University of Asia Pacific
Department of Basic Sciences and Humanities
Mid Semester Examination, Fall 2021
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: 20

Answer TWO questions including Question no. 3 (2x10)

1. a) Write how the events of the French Revolution influenced Sociology.   5

   b) Explain how "sociological imagination" helps us to understand social interactions in everyday life.   5

<div align="center">OR</div>

2. a) State why socialization is a lifelong process.   5

   b) Discuss how the family, schools, peer groups, and the mass media guide the sociological process.   5

3. a) Distinguish between norms and values.   4

   b) Analyze the term 'Cultural Lag' in the present social context of Bangladesh.   6

University of Asia Pacific
Department of Basic Sciences and Humanities
Mid Semester Examination, Fall 2021
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: 20

There are **Three** questions. Answer **Two Questions including Q-1**

1. a. Describe the ancient Janapads of Bengal.   5

     b. Summarize Shasanka's identity.   5

2. a. Descibe the way Bakhtiar Khilji defeated Laxman Sena in 1204.   5

     b. Explain the effects of the Muslim conquest on Bengal.   5

<div align="center">OR</div>

3. a. Identify the Baro Bhuiyans.   5

     b. Explain how Murshid Kuli Khan revolutionized the revenue system of Bengal.   5

Course Title: Mathematics-III   Course Code: MTH 201
Credit: 3.00   Time: 1.00 Hour   Full Marks: 60

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

1. **(a)** When a matrix is said to be in echelon form. Find echelon form for   **10**

$$\begin{pmatrix} 1 & 2 & 3 & 1 \\ 2 & -1 & 2 & 2 \\ 3 & 1 & 2 & 3 \end{pmatrix}$$

   (b) Define the inverse of a square matrix. State a condition for a square matrix to be   **10**
   invertible. For $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 6 & 8 \end{pmatrix}$ find adjoint of A and hence find inverse of A, if A is
   invertible.

2. **(a)** Write the augmented matrix for the system of equations and then reduce the matrix   **10**
   to reduced row echelon form and hence solve the system

$$x_1 - x_2 + 2x_3 = x_4 - 1$$
$$x_2 - 2x_4 = -2x_1 + 2x_3 - 2$$
$$-x_1 - 4x_3 + x_4 = -2x_2 + 1$$
$$3x_1 - 3x_4 = -3$$

   (b) Solve the system of linear equations using determinants $\begin{cases} 3y + 2x - z = 1 \\ 3x + 5y + 2z = 8 \\ 2z + 2y - x = 1 \end{cases}$ **10**

3. **(a)** Show that $\begin{vmatrix} x & x^2 & x^3 + 1 \\ y & y^2 & y^3 + 1 \\ z & z^2 & z^3 + 1 \end{vmatrix} = (x - y)(y - z)(z - x)(xyz + 1)$ **13**

   (b) If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ show that $(A^{-1})^T = (A^T)^{-1}$ **7**

4. **(a)** If $A = \begin{pmatrix} 2 & 1 & 3 \\ 1 & -2 & 2 \\ 1 & 2 & 1 \end{pmatrix}$ find $A^3 - 3A^2 - 9A$ **10**

(b) Determine whether or not the vector $v = (2,-5,3) \in \mathfrak{R}^3$ is a linear combination of the   **10** vectors $v_1 = (1,-3,2), \quad v_2 = (2,-4,-1), \quad v_3 = (1,-5,7)$

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination, Fall-2021
Program: B. Sc Engineering (2nd Year/1st Semester)

Course Title: Basic Electrical Engineering   Course Code. ECE 201
Credit Hr: 3.00   Time: 60 minutes.   Full Mark: 60

[There are **Four** Questions. Answer **Three** questions including Q-1 and Q-2. All questions are of equal value. Symbols have their usual meanings. Figures in the right margin indicate marks.]

