University of Asia Pacific
Department of Civil Engineering
Semester Final Examination, Spring 2024
Program: B.Sc. in Civil Engineering
(Self-study)

Course Title: Bangladesh Studies: Society and Culture   Course Code: HSS211(a)
Time: 2 hours   Credit: 2.00   Full Marks: 50

[There are **six** questions. Answer **four** questions **including questions 1 and 2**. Figures in the right margin indicate marks.]

1. Define culture and its elements. Discuss the nonmaterial elements of culture.   [10]

2. Define marriage and family. Discuss the forms and functions of family.   [10]

3. Define Gerherd Lenski's sociocultural evolution. Discuss how he relates the evolution of human societies with the innovation of technology.   [15]

OR

4. Name the determinants of social class. Analyze the theory given by Max Weber about social class stratification.   [15]

5. Define social stratification. Mention the major systems of social stratification. Briefly discuss about slavery.   [15]

OR

6. Define social mobility. Briefly describe the types of social mobility with examples. Relate social mobility with open class system.   [15]

Course Title: Bangladesh Studies   Course No. HSS 211(b)   Credit: 2.00

Time: 2.00 Hours.   Full Mark: 100

There are six questions. Answer any **four including Q5 and Q6**. All questions are of equal value. Figures in the right margin indicate marks.

1.		Explain the contribution of Ishwarchandra Vidyasagar to the society.	[25]	CO3
		OR		
2.		Explain the contribution of Raja Rammohon Roy to the society.	[25]	CO3
3.	a.	Explain the background of the Lahore Resolution.	[15]	CO5
	b.	Explain the Reaction of the Lahore Resolution.	[10]	CO5
		OR		
4.	a.	Discuss the Second phase of the Language Movement.	[15]	CO5
	b.	Discuss the significance of the Language Movement.	[10]	CO5
5.		Explain the 6-point program of the Awami League.	[25]	CO5
6.		Write an article on the Liberation War of Bangladesh.	[25]	CO5

University of Asia Pacific
Department of Civil Engineering
Semester Final Examination Spring-2024
Program: B.Sc. in Engineering

Course Title: Mathematics-III   Course Code: MTH 201
Time: 3.00 Hours   Credit Hour: 3.00   Full Marks: 150

There are eight (8) questions. Answer six (6) questions including Q1, Q2, Q3 and Q4. Figures given in the right margin indicate the marks of the respective questions.

1. a) Balance the equation $CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$ using system of linear equation. **15**

   b) Define symmetric and skew-symmetric matrix. Express the symmetric and skew-symmetric parts of the matrix $A = \begin{bmatrix} 2 & 3 & 5 \\ 5 & 3 & -1 \\ 8 & 1 & 5 \end{bmatrix}$. **10**

2. Calculate the degree of kurtosis **25**

Profits	70-90	90-110	110-130	130-150	150-170
No of Companies	8	11	18	9	4

3. a) In an industry there is 20% chance of suffering an occupational disease. What is the probability that out of 6 workers, **15**
   i.   3 workers will contract the disease
   ii. 4 workers will contract the disease
   iii. 4 or more workers will contract the disease.

   b) A car hire firm has two cars which its hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the number of days in a year on which **10**
   i   Car is not used
   ii. The number of days in a year on which some demand is refused.

4. a) A 10 volt electromotive force is applied to an LR series circuit in which the inductance is 0.4 henry, the resistance is 12 ohms. Find the current $i(t)$ if $i(0) = 2$. Determine the current after a long time. **15**

   b) Identify the equation and solve $\frac{dy}{dx} = \frac{y}{x} + x\sin\left(\frac{y}{x}\right)$. **10**

5. a) Calculate mean and mode. Using empirical relation find median of the following data **15**

Height	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Students	5	15	28	24	17	10	1

1

b) Find Q_1, Q_2 and Q_3 of the following data   10

Height	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Students	5	15	28	24	17	10	1

OR

6   a)   Calculate the measure of skewness   10

Profits	70-90	90-110	110-130	130-150	150-170
No of Companies	8	11	18	9	4

b)   Calculate mean deviation. Using empirical relation find quartile deviation and   15
standard deviation of the following data
1320, 1310, 1315, 1322, 1326, 1340, 1325, 1321, 1320, 1331

7   a)   Solve the Bernoulli's equation $(x + 2y^3)dy = ydx$.   15

b)   Find the integrating factor of the linear differential equation and solve it   10
$$x(x-1)\frac{dy}{dx} - (x-2)y = x^2(2x-1).$$

OR

8   a)   Check exactness of the equation and solve it   12
$$(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0.$$

b)   Check exactness of the equation and solve it $\frac{dy}{dx} = \frac{x^3 + y^3}{xy^2}$.   13

Course Title: Mechanics of Solids I		Course Code: CE 211
Time: 3 hours	Credit Hour: 3.0	Full Marks: 100 (10 x 10)

ANSWER ALL THE QUESTIONS

1. ***Fig.1*** shows a composite cross-section consisting of steel and aluminium of a simply supported beam. Calculate the maximum stresses produced in aluminium and steel for induced bending moment of 200 kip-ft [Given: E_{steel} = 30000 ksi, $E_{aluminium}$ = 10000 ksi].

