University of Asia Pacific
Department of Basic Sciences and Humanities
Mid Semester Examination, Spring 2019
Programme: B.Sc. Engineering (Civil)
(2ⁿᵈ Year 1ˢᵗ Semester)

Course Title: Bangladesh Studies: Society and Culture **Course Code: HSS 211(a)**
Credit: 2
Time: 1 Hour **Full Marks: 40**

Answer ANY FOUR questions of the following (4x10)

1. a) Define society. 2

   b) Justify why you are studying 'Bangladesh Studies: Society and Culture'. 8

2. Critically discuss Durkheim's views about suicide. 10

3. a) Define social stratification. 2

   b) Critically discuss the major types of social stratification. 8

4. a) Identify five major social problems of Bangladesh. 2

   b) Discuss the causes of domestic violence in Bangladesh. 8

5. a) Define "Sociological Imagination" according to C. Wright Mills. 4

   b) Distinguish between Institution and Association. 6

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Department of Basic Sciences and Humanities
Mid Semester Examination, Spring 2019
Program: B.Sc. Engineering (Civil)
2nd year 1st semester

Course Title: Bangladesh Studies: History   Course Code: HSS 211(b)   Credit: 2.00

Total Time: 1 Hour   Full Marks: 40

There are **Five** Questions. Answer any **Four**. All questions are of equal value. Figures in the right margin indicate marks.

1.	a.	Explain Janapadas.	3
	b.	Describe any two Janapadas of ancient Bengal.	7
2.	a.	Explain the meaning of Matsyanyayam.	3
	b.	Write a short paragraph on the founder of Pala dynasty.	7
3.		Write an essay on the Bengal conquest of Bakhtiar Khalji.	10
4.	a.	Explain why Bengal was called Bulgakpur.	3
	b.	Describe the achievements of Illiyas Shahi dynasty.	7
5.	a.	Identify the Bara Bhuiyans.	3
	b.	Explain how Murshid Quli Khan revolutionized the revenue system of Bengal.	7

Course Title: Mathematics-III

Time: 1.00 Hour.

Course Code: MTH 201

Full Marks: 60

There are **Four** questions. Answer any **Three**. All questions are of equal values, indicated in the right margin.

1. (a) Define row echelon matrix and rank of matrix with example. **8**

   (b) Find the rank of matrix $\begin{pmatrix} 1 & 2 & 3 & 2 & 1 \\ 3 & 1 & -5 & -2 & 1 \\ 7 & 8 & -1 & 2 & 5 \end{pmatrix}$. **12**

2. (a) If $A = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{pmatrix}$, then find A^{-1}. **8**

   (b) If $A = \begin{pmatrix} 1 & 2 & -1 \\ 2 & 0 & 3 \\ 0 & 1 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 3 & -1 & 1 \\ 0 & 0 & 2 \\ 4 & -3 & 2 \end{pmatrix}$ verify that $(A+B)^2 = A^2 + AB + BA + B^2$. **12**

3. (a) Evaluate $\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix}$ **10**

   (b) Solve the system of linear equations $\begin{cases} 2x + 4y + 6z = 22 \\ 3x + 8y + 5z = 27 \\ -x + y + 2z = 2 \end{cases}$ **10**

4. (a) Let $\vec{v} = (5, 9, 5)$ and $\vec{v}_1 = (2, 1, 4)$, $\vec{v}_2 = (1, -1, 3)$, $\vec{v}_3 = (3, 2, 5)$. Show that v can be expressed as a linear combination of vectors v_1, v_2 and v_3. **10**

   (b) Show that the vectors $(1, -1, 2)$, $(3, -5, 1)$, $(2, 7, 8)$ and $(-1, 1, 1)$ are linearly dependent. **10**

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination, Spring-2019
Program: B. Sc Engineering (2nd Year / 1st Semester)

