 marks)

b) Give five factors affecting soil permeability. (5 marks)

MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY

DIPLOMA IN CIVIL ENGINEERING

BCEBD 218: BUILDING TECHNOLOGY III

Date: 8/12/2015 **Time: 2:00 – 4:00 PM**

INSTRUCTIONS:

- ***This paper comprises of five questions***
- ***Question one is compulsory and carry 30 marks***
- ***Answer any other two questions***

1. a) With the aid of sketches, describe the following shoring types; (8 marks)

   (i) Raking shoring
   (ii) Dead shoring

   b) Give six principles of a good drainage system. (6 marks)

   c) With the aid of sketches, describe the following foundations; (8 marks)

   (i) Deep strip foundation
   (ii) Pile foundation

   d) Explain five design considerations of a stair. (8 marks)

2. a) With the aid of sketches, describe the following underpinning methods:

(i) Wall underpinning
(ii) Jack and pile underpinning

b) With the aid of sketches, describe the following scaffolds. (12 marks)

(i) Putlog scaffold
(ii) Independent scaffold

3. a) Describe with a sketch a manhole (6 marks)

b) Describe with a sketch, two types of drainage systems. (14 marks)

4. a) Give six designs considerations for underground drainage system. (12 marks)

b) Describe four functional requirement of a good scaffold. (8 marks)

5. a) With sketches, describe the following timber stairs. (8 marks)

(i) Dog-leg stair
(ii) Open well stair

b) Describe any foundation for a framed building. (8 marks)

c) Describe the following dewatering method; (4 marks)

Well point method

MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIRST SEMESTER EXAMINATION FOR DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY

DIPLOMA IN CIVIL ENGINEERING

BCECD 103: ECONOMICS I

Date: 4/12/2015 **Time: 2:00 – 4:00 PM**

INSTRUCTIONS:

- ***This paper comprises of five questions***
- ***Question one is compulsory and carry 30 marks***
- ***Answer any other two questions***

1. a) Define the following economic concepts (8 marks)

   (i) Scale of preference
   (ii) Opportunity cost
   (iii) Choice
   (iv) Utility

   b) (i) With a graph, show a shifting demand curve (2 marks)

   (ii) List the factors that will cause demand of a product to shift. (4 marks)

   c) (i) Describe the three types of market structures. (6 marks)

   (ii) State two roles of the central bank (2 marks)

   (iv) Explain briefly two methods used in the determination of National Income Accounting. (4 marks)

d) Explain the theory of comparative advantage. (2 marks)

2. a) Give the significance of national income accounting. (12 marks)

b) Describe four limitations of having monopolistic competition. (8 marks)

3. a) State five causes of inflation. (5 marks)

b) Explain the following terms (8 marks)

(i) Fiscal policy
(ii) Income policy

c) With a graph, explain the law of diminishing marginal utility (7 marks)

4. a) Describe six factors affecting production cost. (12 marks)

b) Explain the theory of consumption by giving a relevant example. (8 marks)

5. a) Sketch a graph to show an equilibrium market. (4 marks)

b) With a graph show a shifting supply curve. (2 marks)

c) Describe six factors that will affect the production of a commodity. (12 marks)

d) Give two functions of a market. (2 marks)

MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIRST SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING

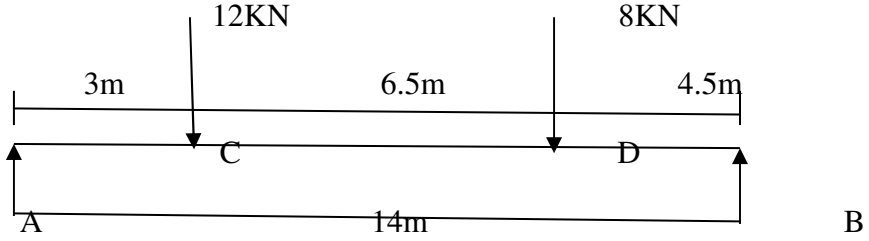
BCECD 204: THEORY OF STRUCTURES I

Date: 3/12/2015 **Time: 2:00 – 4:00 PM**

INSTRUCTIONS:

- ***This paper comprises of five questions***
- ***Question one is compulsory and carry 30 marks***
- ***Answer any other two questions***

1. a) A horizontal steel girder having uniform cross-section is 14m long and is simply supported at its ends. It carries two concentrated loads as shown



Calculate the deflections of the beam under the loads C and D. Take $E=200N/MM^2$ and $I=160x10^6\ MM^4$ (20 marks)

b) Differentiate between the following (4 marks)

(i) Short column
(ii) Long column

c) Explain the following (6 marks)

