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University of Asia Pacific
Department of Basic Sciences and Humanities
Mid-term Examination Spring 2023
Program: B.Sc. in Civil Engineering

Course Title: Bangladesh Studies: Society and Culture
Time: 1 hour

Credit Hours: 2

Course Code: HSS 211(a)
Full Marks: 40

Answer TWO questions including question no. 3

1. a. Define sociology and common sense. 5
b. Discuss how sociological knowledge might be used in everyday life. 15

OR

2. a. Define culture and society. 5
b. Identify the essential components of culture. 15
3. a. What are the features of industrial societies advanced by Lenski? 5
b. Point out the stages of development of human society from Marxist Perspective. 15

University of Asia Pacific
Department of Basic Sciences and Humanities
Mid-Term Examination Spring 2023
Program: B.Sc. in Civil Engineering

Course Title: Bangladesh Studies: History
Time: 1 hour

Credit Hour: 2

Course Code: HSS211(b)
Full Marks: 40

There are **three** questions. Answer **two** questions including **Q-1**.

1. a. Explain Matsyanyayam. 10
b. Discuss how the Matsyanyaym ended and by whom. 10

2. a. Write a short note on Sultan Shamsuddin Iliyas Shah. 10
b. Explain the social changes in the Muslim period. 10

OR

3. a. Explain who the Bara Bhuiyans were and how they were defeated. 10
b. Write in brief the reasons and results of the Battle of Palassy. 10

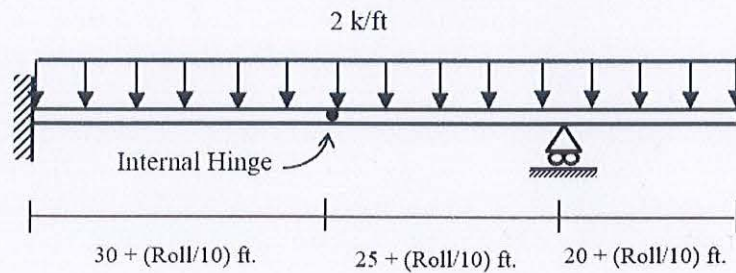
University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Spring 2023

Course Code: CE 211
 Course Title: Mechanics of Solids I

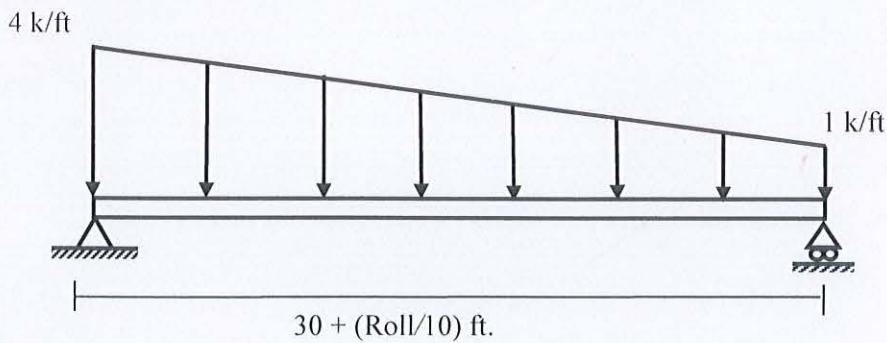
Time: 1 (one) Hour
 Full Marks: (3x20) = 60

Answer all questions.
Each question carries equal marks

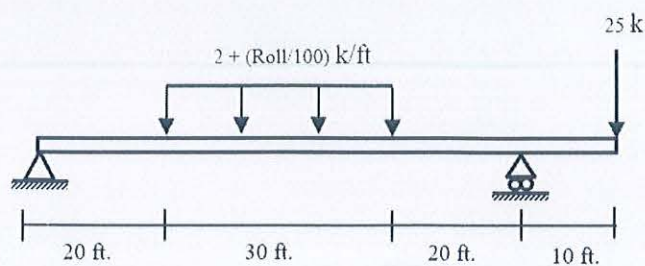
1. Draw Shear Force and Bending Moment Diagram for the following beam loading.