Course Title: Basic Electrical Engineering   Course No. ECE(CE) 201   Credits: 3.00
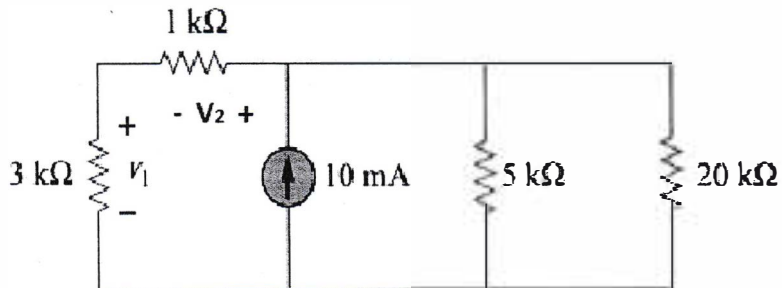Time: 1.00 Hour   Full Marks: 60

There are **Four** Questions. Answer any **Three**. Figures in the right margin indicate marks.

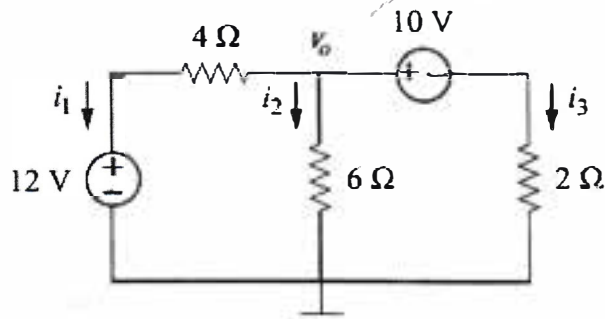1. (a) Calculate the equivalent resistance R_{ab} at terminals a-b.   10
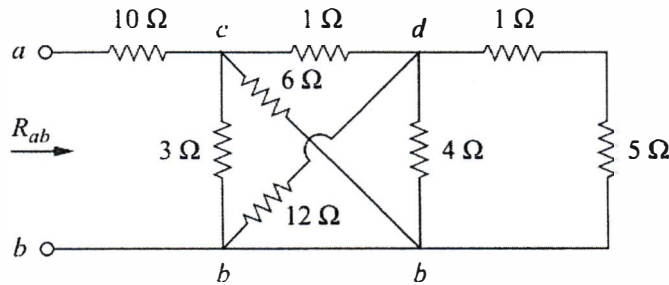
Circuit diagram for question 1(a)

(b) For the following circuit, find: (a) V_1 and V_2, (b) the power dissipated in 10
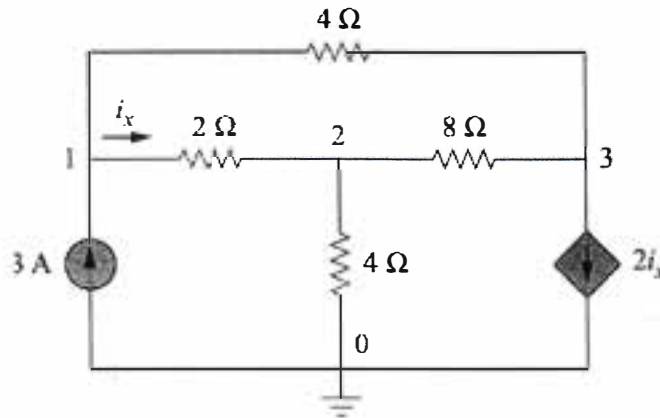the 3-k and 1-k resistors, and (c) the power supplied by the current source.

Circuit diagram for question 1(b)

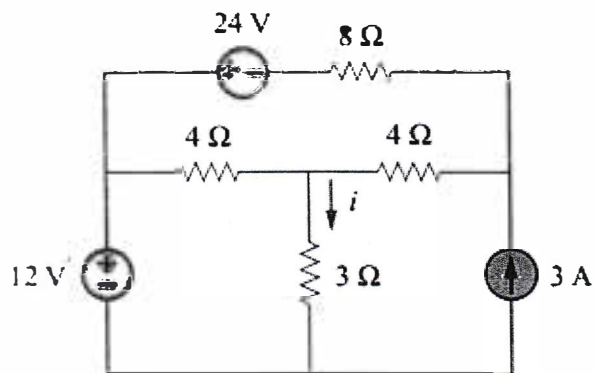2. (a) Determine v₀ and i₂ in the following figure using nodal analysis.   10