1. For the circuit in figure-1, mathematically show that the total supplied and absorbed **[20]** powers of the circuit are equal. Assume that the values of R_1, R_2 and R_3 are 100Ω, 200Ω and 500Ω respectively and the source voltage is 12 V.
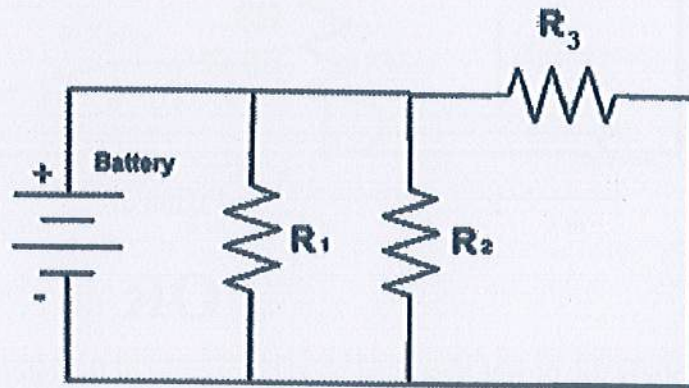

Figure 1

2. For the circuit in figure-2, find the smallest equivalent circuit [one source and a resistor] **[20]** with respect to the load resistor R_L.
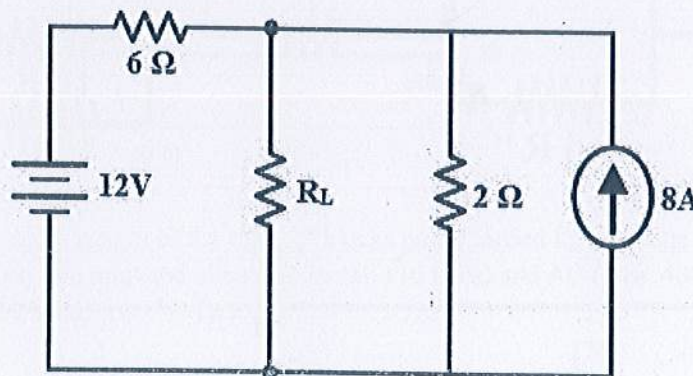