2. ***Fig.2*** shows a cross section consisting of a metal of a simply supported beam. Calculate the maximum allowable induced bending moment [Given: E_{metal} = 20000 ksi, $\sigma_{allowable}$ = 40 ksi].
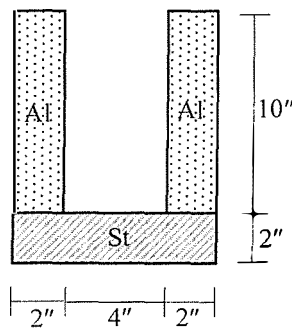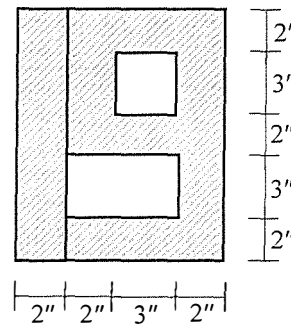

Fig.1   ***Fig.2***

3. For a simply supported beam. (a) Calculate the flexural shear flow at bolt level, (b) Calculate the spacing of 3/4″ bolts required at the joints shown either in ***Fig.3*** or ***Fig.4*** to withstand the shear flow [Given: Shear force at the section, V = 52 kips, Allowable shear stress for bolt is 24 ksi].
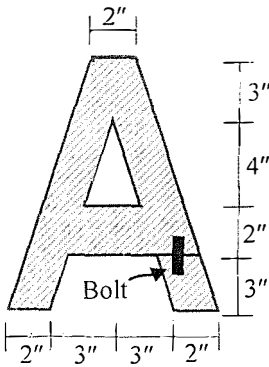

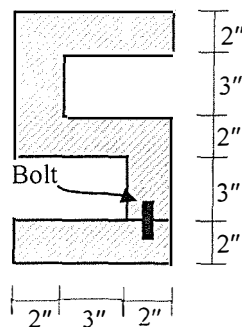***Fig.3***   ***Fig.4***   ***Fig.5***   ***Fig.6***

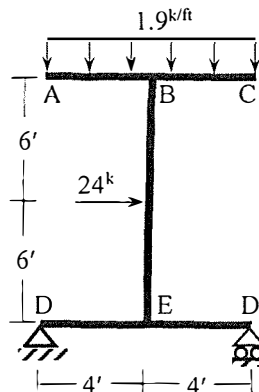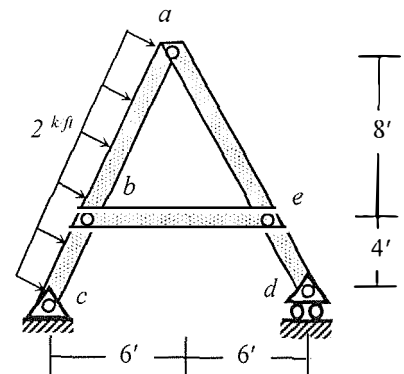4. Draw axial force, shear force and bending moment diagram:
    Either for the member ***BE*** of the frame ***ABCDEF*** loaded as shown in ***Fig.5***
    Or for the member ***abc*** of the frame ***abcde*** loaded as shown in ***Fig.6***

5. The vertical shear force is 2024 N. Compute and illustrate shear flow and determine the location of shear center shown in *Fig. 7*.

6. A uniform concrete slab of total weight W is to be attached, shown in *Fig.8*, to two rods whose lower ends are on the same level. Determine the Cross section of the steel rod so that the slab will remain level.
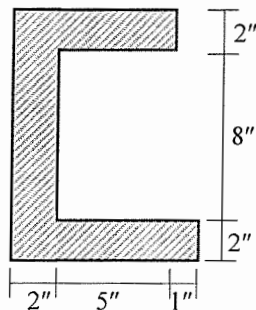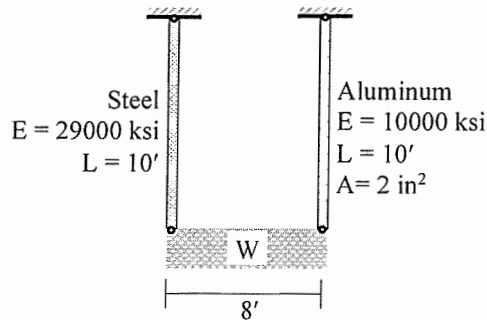

Steel
E = 29000 ksi
L = 10'