Circuit diagram for question 2(a)

(b) Determine the voltages at the nodes using nodal analysis in the following circuit.   10

Circuit diagram for question 2(b)

3. (a) State the Superposition theorem. Use the Superposition theorem to find i in the following circuit.   2+12
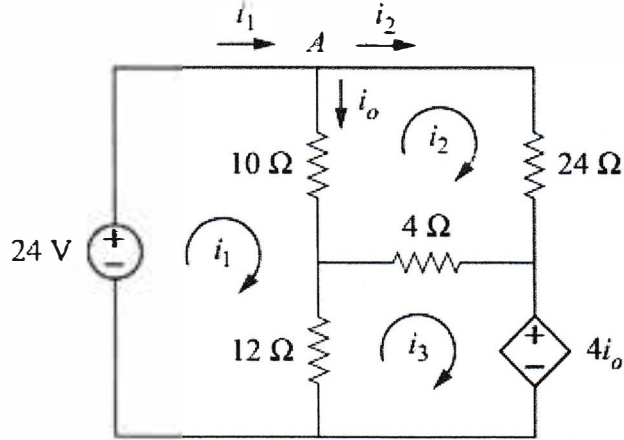

Circuit diagram for question 3(a)

(b) Write short notes with necessary figures on: 3*2=6
   (i)   Ohm's law   (ii) KVL

4. (a) Use mesh analysis in the following circuit to find the current i_o.   10
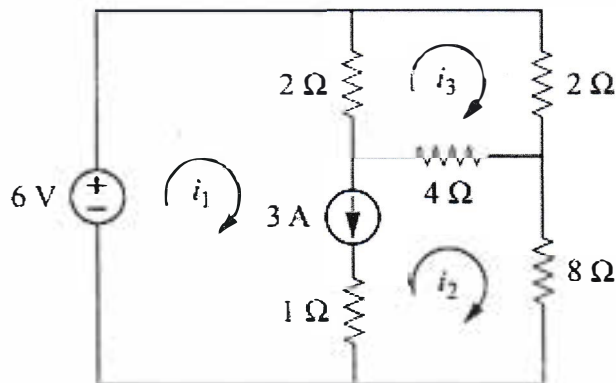

Circuit diagram for question 4(a)

(b) Use mesh analysis to find i_1, i_2, i_3 in the following circuit.   10
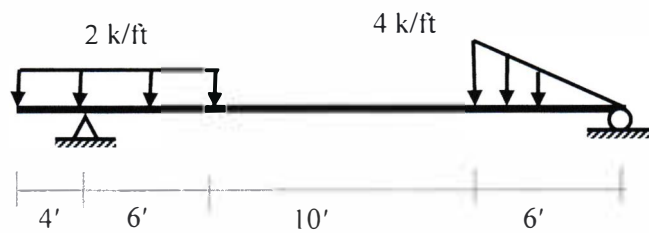

Circuit diagram for question 4(b)

University of Asia Pacific
Department of Civil Engineering
Mid Examination Spring 2019
Program: B.Sc. in Civil Engineering
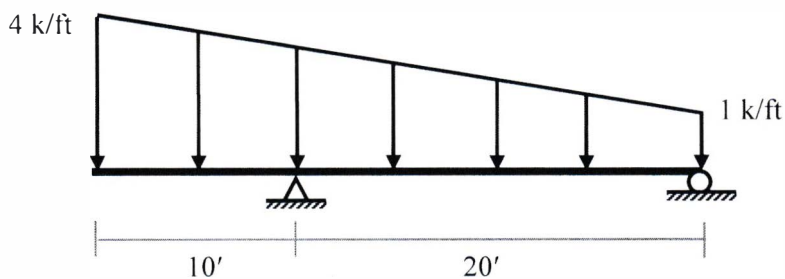
Course Title: Mechanics of Solids I

