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

Answer TWO questions including question no. 3 (2x20)

1. a) Is Sociology a science?   5

    b) Briefly explain the social impact of the industrial revolution in the development of   15
        Sociology as an independent discipline.

OR

2. a) How do you define socialization?   5

    b) Briefly discuss why socialization process is important in understanding the
        development of an individual.   15

3. a) What is the scientific method in doing a sociological research?   5

    b) What are the steps of doing a social research? Briefly describe.   15

University of Asia Pacific
Department of Basic Sciences and Humanities
Mid Semester Examination, Spring 2022
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 **Three** questions. Answer **Two Questions including Q-1**

1.	a.	Describe the ancient Janapads of Bengal.	10
	b.	What is "Matsyanyayam"?	10
2.	a.	Describe the way Bakhtiar Khilji defeated Laxman Sena in 1204.	10
	b.	Explain the effects of the Muslim conquest on Bengal.	10

OR

3.	a.	Identify the "Baro Bhuiyans".	10
	b.	Explain how Murshid Kuli Khan revolutionized the revenue system of Bengal.	10

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

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

1. (a) Define rectangular matrix, diagonal matrix, transpose matrix, symmetric matrix, singular matrix with examples. **10**

   (b) For $A = \begin{pmatrix} -1 & 2 & -3 \\ 1 & 2 & -2 \\ 3 & 2 & -3 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 1 & -1 \\ 4 & -2 & 1 \\ 3 & 0 & -3 \end{pmatrix}$. Find BA, AB. **10**

2. (a) Find the rank of the matrix $\begin{pmatrix} 1 & 3 & -1 \\ -2 & 4 & -3 \\ 3 & -5 & 4 \end{pmatrix}$. **10**

   (b) For $A = \begin{pmatrix} 1 & 2 & -2 \\ 2 & 4 & 1 \\ 1 & 2 & -2 \end{pmatrix}$ Find $A^2 - A^T + (A^T)^T$. **10**

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 $\begin{pmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{pmatrix}$. **10**

4. (a) Solve the system of linear equations using Gaussian elimination method **10**
   $\begin{cases} x+2y-z=9 \\ 2x-y+3z=-2 \\ 3x+2y+3z=9 \end{cases}$

   (b) Using Cramer's rules solve $\begin{cases} x-y+z=1 \\ x+y-2z=0 \\ 2x-y-z=0 \end{cases}$. **10**

Course Title: Basic Electrical Engineering   Course Code. ECE 201

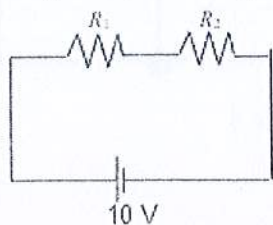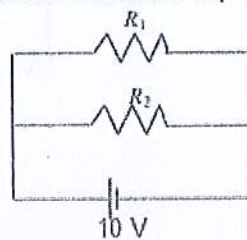Credit Hr: 3.00   Time: 60 minutes.   Full Mark: 60

[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 circuits in figure 1, find the power of each element. Consider $R_1=R_2=$ 100 Ohm.   [10+10 = 20]

Figure 1

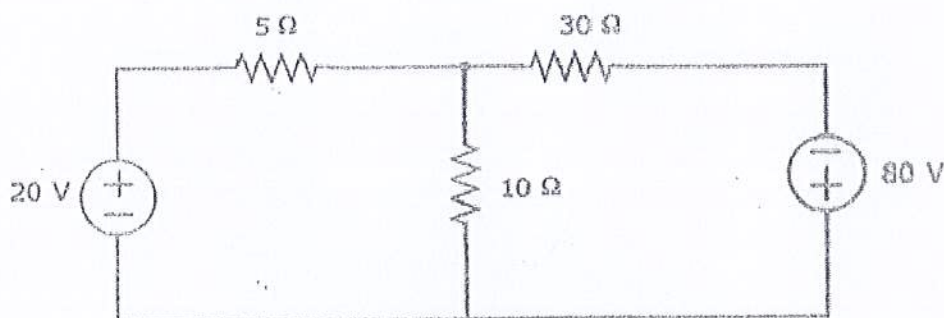2. Find the absorbed power by the 10-ohm resistor.   [20]

