



Iqra National University, Peshawar  
Department of Electrical Engineering

Spring Semester Examination 2020, Date:22/06/2020  
Final term Examination

Course Code:	<u>HSS-460</u>	Course Title:	<u>Engineering E &amp;M</u>				
Prerequisite:	<u>None</u>	Instructor:	<u>Jehanzeb Khan</u>				
Module:	<u>6</u>	Program:	<u>BEE</u>	Total Marks:	<u>50</u>	Time Allowed:	<u>6 Hours (online)</u>
NAME JUNAID UR REHMAN ID 11484							Marks

Note: Attempt all questions.

- Q.1 (a) A property dealer in Hayatabad township has an option to purchase a twenty Marla plot that will be worth Rs.100 Million in six years. If the value of the plot increases at 8%, how much the property dealer is willing to pay for this property? 5
- (b) MR. Hamza an employee of Iqra national university on retirement from service received a lump sum amount of Rs.10 Million. He wishes to distribute to his four children at the rate of Rs. one Million per year. If the 10 Million amounts are deposited in a bank account that earns 6% interest per year, how many years it will it take to completely deplete the account? 5
- Q.2 (a) Four Generators installed at Turbela Dam, if undergoes a major overhaul now, its output can be increased by 30% - which translate into additional cash flow of Rs.30 Million at the end of each year for five years. If interest rate is 15% per year, how much can the WAPDA afford to invest to overhaul these Generators? 5
- (b) Suppose Mr. Zafar make 15 equal annual deposits of \$10,000 each into Summit bank account paying 5% interest per year. The first deposit will be made one year from today. How much money can be withdrawn from this bank account immediately after the 15<sup>th</sup> deposit? 5
- Q.3 (a) A Property is depreciable if it meets certain basic requirements. What are those basic requirements? 3
- (b) An MRI machine was installed at Khyber teaching hospital Peshawar in year 2018 at an initial cost of Rs 400,000 and expected to have zero salvage value at the end of useful life of 10 years. Determine the annual depreciation amount using SYD method. Tabulate the annual depreciation amounts and the book value of the air condition at the end of each year. 7

Q4 (a) A company buys a Digital controlled (DC) machine for \$28,000 (year zero) and uses it for five years, after which time it is scrapped. The allowed depreciation deduction during the first year is \$4,000. as the equipment falls into the seven-year MACRS-property category. (The first-year depreciation rate is 14.29 %.) The cost of the goods produced by this DC machine should include a charge for the depreciation of the machine. Suppose the company estimates the following revenues and expenses, including the depreciation for the first operating year:  
 Gross income = \$50,000;  
 Cost of goods sold = \$20,000;  
 Depreciation on DC machine = \$4,000;  
 Operating expenses = \$6,000.  
 If the company pays taxes at the rate of 40% on its taxable income, what is its Net income during the first year from the project'?

(b) A new convention center and sport complex has been proposed by Abbottabad development Authority at Shimla Pahari . This public project, if approved will be financed through the issue of bonds. The facility will be located near the city in a wooded area which includes a bike path, a nature trail and a pond. Because the city already owns the park, no purchase of land is necessary. List the project's benefits, costs, and any disbenefits.

Q.5 (a) Star Marketing company is considering building a 30-unit apartment complex in Regi Model town. Because of the long term growth potential of the town, it is felt that Star marketing company could average 90% of full occupancy for the complex each year. If the following items are reasonably accurate estimates, what is the minimum monthly rent that should be charged if a 12 % MARR (per year) is desired? Use the AW method.

Land investment cost	\$50,000
Building investment cost	\$225,000
Study period	\$20 years
Upkeep expenses per unit per month	\$30
Property taxes and insurance per year	10% of the total investment

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Q1 (a)

SOLUTION :-

$$F = 100000000$$

$$i = 8\%$$

$$n = 6$$

$$Pv = ?$$

FORMULA :-

$$Pv = Fv (1 / (1+i)^n)$$

$$Pv = 100000000 (1 / (1+0.08)^6)$$

$$Pv = \underline{158,600,000 \text{ ANS}}$$

Q1 (b)

