

Program: B. Sc. in Civil Engineering  
Semester: 7<sup>th</sup> Semester

Date: 05 December 2023  
Time: 9:00 am – 12:00 pm

**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**  
ORGANISATION OF ISLAMIC COOPERATION (OIC)  
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Final Examination  
Course Number: HUM 4753  
Course Title: Engineering Economics and Accounting

Winter Semester: 2022 - 2023  
Full Marks: 150  
Time: 3 Hours

There are 6 (Six) questions. Answer all questions. The symbols have their usual meanings. Marks of each question and the corresponding CO and PO are provided in brackets.

1. (a) Exemplify the "Deadweight Loss". (5)  
(CO1)  
(PO1)

(b) What is meant by "Errors of Omission", "Compensating Errors", "Errors of Commission", and "Errors of Principles"? (10)  
(CO1)  
(PO1)

(c) Explain the mathematical philosophy of the factor notations and formulas used in "Single Amount" and "Uniform Series" calculations. (10)  
(CO1)  
(PO1)

2. (a) Draw the relevant figure and present the equation of "Change in Consumer Surplus" in terms of "Price Elasticity of Demand". (10)  
(CO1)  
(PO1)

(b) Calculate the net annual worth in years 1 through 10 of the following series of incomes and expenses if the interest rate is 10% per year. (5)  
(CO2)  
(PO2)

Year	Income, \$/Year	Expense, \$/Year
0	0	-2500
1-4	700	-200
5-10	2000	-300

(c) For the cash flows shown in the diagram, determine the value of x that will make the future worth in year 8 equal to \$-70,000 (negative 70,000 \$). (10)  
(CO2)  
(PO2)

Cash flow diagram for Question # 2(c):

$i = 10\%$  per year



3. (a) Record the following transactions:

1. Started business with cash of \$ 25,000, office equipment worth \$ 8,000, and a motor car worth \$ 12,000.
2. Purchased furniture worth \$ 4,000 in cash.
3. Purchased goods worth \$ 4,500 from Mr. John on credit.
4. Paid Mr. John in full settlement of his account \$ 4,350.
5. Purchased goods worth \$ 6,000 from Mr. Carter on credit.
6. Returned goods worth \$ 1,000 to Mr. Carter.
7. Sold office equipment for \$ 4,000.
8. Paid landlord \$ 1,200 for rent. One-third of the premises are occupied by the proprietor for his own residence.
9. Paid cash for a salary of \$ 500.
10. Sold goods to Mr. Tony are worth \$ 5,000 in cash.
11. Opened a current A/C with Chase Bank for \$ 6,000.

(15)  
(CO2)  
(PO2)

Prepare a Journal to represent the transactions.

(b) Present the "Accounting Equation" based classification of accounts, meaning, and examples.

(10)  
(CO1)  
(PO1)

4. (a) Post the Journal entries into Ledger Accounts for the transactions stated in Question # 3(a).

(15)  
(CO2)  
(PO2)

(b) Prepare the Trail Balance for the Ledger Accounts of Question # 4(a).

(10)  
(CO2)  
(PO2)

5. (a) Derive the fundamental "Accounting Equation". Present the extension of the equation and explain the terms. Explain the steps of the 'Accounting Cycle' with examples. (10)  
(CO1)  
(PO1)

- (b) As a credit manager of the Central Bank of Bangladesh, you have been approached by 2 companies for a loan of Tk. 2,00,000 for 6 months with no collateral offered. Since the bank has reached its quota for loans of this type, only one of these requests can be granted. The relevant information supplied to you by the 2 companies is presented below. (10)  
(CO2)  
(PO2)

Particulars	Company X	Company Y
<b>Assets</b>		
Cash	1,50,000	3,00,000
Marketable Securities	2,75,000	4,25,000
Stock	9,00,000	13,00,000
Other Assets	10,00,000	10,50,000
<b>Liabilities and Capital</b>		
Current Liabilities	5,00,000	6,50,000
Long-term Loans	8,00,000	10,00,000
Equity Share Capital	8,00,000	12,00,000
Retained Earnings	2,45,000	2,55,000
<b>Other Information</b>		
Sales	25,00,000	18,00,000
Rate of Gross Profit on Sales	30%	40%

Considering the above data, specify the company which should be granted the credit. Explain your answer with proper reasoning.

- (c) Why do total assets equal the total of equities (liabilities and owner's equity) of an accounting equation? (5)  
(CO1)  
(PO1)

6. (a) Present the "Profitability Ratios" in relation to expenses. (10)  
(CO1)  
(PO1)

- (b) What are the limitations of financial statements? (5)  
(CO1)  
(PO1)

- (c) Calculate the 'Current Asset', 'Current Liabilities', and 'Stock' from the following information. Assume, there is no prepaid expense. (10)  
(CO2)  
(PO2)

Net Working Capital	Tk. 2,40,000
Current Ratio	3.5
Quick Ratio	2.5

## NOTES

Type	Find/Given	Factor Notation and Formula	Relation	Sample Cash Flow Diagram
Single Amount	F/P Compound amount	$(F/P, i, n) = (1 + i)^n$	$F = PF(F, i, n)$	
	P/F Present worth	$(P/F, i, n) = \frac{1}{(1 + i)^n}$	$P = FP(F, i, n)$	
Uniform Series	P/A Present worth	$(P/A, i, n) = \frac{(1 + i)^n - 1}{i(1 + i)^n}$	$P = A(P/A, i, n)$	
	A/P Capital recovery	$(A/P, i, n) = \frac{i(1 + i)^n}{(1 + i)^n - 1}$	$A = PA(P, i, n)$	
	F/A Compound amount	$(F/A, i, n) = \frac{(1 + i)^n - 1}{i}$	$F = A(F/A, i, n)$	
	A/F Sinking fund	$(A/F, i, n) = \frac{i}{(1 + i)^n - 1}$	$A = FA(F, i, n)$	
Arithmetic Gradient	P <sub>0</sub> /G Present worth	$(P_0/G, i, n) = \frac{(1 + i)^n - 1}{i(1 + i)^n} - \frac{n}{(1 + i)^n}$	$P_0 = G(P_0/G, i, n)$	
	A <sub>0</sub> /G Uniform series (Gradient only)	$(A_0/G, i, n) = \frac{1}{i} - \frac{n}{(1 + i)^n - 1}$	$A_0 = GA_0(G, i, n)$	

$$\text{Gross Profit to Sales} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$

[Gross Profit = Sales - Cost of Goods Sold]

$$\text{Operation Profit Margin} = \frac{\text{Operating Profit}}{\text{Sales}}$$

[Operating Profit = Earnings Before Interest and Taxes (EBIT)]

$$\text{Net Profit Margin} = \frac{\text{Net Profit After Tax}}{\text{Sales}}$$

[Net Profit After Tax = Earnings After Taxes (EAT)]