Figure 2

3. Minimize the circuit of Figure 3 into an equivalent circuit of 1 source and 1 resistor with respect to the 5 Ohm load resistor. Draw the resultant equivalent circuit along with the load resistor.   [15+5 =20]
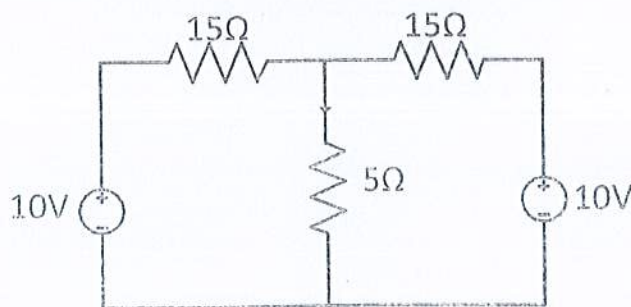

Figure 3

OR

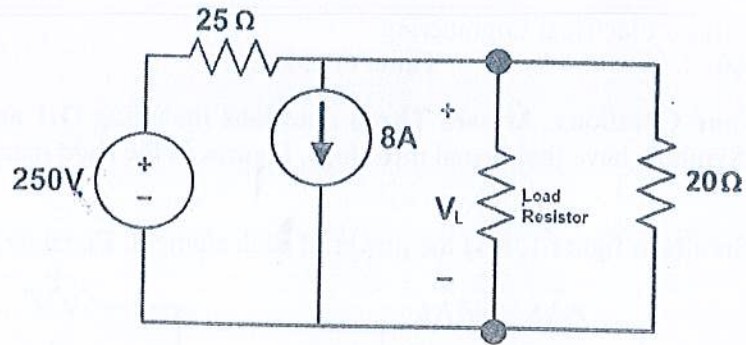4. What is the possible maximum voltage delivered to the load resistor in figure 4? [20]
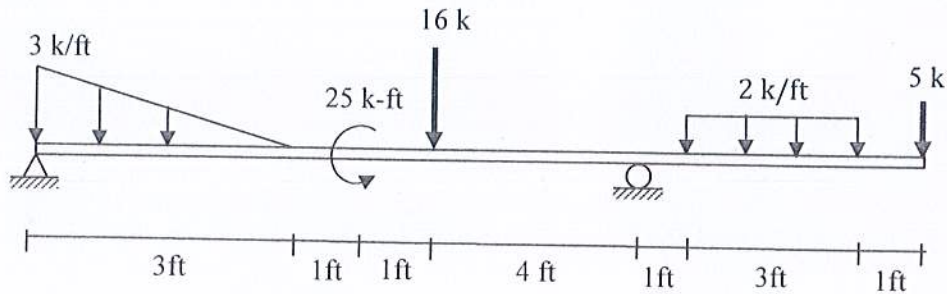

Figure 4

Course Title: Mechanics of Solids I Course Code: CE 211 Credit: 3.0
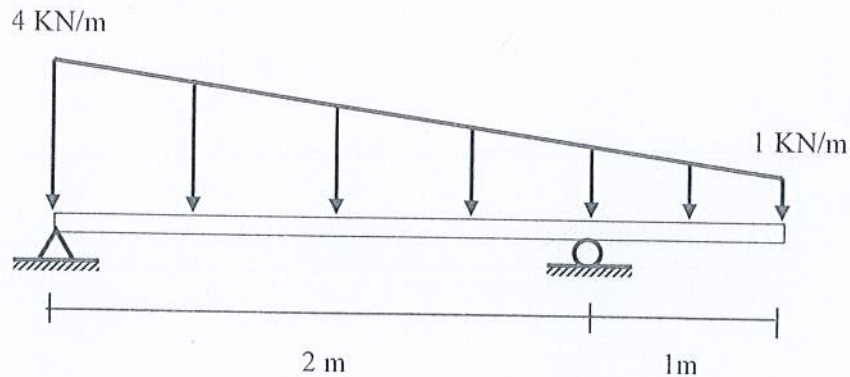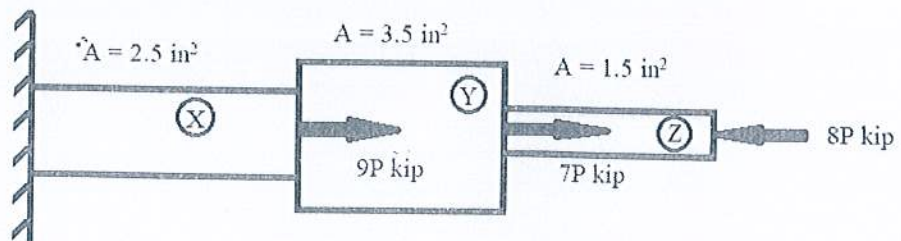Time: 1 hour Full Marks: 60

Answer all questions.