Aluminum
E = 10000 ksi
L = 10'
A= 2 in²
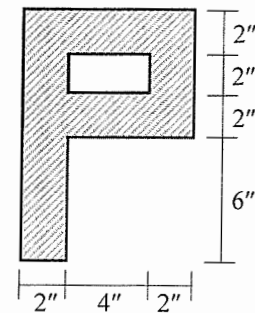
Fig.7   *Fig.8*   *Fig.9*

7. Calculate the maximum shear stress produced in the section shown in *Fig.9* if the induced shear force is 52 kips
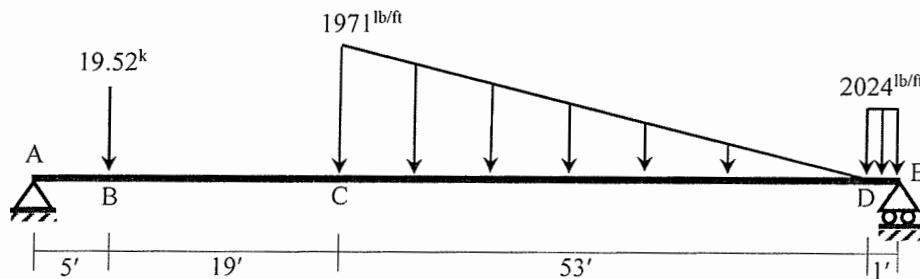
Fig.10

8. Draw shear force and bending moment diagram for the beam *ABCDE* loaded as shown in *Fig.10*.
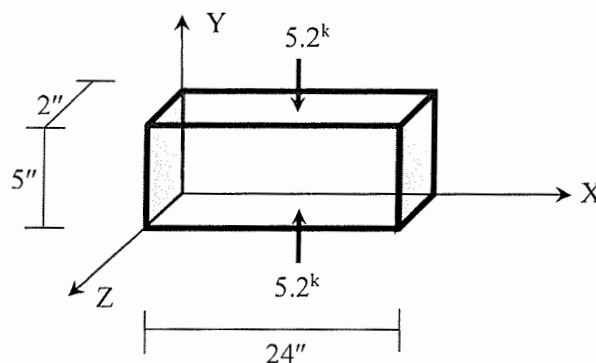
Fig.11

9. The rectangular prism shown in *Fig.11* is subjected to normal force in the Y direction and is restrained in the X direction only. Calculate the normal stresses and strains that develop in the prism [Given: Modulus of Elasticity = 2024 ksi and Poisson's Ratio = 0.24].

10. A cylindrical steel pressure vessel of 1971 mm in diameter with a wall thickness of 24 mm is subjected to an internal pressure of 5.2 MPa [Given: Modulus of Elasticity = 200 GPa and Poisson's Ratio = 0.24]
    a) Calculate the tangential and longitudinal stresses and strains in the steel.
    b) To what value may the internal pressure be increased if the allowable stress in steel is 520 MPa.
    c) If the internal pressure is increased until the vessel burst, sketch the type of fracture that would occur.

University of Asia Pacific
Department of Civil Engineering
Final Examination Spring 2024
Program: B.Sc. in Civil Engineering

Course Title: Engineering Materials   Credit Hour: 4.00   Course Code: CE 201

Time: 3 hours   Full Marks: 120

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

Part A

1. **a)** Three aggregates are to be mixed together to obtain an aggregate blend for an asphalt mixture. The grain size distribution is given below: **[18+4+3+5]**

Sieve size	% Passing			
	Aggregate A	Aggregate B	Aggregate C	Target Specification
3"	-	-	-	
1"	-	100	100	100
¾"	100	85	94	95
1/2"	73	53	62	
No. 4	52	27	44	
No. 8	12	16	22	20
No. 16	0	8	12	
No. 30	0	1	0	

     i. Determine the mix ratio of aggregates A, B, and C to meet the target specification provided in Table.

     ii. Calculate the fineness modulus of the combined aggregate.

     iii. If the compressive strengths of aggregates A, B, and C are 12, 45, and 27 MPa respectively, calculate the compressive strength of the aggregate blend.

b) Discuss the type of concrete admixture need to be used in hot weather concreting and clarify your discussion.

c) Draw qualitative gradation curve for (i) well-graded; (ii) gap-graded and (iii) uniform-graded aggregate.

d) List the measures to control alkali-aggregate reactivity.

2. **a)** Amount of ingredients for a non-air entrained concrete mix is to be designed for a 6" slab with specified compressive strength 27 MPa. Maximum allowable slump of concrete is 80 mm. A plasticizer (specific gravity 1.2) at a 1.5% weight of cement dose is required to be used in the concrete mix which is capable to reduce water demand by about 15% while keeping the workability same. Design a   **[25+5]**

concrete mix following **ACI 211.1 method**. Also find the amount of ingredients required for a trial mix of 9 set of cylinders. Table 1- Table 4 with the following data are provided for the mix design.

