



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 215: ENGINEERING GEOLOGY

Date:

Time:

INSTRUCTION:

- 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 agents of metamorphic rocks (4 marks)
 - c) Describe any three types metamorphic rocks (9 marks)
 - d) Give three geological importance of faulting (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 mechanical weathering (4 marks)
 - b) Describe any two types of sedimentary rocks (4 marks)
 - c) Explain four factors affecting metamorphic rock textures (8 marks)

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- d) Differentiate chemical weathering from biological weathering (4 marks)
- 3. a) Explain four metamorphic rocks (12 marks)
- b) Explain briefly the following types of igneous rocks (8 marks)
 - i) Intrusive rock
 - ii) Extrusive rock
- 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 faulting (10 marks)
- 5. a) Explain five geological problems in dam construction (10 marks)
- b) Explain five physical properties of igneous rocks (10 marks)



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FIRST SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING

BCE CD 103: ECONOMICS 1

Date:

Time:

INSTRUCTION:

- Question one is compulsory and carry 30 marks
- Answer any other **two** questions

- Define the following economic concepts (8 marks)
 - Scale of preference
 - Opportunity cost
 - Choice
 - Utility
 - With a graph, show a shifting demand curve (2 marks)
 - List the factors that will cause demand of a product to shift. (4 marks)
 - Give four situations in which monopoly would arise. (8 marks)
 - Explain briefly two methods used in the determination of National income Accounting (4 marks)
 - Explain two characteristics of firms operating in oligopoly (4 marks)
- Describe five importance of International trade (10 marks)
 - Explain the theory of comparative advantage (2 marks)
 - Describe four limitations of having monopolistic competition (8 marks)
- Explain three uses of national income statistics (6 marks)

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- b) Explain the following terms (8 marks)
 - i) Fiscal policy
 - ii) Income policy
- c) With a graph, explain the law of diminishing marginal utility (6 marks)
- 4. a) Explain four types of inflation in economics (8 marks)
- b) Explain four measures which may be used to curb inflation (8 marks)
- c) With a graph, show a shifting demand curve (4 marks)
- 5. a) Describe four roles of the central bank in Kenya (8 marks)
- b) Give six main objectives of the fiscal policy (6 marks)
- c) Explain three factors affecting the production cost of commodity. (6 marks)



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DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND SEMESTER EXAMINATION FOR CERTIFICATE IN CIVIL ENGINEERING

BCE CD 204: THEORY OF STRUCTURES I

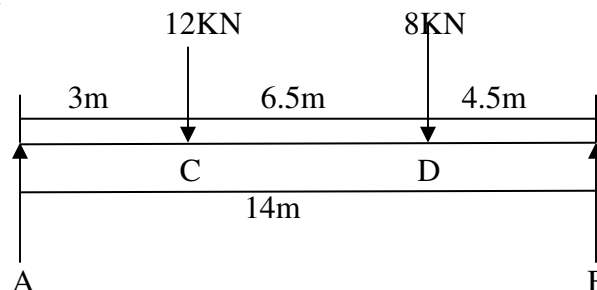
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INSTRUCTIONS:

- Question one is compulsory and carry 30 marks
- Answer any other two questions

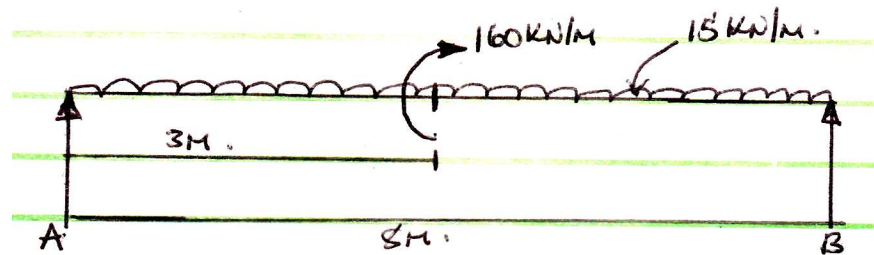
1. a) With a sketch, explain how a long column is bound to fail. (4 marks)
- b) Explain the following (6 marks)
- i) Crippling load
 - ii) Slenderness ratio
 - iii) Radius of gyration
- c) A horizontal steel girder having uniform cross-section is 14m long and is simply supported at its ends. It carries two concentrated loads as shown.



