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**University of Asia Pacific**  
**Department of Basic Sciences and Humanities**  
**Mid Semester Examination, Fall 2018**  
**Programme: B.Sc. Engineering (Civil)**  
**(2<sup>nd</sup> Year 1<sup>st</sup> 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. Define society. Justify why you are studying sociology. 10
2. Discuss on Karl Marx's different types of societies with examples. 10
3. Define culture. Explain the various elements of culture with examples from the "culture" that exists in University of Asia Pacific. 10
4. Define family. Explain different types of families with examples. 10
5. Discuss in some detail on **any two** of the following. 5+5
  - a) Community and Association
  - b) Independent and Dependent Variable
  - c) Class and Power

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**Mid Semester Examination, Fall 2018**  
**Program: B. Sc. Engineering (Civil)**  
**2<sup>nd</sup> year 1<sup>st</sup> 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. Define History. 3  
b. Narrate the utilities of History from global, state and individual perspectives. 7
  
2. a. State what is Environmental Determinism. 3  
b. Describe the impacts of geographical factors on the culture of Bangladesh. 7
  
3. a. Point out what was matsyanyayam. 3  
b. Describe the establishment of Pala dynasty in the ancient Bengal. 7
  
4. a. Mention who were the Senas. 3  
b. Compare and contrast Sena's socio-religious policies with those followed by Palas. 7
  
5. Write short note on any two  
a. Radiocarbon dating 5  
b. Janapadas 5  
c. Laksmanasena 5

**University of Asia Pacific**  
**Department of Basic Sciences & Humanities**  
**Mid Examination, Fall-2018**  
**Program: B.Sc. in Civil Engineering**

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. Define reduced row echelon matrix. Find the rank of matrix  $\begin{pmatrix} 1 & 0 & -1 & 2 \\ 2 & 1 & 2 & -1 \\ -2 & 2 & -1 & 3 \\ 3 & 4 & -1 & -2 \end{pmatrix}$ . 20

2. (a) If  $A = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 5 \end{pmatrix}$ , then find  $A^{-1}B$ . 14

(b) For  $A = \begin{pmatrix} 2 & -3 & 1 \\ 4 & 2 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} 3 & -2 & 4 \\ 1 & 3 & -5 \end{pmatrix}$ , show that  $(A+B)^T = A^T + B^T$ . 6

3. (a) Prove that  $\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix} = 4a^2b^2c^2$  10

(b) Solve the following system of linear equation 10

$$\begin{aligned} 2x + 3y + 5z + t &= 3 \\ 3x + 4y + 2z + 3t &= -2 \\ x + 2y + 8z - t &= 8 \\ 7x + 9y + z + 8t &= 0 \end{aligned}$$

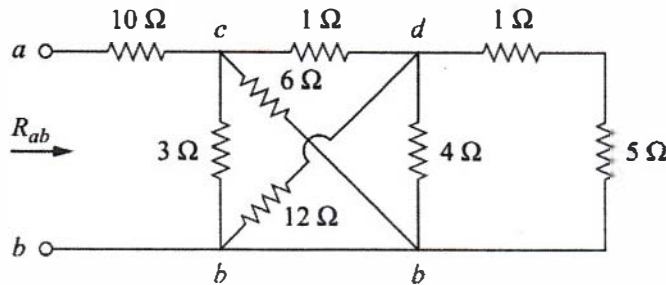
4. Find eigenvalues and corresponding eigenvectors of matrix  $A = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 0 & -1 \\ 0 & 1 & 1 \end{pmatrix}$  20

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Semester Examination, Fall-2018**  
**Program: B. Sc Engineering (2<sup>nd</sup> Year / 1<sup>st</sup> Semester)**

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

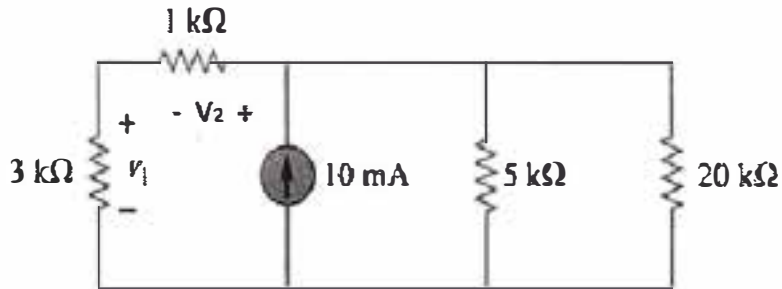
There are **Four** Questions. Answer any **Three**. Figures in the right margin indicate marks.