1. Draw Shear Force and Bending Moment Diagram for the following beam loading. [20]

2. Determine the maximum positive bending moment for the following beam. [20]

3. A shaft consists of three materials X, Y and Z with different cross-sectional area as indicated in the following figure. Determine the maximum value of P for which stress in X, Y and Z do not exceed 10 ksi, 14 ksi and 8 ksi respectively. [20]

Course Title: Engineering Materials   Credit Hour: 4.00   Course Code: CE 201
Time: 1 hour   Full Marks: 80

Answer all FOUR questions.

1. A mortar mix prepared to provide a smooth coat finish only on the interior side of a wall, has a unit weight of $2100 kg/m^3$. The ratio of cement to sand to water is 1: 3: 0.5 by weight.
Wall dimensions: 12m long, 3m high and coat thickness: 25mm.

     i)   Calculate the volume of the mortar required for the work including 20% extra considered for loss during application.

     ii)   Calculate the amount of each ingredient of mortar in kg necessary to provide the smooth coat finish onto the wall.

     iii)   Given, unit weight of cement is $1440 kg/m^3$, find the specific gravity of the sand used in this work, assuming air content of 1%.

     iv)   Due to the bulking of sand, some adjustment in the mix ratio is necessary. Write in one sentence what do you understand by "20% bulking of sand".   [3+12+5+2]

2. (a) With the aid of diagrams and formulae differentiate between bulk and apparent specific gravities.

(b) Explain how the inclusion of gypsum prevents the flash setting of cement.

(c) Why it is important to know the setting time of cement and what effect does weather or ambient temperature have on the setting time?

(d) Interpret and explain the compressive strength vs fineness of cement graph as shown below.
                                                        [4+4+4+8]
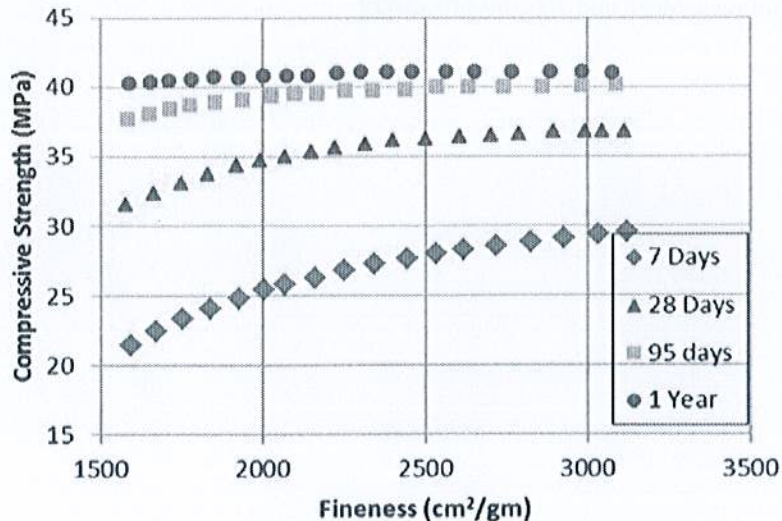
3. The sieve analysis result of a sample of sand collected from the river bed of Shari Ghat is given below:

Sieve Size	Standard Opening (mm)	Materials retained (gm)
#4	4.75	0
#8	2.36	1
#16	1.19	10
#30	0.59	38
#50	0.3	191
#100	0.15	743
#200	0.075	12
Pan		5

    i.   Calculate the FM of the sample.

   ii.   Draw the gradation curve of the sand sample and comment on the shape of it.

  iii.   This sand sample is to be mixed with a sand sample from another source having FM of 2.94. In what proportion the sand samples are to be mixed to achieve a FM of 2.3 from the mix.

<div align="right">[10+5+5]</div>

4. Differentiate between the following: **(any three)**

      i) Modulus of resilience and Modulus of toughness

      ii) Stiffness and Hardness

      iii) Pointing and Plastering

      iv) Ductile material and Brittle material

      v) False setting and Flash setting

      vi) Rodding procedure and Jigging procedure

<div align="right">[3x6]</div>