Cement: Portland Composite Cement; Specific gravity = 2.85
Coarse Aggregate:
- Maximum size: 25 mm
- Absorption capacity: 1.7%
- Moisture content: 1.3%
- Bulk specific gravity (Oven Dry): 2.6
- Unit weight (dry-rodded): 1660 kg/m^3

Fine Aggregate:
- Fineness modulus: 2.9
- Absorption capacity: 1.9%
- Moisture content: 2.4%
- Bulk specific gravity (OD): 2.66

b) Design the mix ratio of a concrete comprising of crushed stone and coarse sand using **minimum voids method**. Laboratory test result provided that voids in crushed stone was 32% and voids in coarse sand was 15%.

Part B

3. **a)** Explain the reasons of water coming out to the surface of placed concrete? Discuss different controlling methods for this problem. 8

b) Discuss effect of age of concrete on the strength of concrete graphically. Name different curing methods for placed concrete. 6

c) Explain the following graph: 6
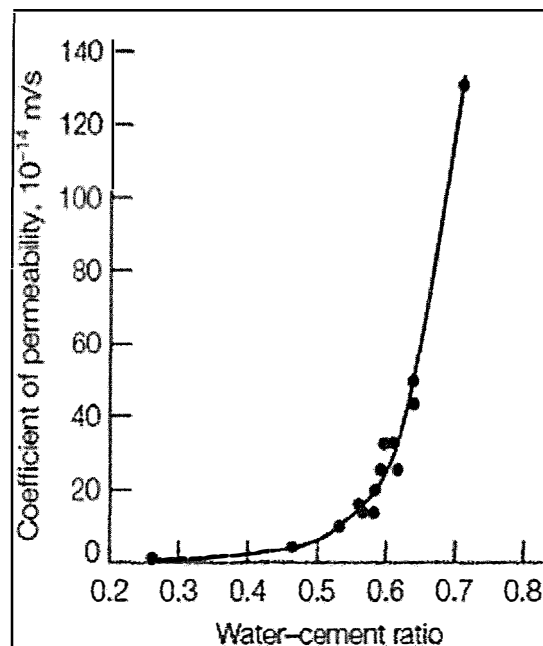
4. **a)** Define hydraulicity of lime. Discuss the uses of lime as building material. 8

    b) Draw and explain lime-mortar cycle. 8

    c) Describe Smith's test for stone. 4

5. **a)** Name chief ingredients of mortar. Explain process of making **sound absorbing mortar**. Discuss role of sand in mortar 5

    b) Explain bulking of sand. Describe the following graph: 5
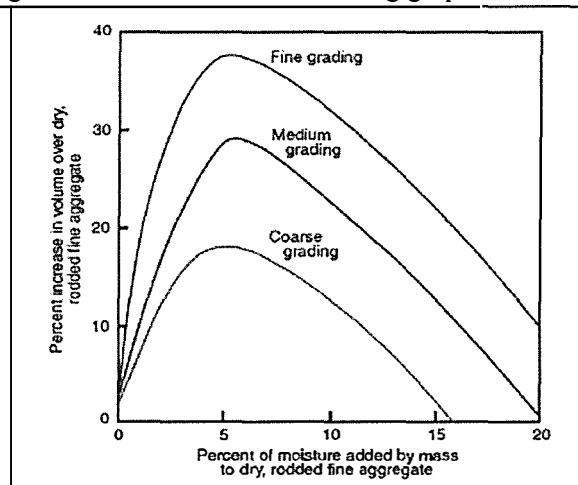
6. **a)** Define laminated boards. Compare between sapwood and heartwood. 2

    b) Draw load-strain diagram for an *Elastic* material for the following load pattern. Take equal time intervals: $t_0=t_1=t_2$. 4
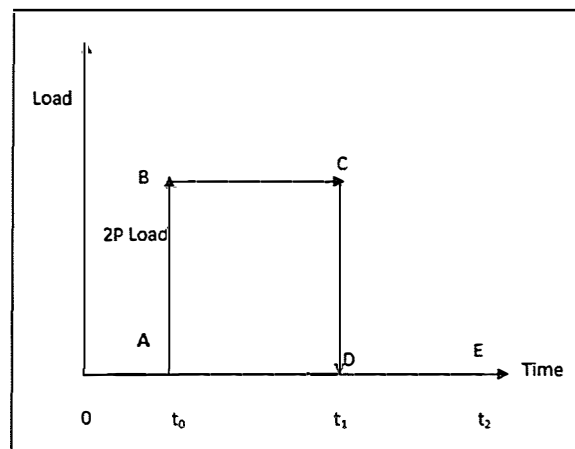
    c) One brick sample is tested for compressive strength and water absorption capacity. Following results in the table are obtained from the tests. 4
Assume unit weight of the brick 100 lb /ft^3 and average depth of brick sample is 2.75 inch. Calibration equation: $Y=0.952X-4.72$.
Calculate compressive strength and absorption capacity of the brick sample.