1. (a) Calculate the equivalent resistance  $R_{ab}$  at terminals a-b. 10



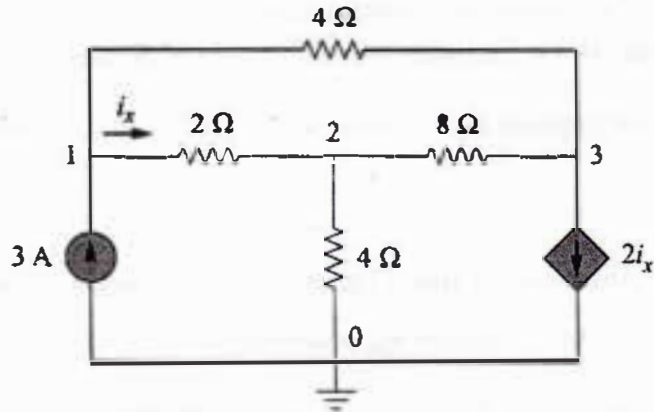
Circuit diagram for question 1(a)

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



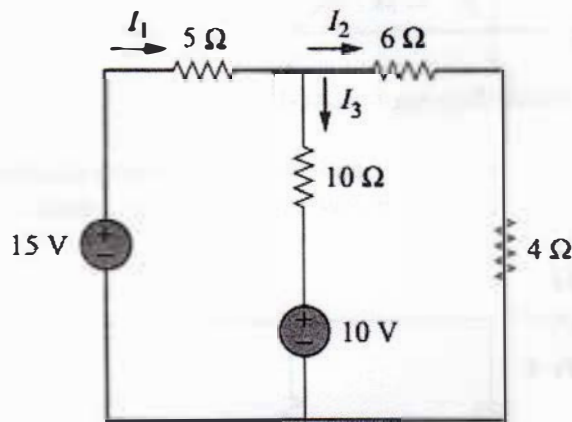
Circuit diagram for question 1(b)

2. (a) Determine the voltages at the nodes in the following figure using nodal analysis. 10



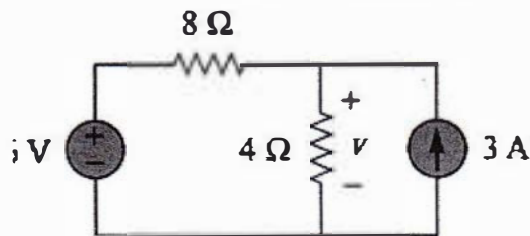
Circuit diagram for question 2(a)

- (b) For the following circuit, find the branch currents  $I_1$ ,  $I_2$  and  $I_3$  using mesh analysis. 10



Circuit diagram for question 2(b)

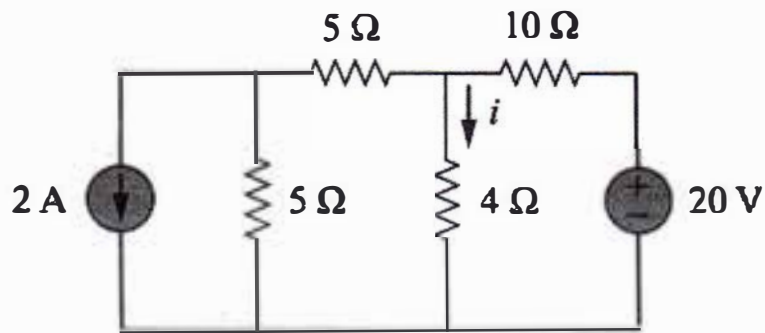
3. (a) State the Superposition theorem. Use the Superposition theorem to find  $V$  in the following circuit. 2+8



Circuit diagram for question 3(a)

(b) Use Source Transformation to find  $i$  in the following circuit.

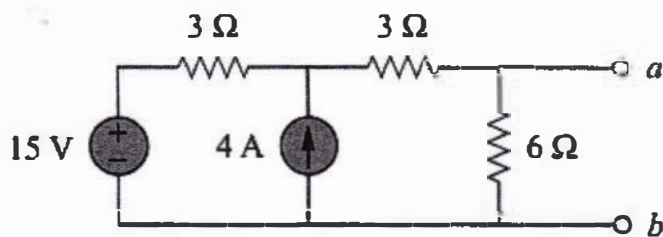
10



Circuit diagram for question 3(b)

4. (a) State Norton's theorem. Find Norton's equivalent circuit for the following figure.

10



Circuit diagram for question 4(a)

(b) State and Prove the maximum power transfer theorem.

10

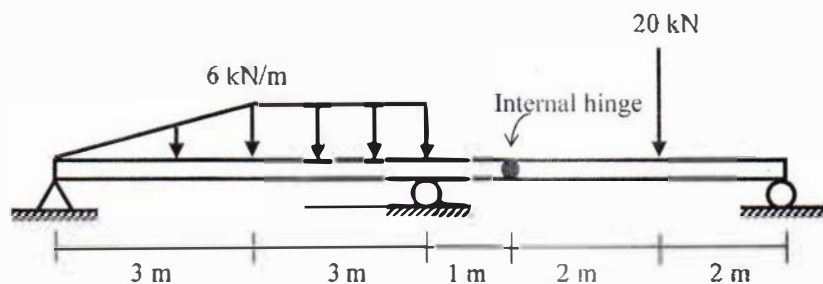
**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Term Examination Fall 2018**  
**Program: B.Sc. in Civil Engineering**