Course Code: CE 211

Time: 1:00 hour

Full Marks: $3 \times 10 = 30$

Answer all Questions
The symbols have their usual meanings.
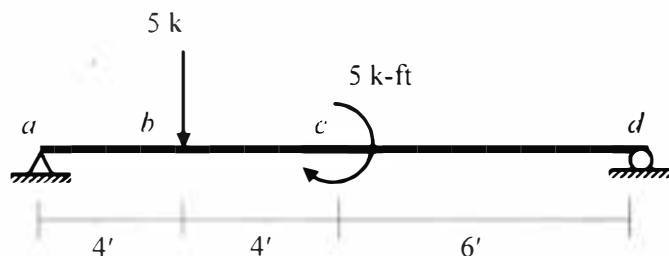*[Assume Reasonable Values for Any Missing Data]*

1. Draw shear force and bending moment diagram for the following beam.

2. Derive the complete equations of shear force and bending moment diagram for the following beam.

3. Use singularity function to evaluate value of shear force at c and bending moment at b for the following beam.

Course Title: Engineering Materials   Course Code: CE 201
Time: 1 hour   Full Marks: 60

Answer all questions

QUESTION 1 [40 MARKS]

a.   Plastering of the reinforced concrete wall is necessary to provide extra protection from the environmental actions at all seasons. To this aim, two sand samples (Sand-1 and Sand-2) are collected from the local market and different physical tests are performed at UAP. The test data of the sieve analysis of sand samples are given below:

ASTM Sieve	Sieve opening (mm)	Materials Retained (gm)	
		Sand-1	Sand-2
3 inch	76.20	0	0
1.5 inch	38.10	0	0
3/4 inch	19.05	0	0
3/8 inch	9.50	0	0
# 4	4.75	0	0
# 8	2.36	50	80
# 12	1.70	0	150
# 16	1.19	50	50
# 30	0.59	50	60
# 40	0.425	150	50
# 50	0.30	100	40
# 100	0.15	80	50
# 200	0.075	20	20
Pan	-	0	0

(i) Complete the calculation including % passing of each sieve and find the Fineness Modulus (FM) of sand samples (Sand-1 and Sand-2). If these two sand samples (Sand-1 and Sand-2) are used in mortar for plastering the wall, explain the performances of both plasters based on their FM.   **[15]**

(ii) If the recommended Fineness Modulus is assumed 2.5, then find in what proportions the sand samples are to be mixed to get the recommended FM?   **[5]**

b. In order to ensure the durability of the wall surface, 15 mm thick mortar is applied to both surfaces (interior and exterior) of the wall. The following data are provided for the mix design:

Air content = 2%
Specific gravity of sand = 2.3
Cement type = Portland Composite Cement (PCC)
Size of the wall: Length = 10 m, Width = 0.2 m, Height = 3 m
Water to cement (W/C) = 0.5
Sand to cement ratio (S/C) = 3

Consider weight basis mix design for the calculation.

(i) Calculate the amount of cement, sand and water per unit cubic meter of mortar (unit: kg/m^3). **[10]**

(ii) Estimate the amount of each ingredient (cement, sand and water) of mortar necessary for the 15 mm thick plastering work of both surfaces (10 m x 3 m) of the wall. Assume 30% extra volume of material is necessary due to total loss of mortar during application on the wall surfaces. **[7]**

(iii) What adjustment in sand volume is necessary, if the bulking of sand is 20%? **[3]** [Unit weight of sand (with void) = 1500 kg/m^3]

QUESTION 2 [10 MARKS]

a. Sketch the qualitative stress-strain curve of wood in compression and tension. Explain why modulus of elasticity of wood has two different values as compared to concrete. **[6]**

b. "Brick gets strength during burning". Justify this statement with proper explanation. **[4]**

QUESTION 3 [10 MARKS]

a. Sketch the development of strength of pure compounds of cement: C_2S, C_3S, C_3A and C_4AF. Explain the hydration of Silicate with chemical reaction. Which is the main strength giving compound and what is the shape and size of that compound? **[6]**

Or

Illustrate the advantages of using blended cement. "The long term strength of blended cement beyond a couple of months is higher than Ordinary Portland Cement". Explain this statement with pozzolanic reaction and proper comments.

b. What is the purpose of the soundness test of cement paste and how is it perform? **[4]**