Figure 2

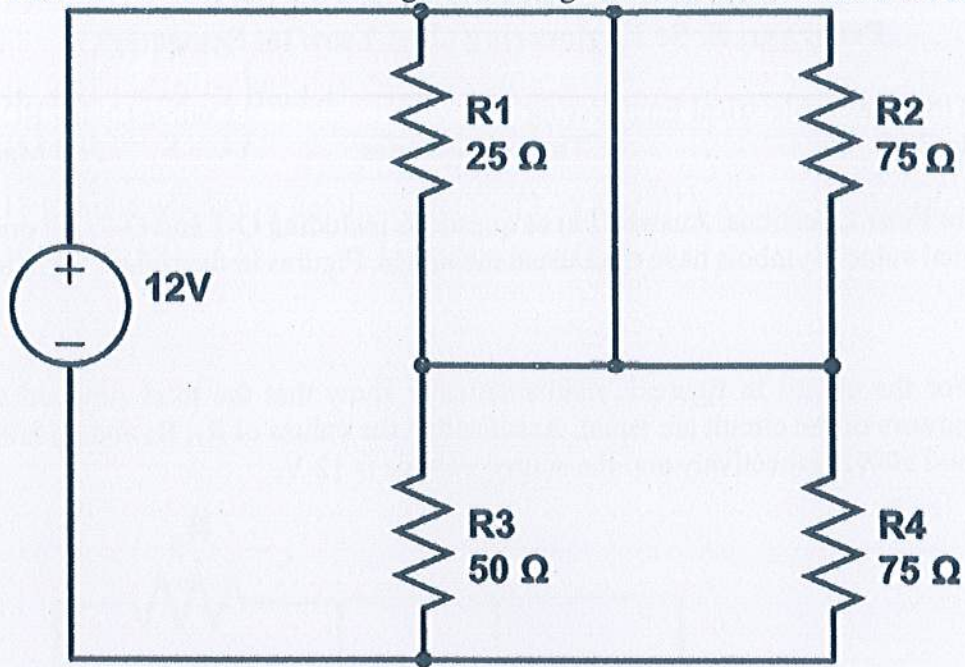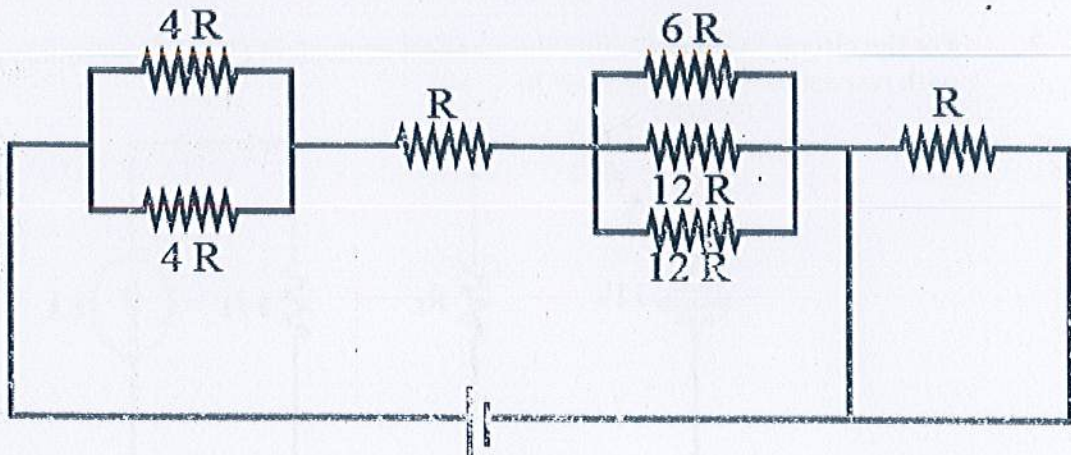**3.** Find the value of current through and voltage across each element of the circuit. [2.

Figure 3

OR

4. Calculate the power absorbed by each resistor of the circuit below. Assume that, [20]
R=1000x[last digit of your registration number]+1000.

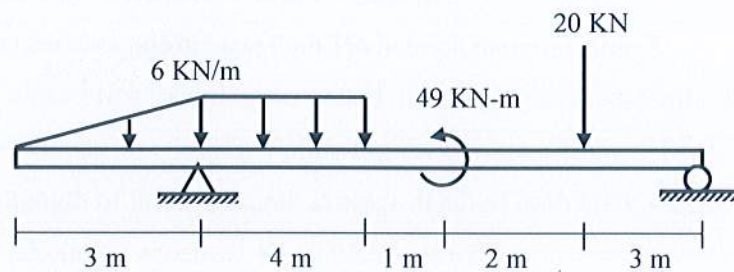Course Code: CE 211 (A & B)   Time: 1 (one) Hour
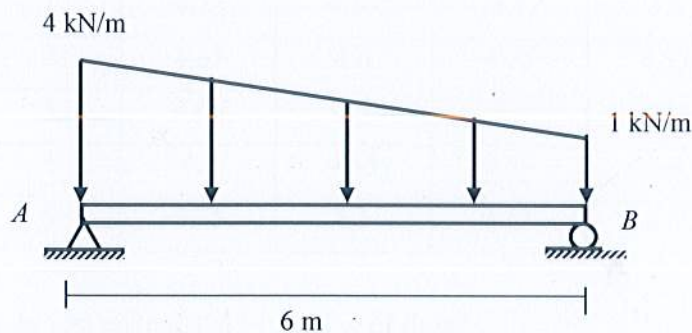Course Title: Mechanics of Solids I   Full Marks: (3x20) = 60