Course Title: Mechanics of Solids I  
 Time: 1 hour

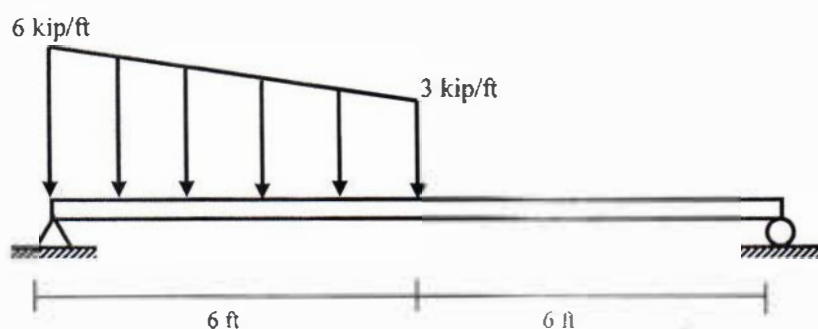
Course Code: CE 211  
 Full Marks:  $3 \times 10 = 30$

Answer all the questions  
Each question carries equal marks

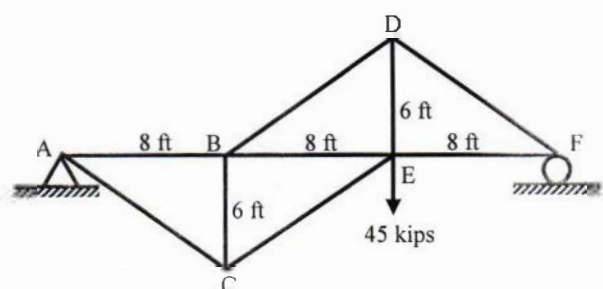
1. Draw the Shear Force and Bending Moment Diagrams for the beam loaded as shown below.



2. Obtain the functions for loading, shear force and bending moment for the following beam and determine the value of maximum positive moment.



3. Determine the stresses in members CE, DE and DF for the truss shown in following figure and indicate whether the stresses are tensile or compressive. Given, the cross-sectional area of each member is  $1.8 \text{ in}^2$ .



**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Semester Examination Fall 2018**  
**Program: B.Sc. Engineering (Civil)**

Course Title: Engineering Materials  
 Time: 1 hour

Course Code: CE 201  
 Full Marks: 60

*Answer all questions*

1. Plastering of the column is necessary to improve the aesthetic view and durability of the structure. In order to ensure better performance of mortar, the recommended Fineness Modulus (FM) is assumed 2.7. To this aim, two sand samples are collected from the local market and different physical tests are performed at UAP. The test data of sieve analysis of sands are given below:

ASTM Sieve	Sieve opening (mm)	Materials Retained (gm)	
		Sand-X	Sand-Y
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	0	0
# 12	1.70	20	10
# 16	1.19	110	150
# 30	0.59	50	180
# 40	0.425	100	10
# 50	0.30	120	100
# 100	0.15	50	50
# 200	0.075	50	0
Pan	-	0	0

- a). (i) Complete the calculation including % passing of each sieve and find the Fineness Modulus of sand samples (Sand-X and Sand-Y). Based on the knowledge of FM, make comments on the performance of mortar if the mortar is made with two different sands. [20]
- (ii) In what proportions, the sand samples are to be mixed to get the recommended FM?
- b). In order to provide a durable surface, 6 mm thick mortar will be applied all around the column surfaces. The column is located inside the one-story building where the top and bottom surface is connected to the ceiling and floor respectively. The following data are provided: sand to cement ratio (weight basis) = 2, water to cement ratio = 0.40, air content = 1.5%, specific gravity of fine sand = 2.6, and cement type = OPC. [20]
- Size of the column: Cross-section = 80 cm x 60 cm; Height (floor to ceiling) = 300 cm.
- (i) Estimate the amount of each ingredient (cement, sand, and water) of mortar necessary for the 6 mm thick plastering work of all surfaces of the column. Assume 20% extra volume of material is necessary due to total loss of mortar during application on the column surfaces.
- (ii) What adjustment in sand volume is necessary, if the bulking of sand is 20%?  
 [Unit weight of sand (with void) = 1500 kg/m<sup>3</sup>]



2. (a) Draw qualitative stress-strain curves of aggregate (i.e. rock), concrete, and hardened cement paste in the same graph and make comparison among them. [4]

**Or**

Using schematic diagram, explain instantaneous strain and creep of concrete.

- (b) "Brick gets strength during burning". Justify this statement with proper explanation. [3]
- (c) Based on your knowledge, list the causes of efflorescence of brick and how to remove it. [3]
3. (a) Sketch the development of strength of pure compounds of cement:  $C_2S$ ,  $C_3S$ ,  $C_3A$ , and  $C_4AF$ . Explain hydration of Silicate with chemical reaction. Which is the main strength giving compound and what is the shape and size of that compound? [4]
- (b) Summarize the factors that affect the normal consistency of cement. [3]
- (c) Describe the main difference between mortar and plaster. [3]