(i) Crippling load

(ii) Slenderness ratio
(iii) Radius of gyration

2. a) A hollow circular column having external and internal diameters of 300mm and 250mm respectively carries a vertical load of 100KN at the outer edge of the column .Calculate the maximum and minimum intensities of stress in the section

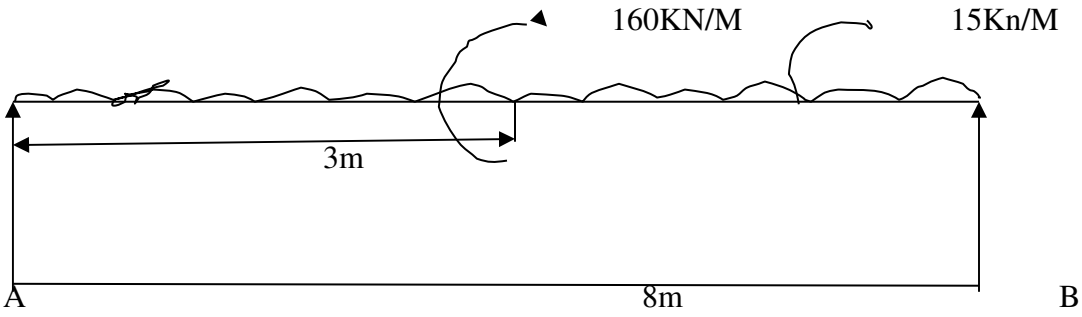
(10 marks)

b) State four assumptions of Euler's theory. (8 marks)

c) Illustrate how a long column is bound to fail. (2 marks)

3. a) A solid round bar 3m long and 5m in diameter is used as a strut with both ends hinged. Determine the crippling load. Take $E=2.0x10^5N/mm^2$ (7 marks)

b) A horizontal beam AB is freely supported at A and B, 8m apart and carries a uniformly distributed load of 15KN/M run. A clockwise moment of 160KN/M is applied to the beam at a point C_1 3m from the left hand support A. Calculate the slope of the beam at C, if $EI=40x10^3KN/M^2$



(13 marks)

4. a) A column of timber section 20x30 cm is 6 metres long both ends being fixed. If young modulus for timber $=17.5KN/MM^2$. Determine

(i) Crippling load
(ii) Radius of gyration (10 marks)

b) Determine the Euler's bucking load for a steel diameter 40mm if the length between the pin joint is 4m.$\{E=210KN/MM^2\}$ (10 marks)

5. a) A hollow rectangular masonry pier is 1.2mx0.8m wide and 150mm thick. A

vertical load of 2MN is transmitted in the vertical plane bisecting 1.2 side at an eccentricity of 100mm from the geometric axis of the section. Calculate the maximum and minimum stress intensities in a section. (12 marks)

b) A rectangular strut is 150mm and 120mm thick. It carries a load 180Kn at an eccentricity of 10mm in a plane bisecting the thickness. Find the maximum and minimum intensity of stress in the section. (8 marks)

MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY

DIPLOMA IN CIVIL ENGINEERING

BCECD 213: THEORY OF STRUCTURESII

Date: 3/12/2015 **Time: 2:00 – 4:00 PM**

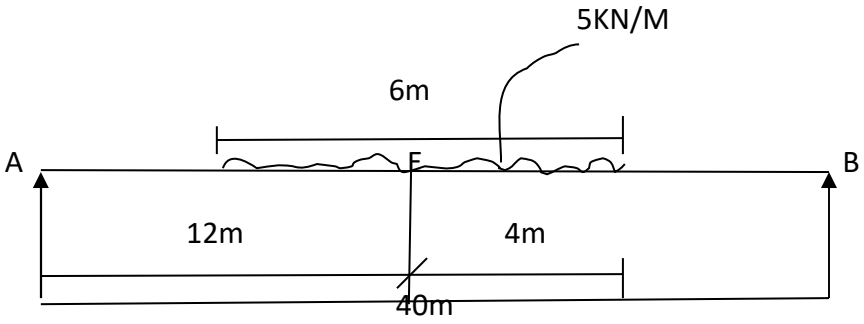
INSTRUCTIONS:

Answer Question One and Any Other Two Questions

1. a) In the following diagram, udl of 5KN/m,6m long crosses a girder of span 40m. Determine

(i) The influence line for shearforce at E
(ii) The influence line for bending moment at E
(iii) The values of S.F and BM at appoint 8m from the left support.

When the load is 16m from the left support.