2. Determine the maximum positive and maximum negative moment for the following beam by Integration method.



3. Use singularity function to draw SFD and BMD for the following beam.



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Program: B.Sc. Engineering (Civil)

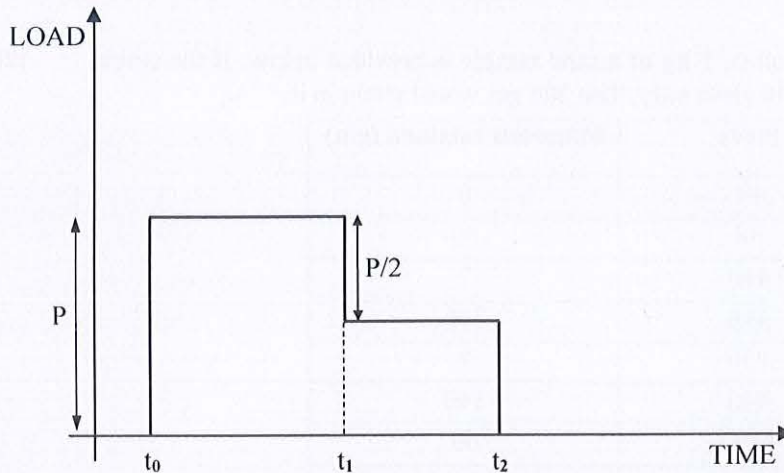
Course Title: Engineering Materials
 Time: 1 hour

Credit Hour: 4.00

Course Code: CE 201
 Full Marks: 80

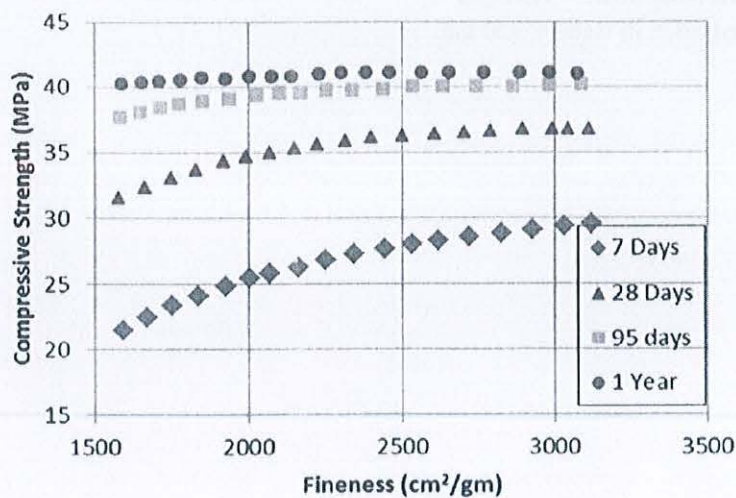
Answer all four questions

1.a) Draw the strain response diagram using the load versus time graph of an elasto-plastic material shown below. [12+8]
 material shown below. ($t_1 - t_0 = t_2 - t_1$)



b) Concrete used in tunnelling works faces the risk of being damaged by high amount of sulfates found in its surrounding environment. Explain how the presence of sulfate salts can lead to deterioration of concrete. How can you modify the composition of OPC to tackle this situation?

2.a) Interpret and explain the compressive strength vs cement fineness graph as shown. [8+10+6+4]



b) Draw the calorimetric curve (rate of heat evolution vs time) of Portland cement hydration process. Label the different stages and add brief descriptions on the figure.

c) Sketch on the same plot the schematic stress-strain graph of two concrete blocks A and B, where the Young's/ elastic modulus of A is about two times greater than that of B.

d) List a few advantages of continuous kiln over intermittent kilns.