Sample	Dimension (inch)				Observed Load (lb)	SSD weight of brick (lb)
	Side-1		Side-2			
	L	W	L	W		
1	4.5	4.55	4.6	4.55	53050	3.81

3

Table 1

Slump, mm	Water, kilograms per cubic meter of concrete, for indicated sizes of aggregate*							
	9.5 mm	12.5 mm	19 mm	25 mm	37.5 mm	50 mm**	75 mm**	150 mm**
	Non-air-entrained concrete							
25 to 50	207	199	190	179	166	154	130	113
75 to 100	228	216	205	193	181	169	145	124
150 to 175	243	228	216	202	190	178	160	—
Approximate amount of entrapped air in non-air-entrained concrete, percent	3	2.5	2	1.5	1	0.5	0.3	0.2

Table 2

Compressive strength at 28 days, MPa	Water-cementitious materials ratio by mass	
	Non-air-entrained concrete	Air-entrained concrete
45	0.38	0.30
40	0.42	0.34
35	0.47	0.39
30	0.54	0.45
25	0.61	0.52
20	0.69	0.60
15	0.79	0.70

Table 3

Specified compressive strength, f'_c, MPa	Required average compressive strength, f'_{cr}, MPa
Less than 21	$f'_c + 7.0$
21 to 35	$f'_c + 8.5$
Over 35	$1.10 f'_c + 5.0$

Table 4

Nominal maximum size of aggregate, mm (in.)	Bulk volume of dry-rodded coarse aggregate per unit volume of concrete for different fineness moduli of fine aggregate*			
	2.40	2.60	2.80	3.00
9.5 (⅜)	0.50	0.48	0.46	0.44
12.5 (½)	0.59	0.57	0.55	0.53
19 (¾)	0.66	0.64	0.62	0.60
25 (1)	0.71	0.69	0.67	0.65
37.5 (1½)	0.75	0.73	0.71	0.69
50 (2)	0.78	0.76	0.74	0.72
75 (3)	0.82	0.80	0.78	0.76
150 (6)	0.87	0.85	0.83	0.81

Course Title: Material Science and Environmental Sustainability   **Course Code:** CE 207
Time: 3 hours   **Credit Hour:** 3.0   **Full Marks:** 100

Answer all the questions.
[Assume reasonable data if required]

PART A

1. (a) With neat sketch show an application of thermal expansion in civil engineering works. **[3]**

   (b) A specimen made of composite material has been tested for mechanical and thermal properties. The results are charted below. Determine the Thermal Shock Resistance (TSR) of the tested material and suggest ways of improving TSR. **[8]**

Stress (MPa)	Strain (mm/mm)
0	0.0000
30	0.0002
90	0.0006
150	0.0009
Fracture	

Thermal conductivity	1.74 W/m-K
Coefficient of linear expansion	8.7×10^{-6} /°C

2. (a) List the effects of nanomaterials on hydration kinetics and rheology of Portland cement paste. **[4]**

   (b) A specimen made of alloy has been tested for tension and a stress vs strain curve is obtained as shown in **Figure 1**. The initial length of the specimen was 150 mm, and initial diameter was 30 mm. Calculate the true area at fracture. **[7]**
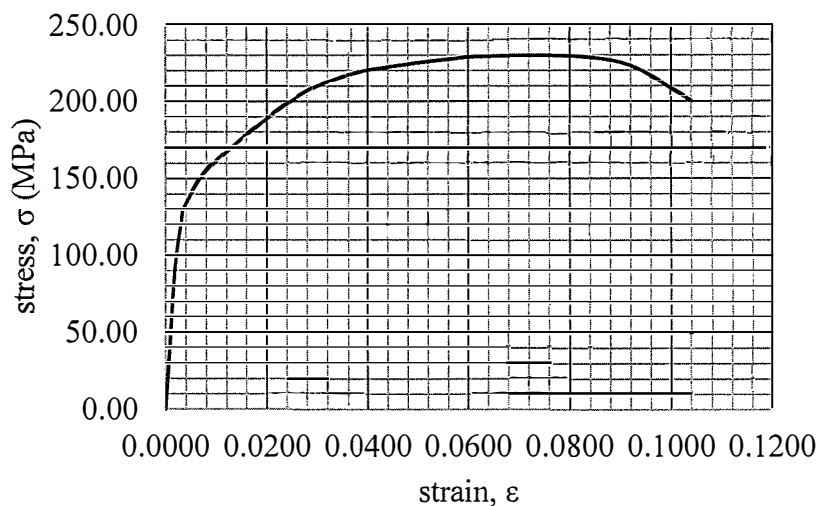

Figure 1

3. (a) With neat sketch discuss elastic recovery after plastic deformation. [4]

(b) In **Figure 2** heater keeps the temperature of the room at 28°C when the outside temperature is 7°C. [7] Through the 10 mm thick tin roofing heat loss occurs. Total area of the tin sheet is 6 m² and thermal conductivity of tin is 63.2 W/m-K. Calculate the heat loss per day through the tin roofing