Answer all questions.
Each question carries equal marks

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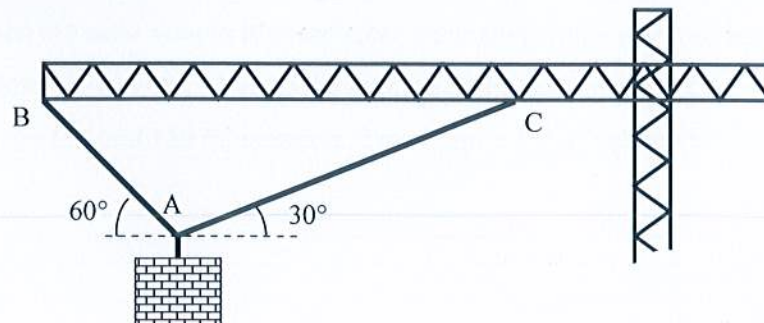

2. Determine the functions for loading, shear and bending moment for the following beam. Hence determine the value of maximum bending moment.

3. Determine the maximum weight of the stock of blocks being carried by the crane boom with two metal wires AB (area: 800 mm² and allowable stress: 110 MPa) and AC (area: 400 mm² and allowable stress: 120 MPa).

Course Title: Engineering Materials   Course Code: CE 201   Credit: 4.0
Time: 1 hour   Full Marks: 60

[Answer all the questions. Assume value for any missing data]

1. (a) Write down the properties of a 1st Class brick. (6)

    (b) What are the applications of lime in construction? (3)

    (c) Why is lime percentage kept less than 1% in brick manufacturing? (3)

    (d) Five first class brick samples are tested for compressive strength. Bricks are cut into identical halves along the length. Following results are obtained from the test. Calculate compressive strength of brick. Assume average depth of each brick = 2.75 inch. Compression Test machine calibration equation: $Y = 0.952X - 4.658$ (8)

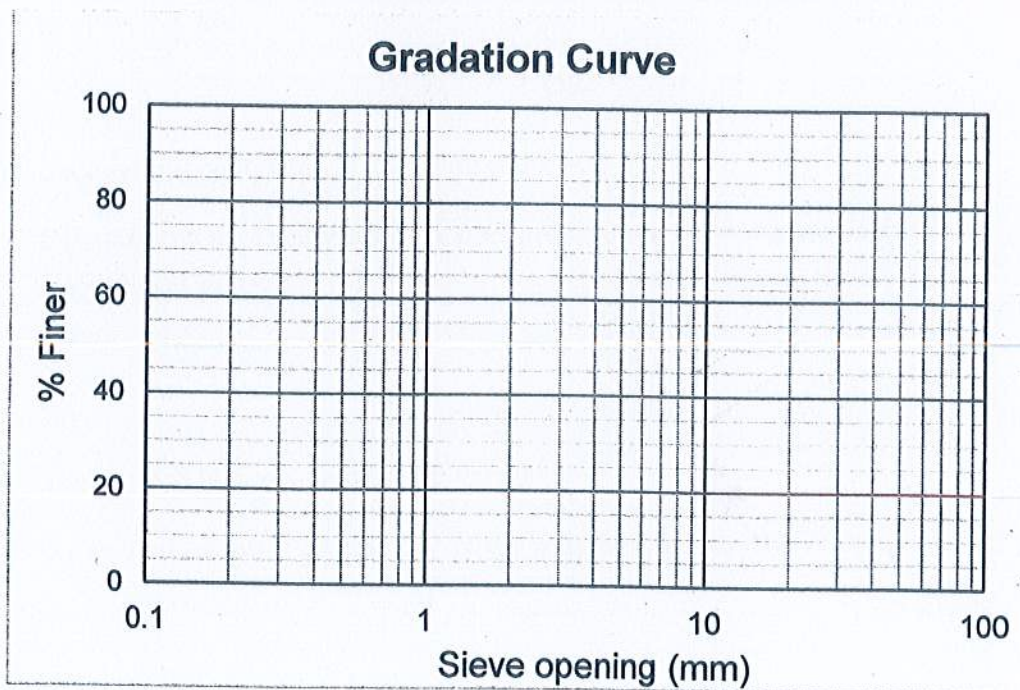| Sample	Dimension (inch)				Observed Load (lb)
	Side-1		Side-2		
	L	W	L	W	
1	4.75	4.55	4.7	4.6	50230
2	4.65	4.6	4.75	4.55	52050
3	4.65	4.5	4.7	4.45	64560
4	4.8	4.55	4.75	4.6	55730
5	4.75	4.5	4.65	4.5	56990