3.a) The sieve analysis result of **1 kg** of a sand sample is provided below. If the entire sample is passed through #10 sieve **only**, then 200 gm would retain in it. [20+12]

Sieve	Materials retained (gm)
#4	0
#8	50
#10	?
#16	360
#30	?
#40	140
#100	60
Pan	20

i. Calculate the FM of the sand sample.

ii. Suppose the experiment is repeated using #50 sieve instead of #40 sieve and the same result is obtained as given above. Calculate the new FM.

b) First class brick samples are tested for density. The following results are obtained from the test. Calculate the density of brick. Assume specific gravity at 25°C = 0.877.

- Oven dry weight of a brick = 1510 gm
- Weight of wax coated brick in air = 1840 gm
- Weight of wax coated brick in water = 720 gm.

University of Asia Pacific
Department of Basic Sciences and Humanities
Mid-term Examination Spring-2023
Program: B.Sc. Engineering (Civil)

Course Title: Mathematics-III
 Time: 1.00 Hour

Credit Hour: 3.00

Course Code: MTH 201
 Full Marks: 60

There are four (4) questions. Answer three (3) questions including Q3 and Q4. Figures given in the right margin indicate the marks of the respective questions.

1. a. If $A = \begin{pmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{pmatrix}$, prove that $A^3 - 4A^2 - A + 4I = 0$. 10

b. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 0 & 1 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 2 \\ 0 & 1 \\ 1 & 0 \end{pmatrix}$, $C = \begin{pmatrix} 1 & 5 \\ -1 & -2 \end{pmatrix}$ then, prove that $(AB)C = A(BC)$. 10

OR

2. a. Find the rank of the matrix $\begin{pmatrix} 1 & 3 & 1 & -2 & -3 \\ 1 & 4 & 3 & -1 & -4 \\ 2 & 3 & -4 & -7 & -3 \\ 3 & 8 & 1 & -7 & -8 \end{pmatrix}$. 10

b. Given $A = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$, $B = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$, $C = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$. Prove the following relations: 10
 $A^2 = B^2 = C^2 = I$, $AB = -BA$, $AC = -CA$, $BC = -CB$.

3. a. Using the property of determinant solve $\begin{vmatrix} a+b+c & -c & -b \\ -c & a+b+c & -a \\ -b & -a & a+b+c \end{vmatrix}$. 10

b. Find the inverse of matrix $A = \begin{pmatrix} 2 & -1 & -1 \\ 1 & -2 & 1 \\ 1 & -1 & 2 \end{pmatrix}$. 10

4. a. Solve the system of linear equations using Gaussian elimination method 10

$$\begin{aligned} x + y + z &= 9 \\ 2x + 5y + 7z &= 52 \\ 2x + y - z &= 0 \end{aligned}$$

b. Using Cramer's rules solve the following system of linear equations 10

$$\begin{aligned} 3x + y + 2z &= 3 \\ 2x - 3y - z &= -3 \\ x + 2y + z &= 4 \end{aligned}$$

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination, Spring-2023
Program: B.Sc. in Civil (1st Year, 2nd Semester)

Course Title: Basic Electrical Engineering
 Time: 1.00 Hour

Course Code: ECE 201

Credit Hours: 3.00
 Full Marks: 60

[There are **four** questions. Answer any **three** including **questions 1 & 2**. Figures in the right margin indicate marks]

1. a. For the circuit given in figure 1, Calculate- [10+2]
 i) The equivalent resistance R_{eq} .
 ii) The current I .