Heat loss through roof

10 mm thick tin roofing
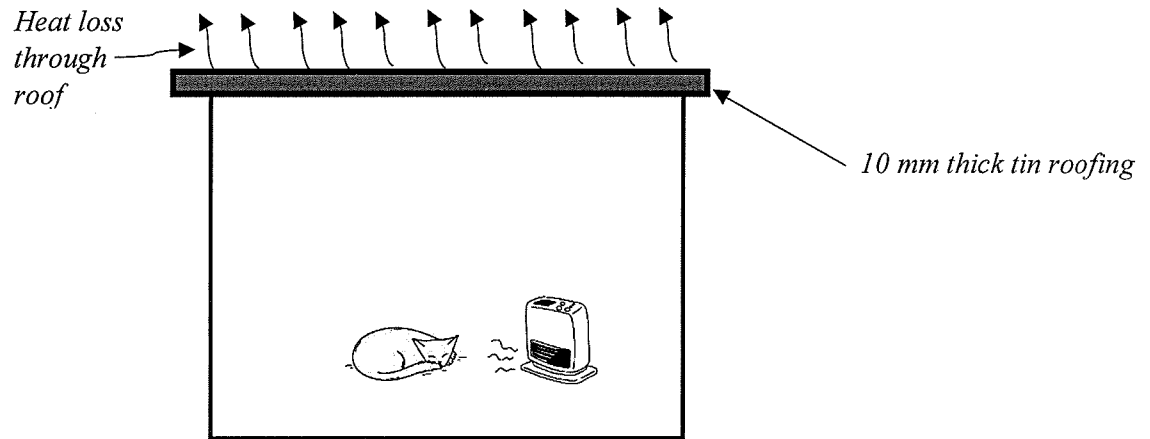
Figure 2

4. (a) Determine the Miller–Bravais indices for the plane through 1, 2, 8 and 7 as shown in **Figure 3**. The [4] length of each side of the hexagonal base is *a* and the height is *c*.
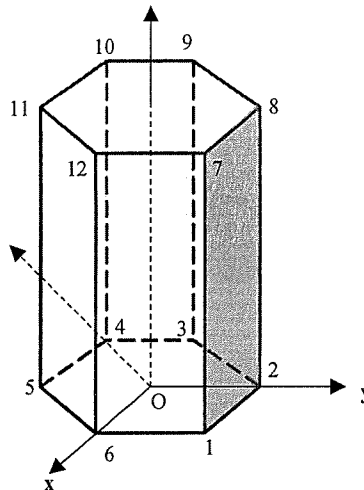
Figure 3

(b) A cylindrical rod, 8 inch long and having a diameter of 0.75 inch is to be deformed using a tensile [7] load of 100 kip. It must not experience either plastic deformation or a diameter reduction of more than 4.3 × 10⁻⁴ inch. Choose a suitable material from the following list with proper mathematical justification.

Material	Modulus of Elasticity (Ksi)	Yield Strength (Ksi)	Poisson's Ratio
CM-1001	1,00,000	250	0.34
CM-1012	1,50,000	280	0.25
CM-1017	3,00,000	100	0.49
CM-1025	50,000	150	0.37

5. (a) With neat sketch explain twin boundary defect in microstructure. [3]

    (b) Construct a **(0 0 1)** plane within a Body Centered orthorhombic cell and determine the planner [8] density. Given, length of unit cell along x axis = 0.133 nm, y axis = 0.212 nm and z axis = 0.447nm.

PART B

6. (a) State difference between guideline and standard with an example. [3]

    (b) BNB textile company emits 300 m^3 gases annually. The Marginal Abetment Cost (MAC) curve for [6] emission reduction is shown in **Figure 4**. To control emission, government imposed a tax of 20 Taka per cubic meter emission. Mathematically demonstrate which amount of emission will be cost effective.
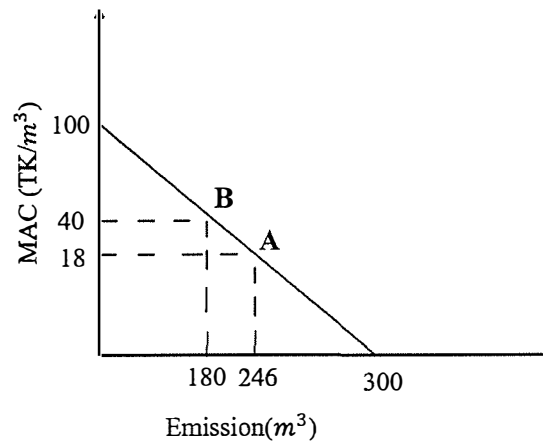
Figure 4

7. (a) Explain the valuation method for clean air. [3]

    (b) State the power and functions of the Director General of the Department of Environment (DoE). [6]

8. (a) Describe the major areas of sustainable development. [3]

    (b) The following table shows the Human Development Index (HDI) indicator values of country 'X'. [6] Calculate the Gender Development Index (GDI) of country 'X' and comment on it.