Calculate the deflections of the beam under the loads C and D. Take $E=200\text{N/mm}^2$ and $I=160 \times 10^6\text{mm}^4$ (20 marks)

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) Explain the four Euler's assumptions (4 marks)
- c) Determine the Euler's critical stress for a steel of diameter 40mm if the length between the pin joints is 4m. $E=210\text{KN/mm}^2$ (6 marks)
3. a) A masonry pier of 3M x 4M supports a vertical of 80kN at an eccentricity of 1M from the Y-axis and 0.5M from the X-axis. (15 marks)
- i) Find the stresses developed at each corner of the pier
- ii) What additional load should be placed at the centre of the pier, so that there is no tension anywhere in the pier section?
- b) With a sketch, derive an expression to show that

$$r_{yy} = \frac{b}{\sqrt{12}}$$
 (5 marks)
4. a) 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, 3m from the left hand support A. calculate the slope of the beam at C, if $EI= 40 \times 10^3 \text{ KN/m}^2$. (13 marks)



- b) Determine the Euler's buckling load for a steel diameter 40mm if the length between the pin joints is 4m. ($E=210\text{KN/mm}^2$) (7 marks)
5. a) A hollow rectangular pier is 1.2m x 0.8m wide and 150mm thick. A vertical load of 2MN is transmitted in the vertical plane bisecting 1.2m side at an eccentricity of 100mm from the geometric axis of the section. Calculate the maximum and minimum stress intensities in the section. (10 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 intensities of stress in the section. (10 marks)



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SECOND SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING

BCE CD:

Date:

Time:

INSTRUCTIONS:

- Question one is compulsory and carry 30 marks
- Answer any other **two** questions

- a) Give six environmental consideration considered before any construction process (6 marks)
 - b) Describe briefly the following processes (4 marks)
 - i) Site investigation
 - ii) Site clearance
 - c)
 - i) Describe with a sketch the isolated pad foundation. (4 marks)
 - ii) Give six functional requirements of roofs (6 marks)
 - iii) With a sketch, describe the open newel stair. (4 marks)
 - iv) Give two functional requirements of doors (2 marks)
 - d)
 - i) State two types of scaffoldings (2 marks)
 - ii) With a sketch, describe the closed couple roof (2 marks)
- a) Give three functional requirements of a foundation (6 marks)
 - b) With an aid of a sketch, explain how timbering is done on loose soils.(6 marks)
 - c) Explain two methods of foundation excavation (4 marks)
 - d) Explain two functional requirements of walls. (4 marks)

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3. a) With aid of sketches, describe two types of doors. (8 marks)
- b) Give four reasons for shoring (8 marks)
- c) Define a sub soil (2 marks)
4. a) With an aid of sketches, describe the following scaffolds (8 marks)
i) Independent scaffold
ii) Put-log scaffold
- b) Explain three reasons for timbering (6 marks)
- c) With an aid of a sketch, describe timbering in firm soils (6 marks)
5. a) With the aid of sketches, describe the following foundations. (8 marks)
i) Deep strip foundation
ii) Wide strip foundation
- b) Give four factors affecting the selection of equipment for excavation(4 marks)
- c) State two types of mechanical plant for excavation (2 marks)
- d) With an aid of a diagram, describe a dog leg type of stairs (6 marks)



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SECOND SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING

BCECD 213: THEORY OF STRUCTURES II

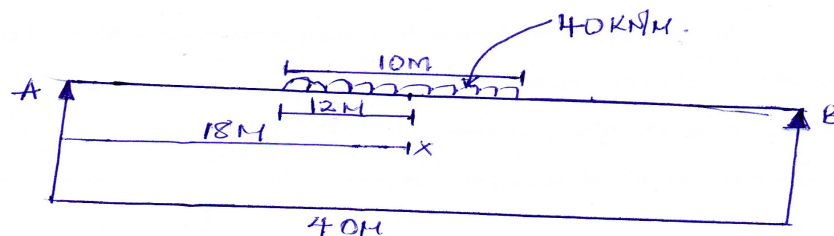
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INSTRUCTIONS:

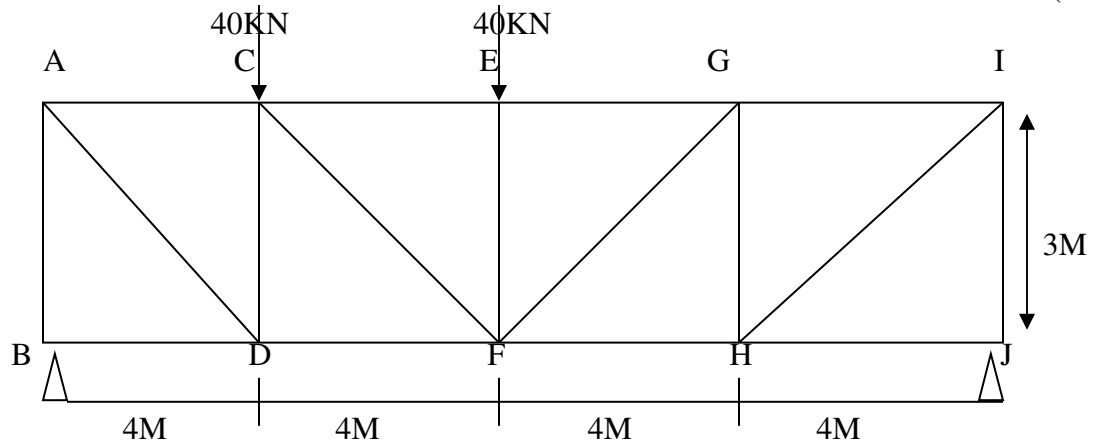
- Question one is compulsory and carry 30 marks
- Answer any other **two** questions

1. a) A uniformly distributed load 40KN/M of 10m length cross a girder of span 40m from left to right. With the help of influence lines, determine the values of shear force and bending moment at a point 18m from the left support, the head of the load is 12m from the left support. (20 marks)

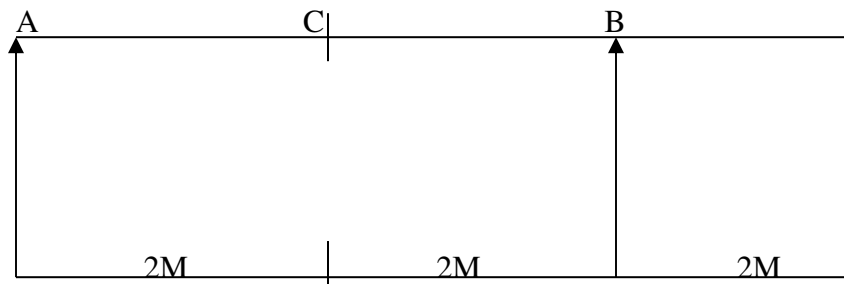


- b) Explain three importance of studying influence lines (6 marks)
- c) State four statically determinate structures (4 marks)

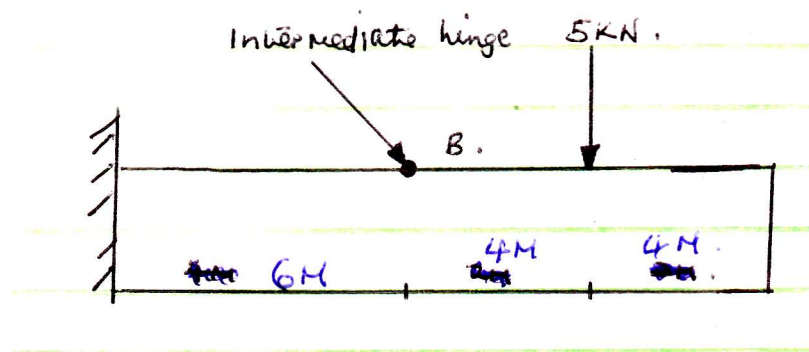
2. Find the forces in AB, AD, AC and equilibrium EG, FG and FH on the right hand side A (20 marks)



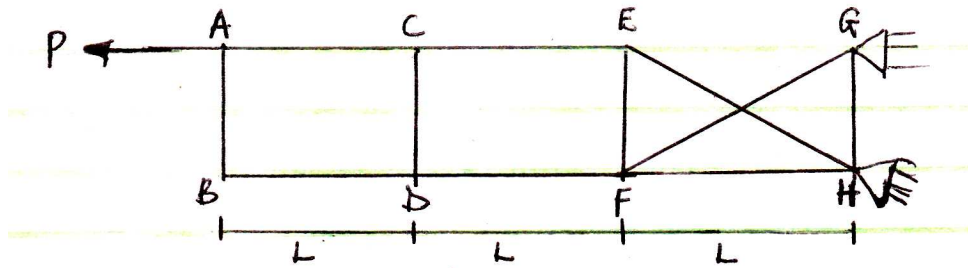
3. a) Construct the influence line for:-
 i) Reaction of A and B
 ii) Shear at point C
 iii) Bending moment at point C in the following figure. (10 marks)