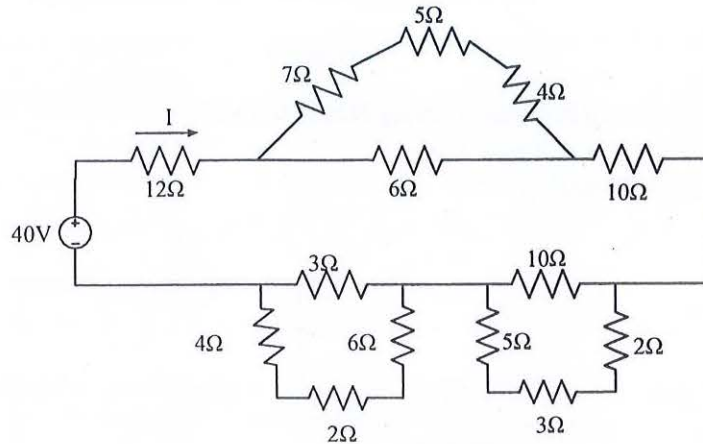


Figure 1

- b. Find the value of current I_1 and I_2 for the circuit given in figure 2. [08]

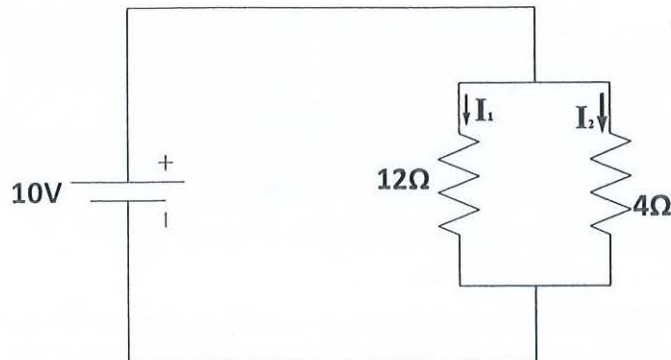


Figure 2

2. For the circuit shown in figure 3, construct the smallest equivalent circuit [one voltage source and a resistor] with respect to the load resistor R_L . [20]

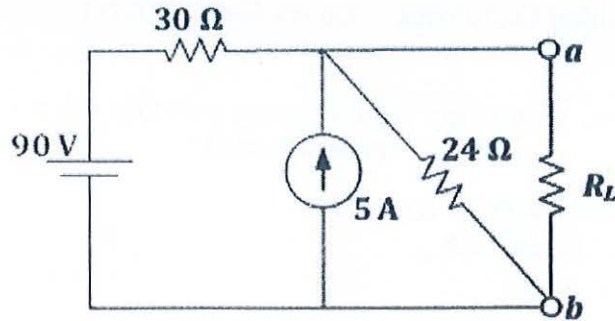


Figure 3

3. For the circuit shown in figure 4, using Nodal analysis. [15+5]
 a. Find the node voltages and
 b. Calculate V_o and i_o

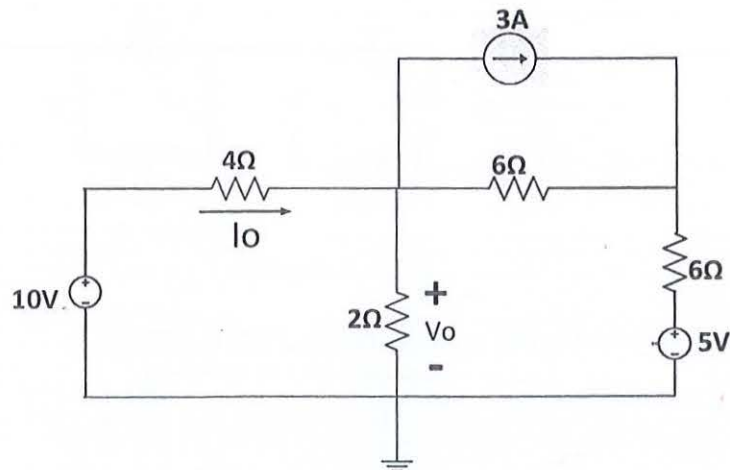


Figure 4

OR

4. For the circuit shown in figure 4, using Mesh analysis. [15+5]
 a. Find the mesh currents and
 b. Calculate V_o and i_o