Indicators	Male	Female
Life expectancy at Birth	72.4	78.8
Mean years of schooling	14.3	12.9
Expected years of schooling	13.0	11.6
GNI per capita (PPP USD)	16,000	11,568

9. (a) Prepare the waste generation to disposal flowchart. [3]

    (b) Express the procedure of attainting Environmental Clearance Certificate (ECC) for Orange- A [6] category using flowchart.

10. (a) Describe surface water pollution with an example. [3]

(b) Determine the Multidimensional Poverty Index (MPI) using data as provided. [6]

Indicator	Household		
	Rahim	Karim	Parvez
Household Size	7	5	7
1. Health			
a. At least one member is undernourished	1	0	0
b. One or more children have died	0	0	1
2. Education			
a. No one has completed at least six years of schooling	0	1	1
b. At least one school-age child not enrolled in school	0	0	1
3. Standard of living			
a. No electricity	0	0	1
b. No access to improved sanitation	1	0	1
c. No access to an improved source of drinking water	1	0	0
d. House built with inadequate materials	0	0	1
e. Household cooks with dung, wood, charcoal or coal	1	1	0
f. Household does not own a car or truck and does not own more than one of the following assets: radio, television, telephone, computer, animal cart, bicycle, motorbike or refrigerator.	0	1	1

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University of Asia Pacific
Department of Civil Engineering
Final Examination, Spring 2024
Program: B.Sc. in Civil Engineering

Course Title: Principles of Accounting	Course Code: ACN201
Time: 2 hours Credit Hour: 2	Full Marks: 50

Part A

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

1.

Rayet Co.
Statement of Financial Position
31 December

Assets	2023	2022
Current assets	**BDT**	**BDT**
Cash	420,700	449,400
Prepaid expenses	518,000	350,000
Accounts receivable	824,600	719,600
Inventory	882,000	808,500
Total current assets	**2,645,300**	**2,327,500**
Plant assets (net)	4,543,000	3,642,100
Total assets	**7,188,300**	**5,969,600**
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	1,120,000	1,015,000
Income taxes payable	304,500	294,000
Total current liabilities	**1,424,500**	**1,311,800**
Bonds payable	1,540,000	1,400,000
Total liabilities	**2,964,500**	**2,711,800**
Stockholders' equity		
Common stock (BDT 5 par)	2,030,000	2,100,000
Retained earnings	2,193,800	1,157,800
Total stockholders' equity	4,223,800	3,257,800
Total liabilities and stockholders' equity	**7,188,300**	**5,969,600**

Note that the total assets for Financial Year 2021 was BDT 1,000,000.

Rayet Co.
Statement of profit or loss and other comprehensive income
For the year ended 31 December

	2023	2022
Net sales	13,233,780	12,253,500
Cost of goods sold	7,409,780	7,042,000
Gross profit	**5,824,000**	**5,211,500**
Selling and administrative expenses	3,500,000	3,353,000
Income from operations	2,324,000	1,858,500
Interest expense	154,000	140,000
Income before income taxes	**2,170,000**	**1,718,500**
Income tax expense	644,000	511,000
Net income	35,259,560	32,088,000

a. **Calculate** each ratio mentioned below for both years: [10]

    i.   **The current ratio**
    ii.   **Debt to equity**
    iii. **Assets turnover**
    iv. **Profit margin ratio**
    v.   **Gross profit ratio**

b. Evaluate the financial health for **Rayet Co.** for the **both years** based on the [5] interpretation of each of the ratio.

2.   Reynold Corporation is reviewing an investment proposal. The initial investment is $110,000. Estimates of the book value of the investment at the end of each year, the net cashflows for each year, and the net income for each year are presented in the schedule below. All cash flows are assumed to take place at the end of the year. The salvage value of the investment at the end of each year is equal to its book value. There would be no salvage value at the end of the investment's life.

Investment Proposal

Year	Book Value	Annual Cash Flows	Annual Net Income
1	80,000	50,000	10,000
2	55,000	45,000	14,000
3	30,000	40,000	18,000
4	12,000	35,000	22,000
5	0	30,000	26,000

The company uses a 10% target rate of return for new investment proposals.

a. Calculate the payback period, net present value and annual rate of return for the [10]

investment.

b. Evaluate whether the company should accept the investment proposal depending on the net present value and annual rate of return methods [5]

3.