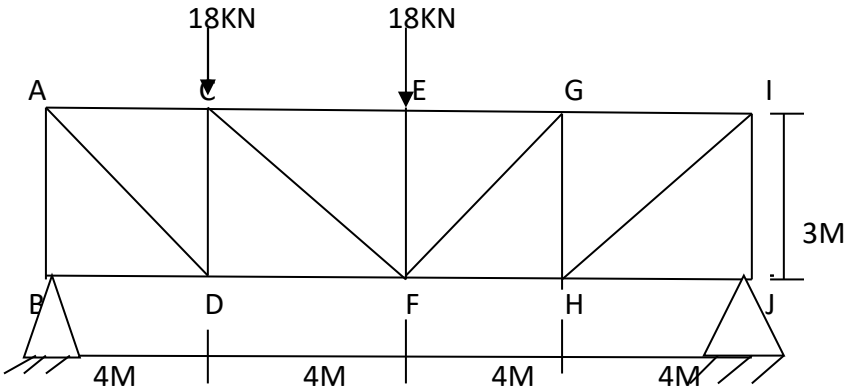


(25 marks)

b) i) Explain what is meant by zero force member

ii) Explain the importance of studying influence line (5 marks)

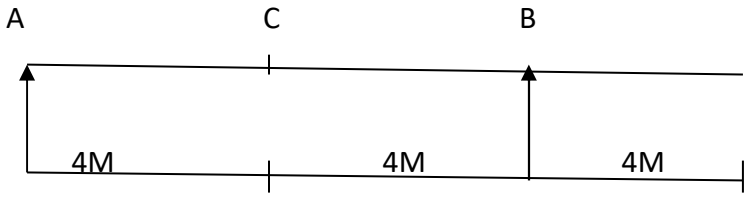
2. Find the forces in AB, AD, AC and equilibrium EG,FG, and FH on the right hand side



(20 marks)

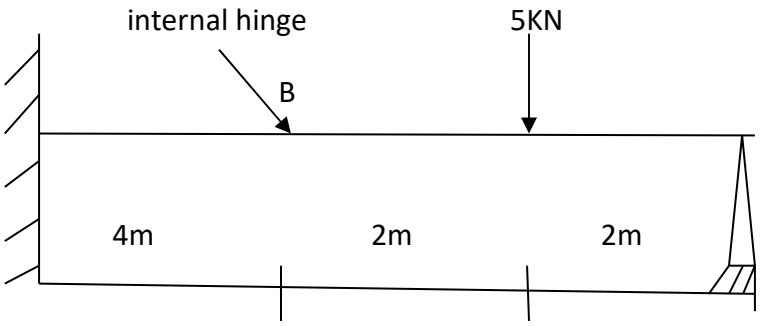
3. a) Construct the influence line for;

(i) Reaction at A and B
(ii) Shear at point C
(iii) Bending moment at point c in the following figure



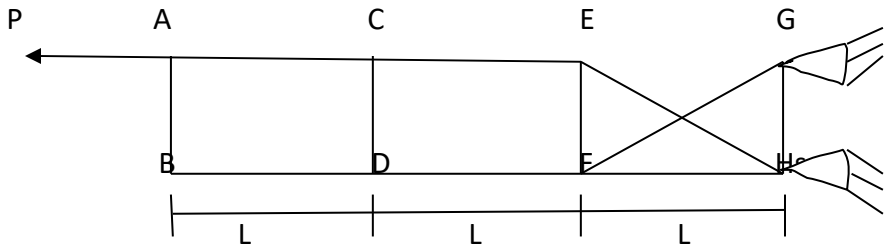
(10 marks)

b) Obtain the internal force diagram [SFD and BMD] for the beam



(10 marks)

4. a) Find the forces in all members in the figure



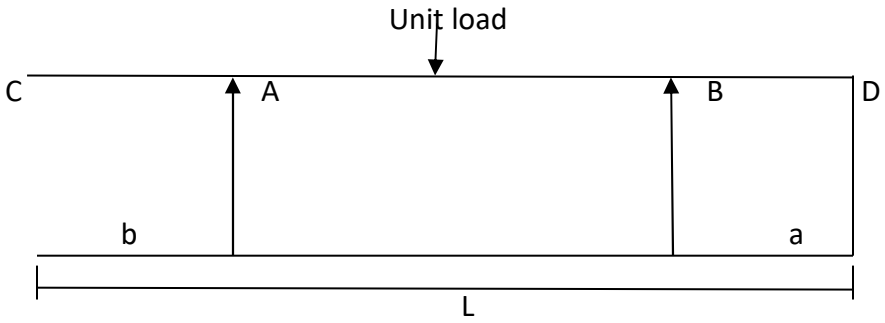
(16 marks)

b) State four statically determinate structures (4 marks)

5. a) A beam below has a double overhang and a unit load at a distance x from A. Construct