2. (a) What do you understand by slaking of lime? (3)

    (b) Draw load-strain behavior with time for bitumen. (6)

    (c) Explain the calorimetric curve of Portland Cement hydration process. (8)

    (d) To measure the bulking of a sand sample, sand is filled in a measuring cylinder up to 300 mm height. When the sand sample is completely inundated with water, the height of the sand sample comes down to 220 mm. What is the bulking of the sand sample? Calculate the volume of this sand required to cast 150 m³ concrete at a mix ratio 1:2:4 (volume basis). (8)

3. (a) What are the differences between well graded and uniformly graded aggregate. (5)

   (b) Draw gradation curve and determine the FM of aggregates from the following particle distribution. (10)

Sieve Size (mm)	Mass Retained (g)
37.5 (1.5 in.)	70
25.0 (1in.)	110
19.0 (3/4 in.)	395
12.5 (1/2 in.)	2750
9.5 (3/8 in.)	2435
4.75 (No. 4)	2030
2.36 (No. 8)	375
Pan	35

Gradation Curve

Y-axis: % Finer (0, 20, 40, 60, 80, 100)
X-axis: Sieve opening (mm) (0.1, 1, 10, 100)

University of Asia Pacific
Department of Civil Engineering
Midterm Examination, Fall 2021
Program: B.Sc. Engineering (Civil)

Course Title: Principles of Economics   Course Code: ECN 201
Time: One hour   Credit Hour: Two   Full Marks: 20

(Answer any two of the following questions.)

1. (a) "When there are changes in factors other than goods own price which affect the quantity purchased --- ---." What do we call the changes?   0.5
(b) " --- --- new technology reduces pizza costs and prices." Will the demand increase along the curve or with the shift of the curve?   0.5
(c) "Quantity demanded tends to fall as price rises for two reasons."
"If gasoline prices double, I have in effect less real income, so I will naturally curb my consumption of gasoline and other goods." Which affect is it?   1
(d) Why the supply curve is upward moving?   1
(e) Draw the curve of production possibility frontier in the graph paper with the following table. Explain the curve briefly.   7

Alternative Production Possibilities		
Possibilities	Butter (Millions of pounds)	Guns (Thousands)
A	0	15
B	1	14
C	2	12
D	3	9
E	4	5
F	5	0

2. (a) Who is the founder of microeconomics?   0.5
(b) Which branch of economics is concerned with the behavior of individual entities such as markets, firms, and households?   0.5
(c) Which resources form the durable goods of an economy, produced in order to produce yet other goods? Write with an example.   1
(d) Which type of economy is most common?   0.5
(e) Which branch of economics is concerned with the overall performance of the economy?   0.5
(f) How government can remedy shortcomings of the market?   7

3. (a) Define economics.   1
(b) " --- --- the government owns most of the means of production (land and capital), it also owns and directs the operations of enterprises in most industries, it is the employer of most workers and tells them how to do their jobs, and decides how the output of the society is to be divided among different goods and services." Which type of economy is it?   0.5
(c) "Suppose that an unregulated business decides to dump chemicals in a river --- --" "Rather, the prices in the market place do not reflect true social priorities – the price on polluting in an unregulated environment is zero ---." What other things the true opportunity cost could include?   1