STG Company
Condensed Balance Sheets
December 31

Particulars	2020($)	2019($)
Assets		
Cash	145,000	140,000
Accounts receivables	200,000	215,000
Inventory	180,000	165,000
Short-term investment	6,000	5,000
Property, plant and equipment	669,000	650,000
Total assets	**1,200,000**	**1,175,000**
Liabilities and Stockholder's Equity		
Liabilities:		
Current liabilities	180,000	200,000
Long-term liabilities	330,000	280,000
Total liabilities	510,000	480,000
Stockholder's Equity:		
Common stock	50,000	50,000
Retained earnings	640,000	645,000
Total stockholder's equity	690,000	695,000
Total liabilities and stockholder's equity	**1,200,000**	**1,175,000**

The sales of the company were $170,000 and $155,000 in 2020 and 2019 respectively.

a. Prepare horizontal and vertical analysis for the balance sheet data. [10]

b. Calculate and explain asset turnover, acid-test ratio, debt-to-assets ratio of the company for 2020. [5]

4. **Rahman Co.** is a car repair company. During the February 2024, the following transactions took place:
Feb 01: Rahman invested BDT 100,000 cash in "**Rahman Co.**"
Feb 10: The company paid for its commercial space of BDT 2,500 to cover the month of January.
Feb 15: Rahman purchased equipment on credit. BDT 6,000 is due to be paid at the end of the month.
Feb 20: Performed car repair work for the first two weeks of January and yet to

receive BDT 7000.

Feb 25: The owner withdrew cash BDT 600 for personal use.

Feb 25: Performed services worth BDT 80,000, BDT 30,000 cash is received from customers, and the balance is billed to customers on account.

Feb 28: Paid income tax of the owner BDT 2,000 as withdraw.

Feb 29: Paid Electricity bill of BDT 1,500.

a. Using the accounting equation (Assets = Liabilities + Owner's Equity), **show how each** **[10]**
   transaction impacts the Company.

b. Calculate the final balances for total **Net income** after all the transactions. **[5]**

Part B

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

5. Edward Co. manufactures and sells a specialized cordless telephone for high electromagnetic radiation environments. The company's contribution format income statement for the most recent year is given below:

	Total	Per Unit	Percent of Sales
Sales (20,000 units)	$1,200,000	?	100%
Variable expenses	900,000	?	?%
Contribution margin	300,000	?	?%
Fixed expenses	240,000		
Net operating income	$60,000		

a. Compute the break-even point in units and sales dollars. **[5]**

b. The company wants to earn a net income of $180,000 next year. Calculate the **[5]**
   required sales in units for the company to achieve its target?

6. The Best Western Hotel's guest days of occupancy and custodial supplies expenses over the last nine months were:

Months	Guest Days of Occupancy	Custodial Supplies Expenses
January	6,000	8,000
February	4,500	7,800
March	4,000	7,500
April	6,500	8,250
May	8,000	10,500
June	10,500	12,000
July	12,000	12,500
August	9,000	10,750
September	7,500	9,750

a. Using the high low method, estimate cost formula for custodial supplies expense. **[5]**

b. Using the cost formula, you derive above, calculate what amount of custodial supplies expense would you expect to be incurred at an occupancy level of 11000 guest days. **[5]**

7. Following Ledger balances of **Usha Company** as on 31 December 2023 are as follows:

Account's name	BDT	Account's name	BDT
Owner's capital	733,333	House rent	33,333
Cash (01-Jan-23)	100,000	Accounts receivable	23,333
Advance rent	166,667	Commission received	1,333
Accounts payable	100,000	Interest expense	200,000
Drawings	66,667	Interest on Bank Deposit	3,333
Purchase	200,000	Loss on fire	26,667
Revenue	300,000	Advertisement	66,667
Royalty	20,000	Opening inventory	166,667
Closing inventory	80,000	Bank balance (31-Dec-23)	40,000
Bank balance (01-Jan-23)	40,000		

a. Define **"Accounting"** in your own words. List down the users of the accounting information. **[3]**

b. Calculate the amount of those items not to be included in **"Trial balance"** and prepare the **"Trial balance"**. **[2+5]**

8. Following Ledger balances of **Alex Co.** as on 31 December 2023 are as follows:

Account's name	Debit	Credit
Prepaid-insurance	12,000	
Supplies	6,000	
Accounts Payable		20,000
Unearned Revenue		7,500
Sales Revenue		125,000
Salaries Expense	75,000	
Rent Expense	12,500	
Utilities Expense	47,000	
Totals	**152,500**	**152,500**

Adjustments Required as of 31 December 2023:

i. A physical count shows BDT 2,000 of supplies is remaining.
ii. Depreciation on equipment for the year is BDT 5,000
iii. Insurance is for 4 years.
iv. BDT 1,000 of previously recorded unearned revenue has now been earned.
v. On 01 July 2023, the company borrowed BDT 500,000 from a local bank, the annual interest rate is 10%.
vi. Revenue earned but unrecorded for December totaled BDT 110,000.
vii. BDT 6,000 of salaries were earned by employees but unpaid as of December 31

a. Define the term **"Efficient Market Hypothesis"** with its calcification. **[3]**

b. Prepare the **adjusting journal entries** for **Alex Co.** as of 31 December 2023, to ensure **[7]** that its financial statements comply with accrual accounting principles.