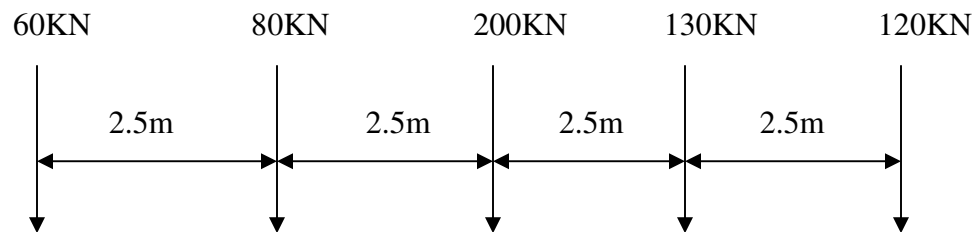
- b) Obtain the internal force diagram (SFD and BMD) for the beam (10 marks)



4. a) Find the forces in all members in the figure (10 marks)

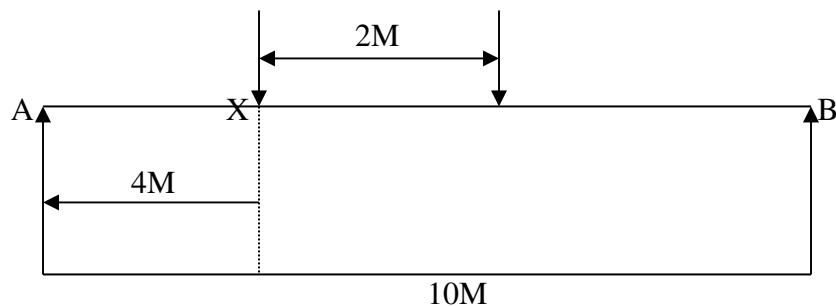


- b) A train of 5 wheel-loads as shown crosses a simply supported beam of span 22.5 metres.

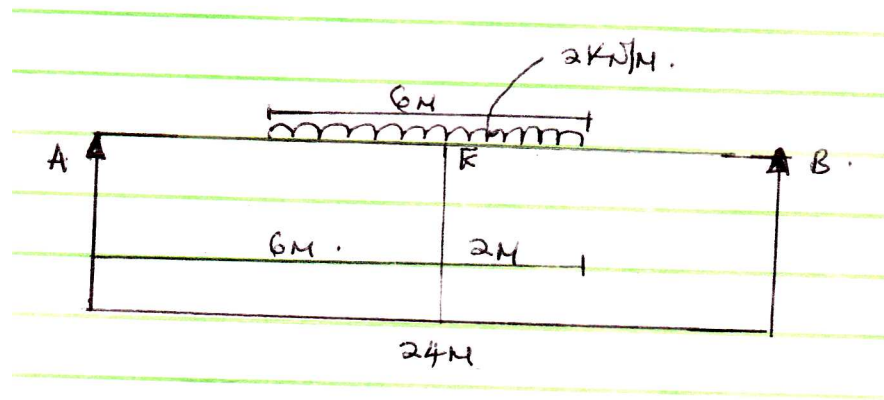


Calculate the maximum negative and positive shear force values of the centre of the span and the absolute maximum bending moment anywhere in span. (10 marks)

5. a) Two point loads of 80 kN and 160 kN spaced 2 m apart, cross a girder of span 10 m with the 80 kN load leading from left to right. Draw the influence lines for shear force and bending moment and find the value of maximum shear force and bending moment at a section 4 m from the left end support. (10 marks)



- b) In the following diagram, udl of 2 kN/m, 6 m long crosses a girder of span 24 m. Determine the values of S.F and BM at a point E. (10 marks)



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SECOND SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING

TRANSPORTATION ENGINEERING

Date:**Time:**

INSTRUCTIONS:

Answer question one and any other two questions

- a) Give six merits of labour based construction. (12 marks)
 - b) Explain three classes of road maintenance (8 marks)
- a) Give three purposes of road maintenance (6 marks)
 - b) Explain briefly the procedure of setting out a construction site (14 marks)
- a) Explain briefly three road furniture's (6 marks)
 - b) Explain briefly the construction process of pavement (14 marks)
- a) Describe two methods of road construction (8 marks)
 - b) Explain briefly laboratory tests for materials (8 marks)
 - c) Describe the term stabilization as in road construction (4 marks)
- a) Explain four contributions of labour based constructions to pro-poor growth. (8 marks)
 - b) Explain six methods of stabilization of roads (12 marks)

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