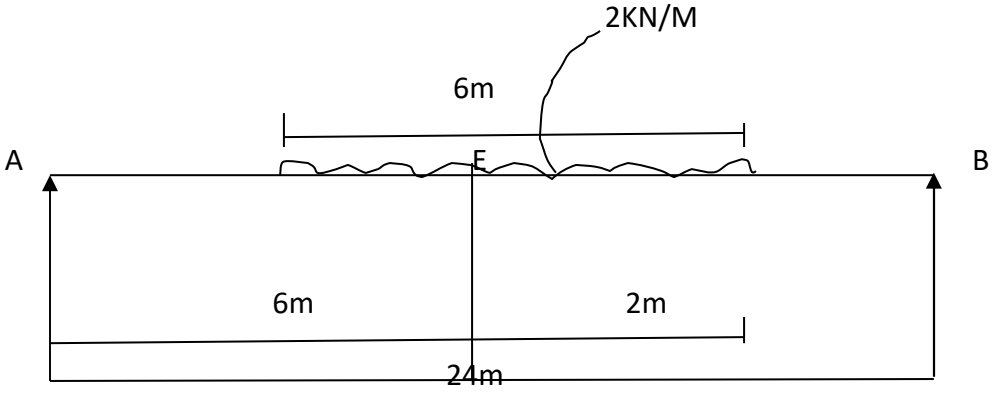
(i) The influence line for Reaction for R_A

(ii) The influence line for reaction B (10 marks)



b) In the following diagram, udl of 2KN/M, 6m long crosses a girder of span 24m.Detrmine

The values of S.F and BM at a point E (10 marks)



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY

DIPLOMA IN CIVIL ENGINEERING

BCECD 216: ENGINEERING GEOLOGY

Date: 2/12/2015 **Time: 2:00 – 4:00 PM**

INSTRUCTIONS:

- ***This paper comprises of five questions***
- ***Question one is compulsory and carry 30 marks***
- ***Answer any other two questions***

1.	a)	Explain six roles of a geologist in construction industry	(6 marks)
	b)	Give four factors affecting igneous rock texture	(4 marks)
	c)	Describe with sketches any three types of faults	(9 marks)
	d)	Give three geological importance of folding	(3 marks)
	e)	Describe with sketches two methods of tunnel construction	(4 marks)
	f)	Give four factors affecting the choice of site of a dam construction	(4 marks)
2.	a)	Describe briefly physical weathering	(4 marks)
	b)	Describe any two types of sedimentary rocks	(4 marks)

c) Explain four factors affecting metamorphic rock textures (8 marks)

d) Differentiate chemical weathering from biological weathering (4 marks)

3. a) Explain six geological significance of faulting (12 marks)

b) Explain briefly the following types of igneous rocks (8 marks)

i) Intrusive rock
ii) extrusive rock (8 marks)

4. a) Give four importance of studying geology (4 marks)

b) Explain the three types of metamorphism (6 marks)

c) With sketches, describe three types of folds (10 marks)

5. a) Explain five geological problems in dam construction (10 marks)

b) Explain five physical properties of igneous rocks (10 marks)

MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY

BCEBD 217: MEASUREMENTS OF BUILDING WORKS I

Date: 8/12/2015 **Time: 8:30 – 10:30 AM**

INSTRUCTIONS:

- ***This paper comprises of five questions***
- ***Question one is compulsory and carry 30 marks***
- ***Answer any other two questions***

1. a) Give four differences between an SMM and CESMM (8 marks)

   b) State four uses of bills of quantities (8 marks)

   c) Explain what is meant by variation (2 marks)

   d) Give four reasons of valuations of variation (8 marks)

   e) Explain two tendering procedure (4 marks)

2. a) Explain the following contract payment certificates

      (i) Penultimate certificate
      (ii) Final payment certificate (4 marks)

   b) Describe the three types of bill of quantities (6 marks)

   c) Explain the two methods of bill of preparation (6 marks)

   d) State two importance of studying measurements (4 marks)

3. a) Explain four functions of a nominated supplier in construction (8 marks)

b) Prepare a bill of quantities for insitu concrete of designed mix, grade c25,40mm aggregate for foundation bed 600mm wide,200mm depth and girth of 50000mm.Assume any other relevant information. (12 marks)

4. a) Give four roles of nominated sub-contractor during construction (8 marks)

b) Give four roles of a quantity surveyor during construction (8 marks)

c) Explain the following;

(i) Provisional sum
(ii) Prime cost sum (4 marks)

5. a) Give four roles of a nominated supplier during construction stage

b) Illustrate the following;

(i) Timesing
(ii) Grouping of dimension
(iii) Dotting-on (12 marks)