Ans (b) SOLUTION :-

$$N = ?$$

FORMULA :-

$$P = A \left[ \frac{(1+i)^n - 1}{i (1+i)^n} \right]$$

$$10 = (1.06)^n - 1 / 0.06 (1.06)^n$$

$$10 \times 0.06 (1.06)^n = (1.06)^n - 1$$

$$0.6 (1.06)^n = (1.06)^n - 1$$

$$1 = (1.06)^n - 0.6 (1.06)^n$$

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$$1 = (1.06)^n [1 - 0.6]$$

$$1 / 0.4 = (1.06)^n$$

$$2.5 = (1.06)^n$$

$$\ln 2.5 = n \times \ln(1.06)$$

$$0.916 = n \times 0.0583$$

$$n = 0.916 / 0.0583$$

$$n = 15.7 \text{ Years.}$$

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Qalal

$$A = 30 \text{ million}$$

$$n = 5 \text{ Years}$$

$$i = 15\%$$

$$P = ?$$

$$\text{Formula: - } P = A \left[ \frac{(1+i)^n - 1}{i(1+i)^n} \right]$$

$$P = 30000000 \left[ \frac{(1+0.15)^5 - 1}{0.15(1+0.15)^5} \right]$$

$$= 30000000 \left[ \frac{1.0113}{0.3017} \right]$$

$$= 30000000 (3.5200)$$

$$= 105,600,000 \text{ Ans.}$$

\_\_\_\_\_ x \_\_\_\_\_ x \_\_\_\_\_ x \_\_\_\_\_ x

Q a (b)

Solution:-

$$A = 10,000$$

$$i = 5\%$$

$$N = 15$$

$$F = ?$$

$$\text{Formula: - } F = A \left[ \frac{(1+i)^n - 1}{i} \right]$$

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Putting the values.

$$F = 10,000 \left[ \frac{(1 + 0.05)^{15} - 1}{0.05} \right]$$

$$= 10,000 (21.5786)$$

$$F = 215786 \text{ Ans}$$

$$F = \cancel{215786} \text{ Ans}$$

Q3 (a)

### DEPRECIATION:-

Depreciation is the decrease in value of physical properties with the passage of time and use. It is a non-cash expense that reduces the value of an asset as a result of wear and tear, age or obsolete. Most assets lose their value over time and must be replaced once the end of their useful life is reached. There are several accounting methods that are used in order to write off an asset depreciation cost over the period of its useful life because it is a non-cash expense, depreciation lowers

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The company's reported earnings, while increasing  
Free cash flow

Property is depreciable if it meets the following  
Basic Requirements

- 1) it must be used in business or held to produce income
- 2) it must have a useful life and the life must be longer than one year
- 3) it must be something that wears out, decays, gets used up, become obsolete or lose value from natural causes.

Depreciable Property is tangible or intangible  
it includes two main types called Personal  
Property or Real Property. Personal Property  
is machinery, vehicles, equipment, furniture  
and similar items. Real Property - land and  
anything erected on it or attached to it  
and itself is not depreciable because it  
does not have a determinable life.  
Intangible Property are Copyright, Patent or  
Franchise

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Book Value :-

The worth of a depreciable property as shown on the accounting records of a company. It is original cost basis of the property, including any adjustments less all allowable depreciation or amount of capital remains invested in property and must be recovered in the future through accounting process.

( Book value ) is = adjusted cost basis

$$= \sum_{1=1}^K (\text{Depreciation deduction})$$

K is no. of years.



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Q 3 (b)

SOLUTION:-

Useful life = 10 Years

Cost = 400,000

Salvage Value = zero

Years	Depreciation Base	Remaining life
1	400000	10
2	400000	9
3	400000	8
4	400000	7
5	400000	6
6	400000	5
7	400000	4
8	400000	3
9	400000	2
10	400000	1

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Fraction: -

$$\frac{10}{55} \times 400000 = 7272.72$$

$$\frac{9}{55} \times 400000 = 65454.54$$

$$\frac{8}{55} \times 400000 = 58181.81$$

$$\frac{7}{55} \times 400000 = 50909.09$$

$$\frac{6}{55} \times 400000 = 43636.36$$

$$\frac{5}{55} \times 400000 = 36363.63$$

$$\frac{4}{55} \times 400000 = 29090.90$$

$$\frac{3}{55} \times 400000 = 21818.18$$

$$\frac{2}{55} \times 400000 = 14545.45$$

$$\frac{1}{55} \times 400000 = 7272.72$$

Book value: -

Year

$$1 = 400000 - 7272.72 = 392727.28$$

$$2 = 400000 - 14545.45 = 385454.55$$

$$3 = 400000 - 21818.18 + 400000 = 378181.82$$

$$4 = 400000 - 29090.90 = 370909.1$$

$$5 = 36363.63 + 400000 = 363636.37$$

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$$6 = -43636.36 + 400000 = 356363.64$$

$$7 = -50909.09 + 400000 = 349090.91$$

$$8 = -58181.81 + 400000 = 341818.19$$

$$9 = -65454.54 + 400000 = 334545.46$$

$$10 = -72727.27 + 400000 = 327272.73$$

— x — x — x — x

Q4 (a)

~~50~~

gross income = 50,000

income tax rate = 40%

Net income = ?

Solution

Consider the purchase of the machine to have been made at the end of year 0 which is also the beginning of year 1

(Note that our example explicitly assumes that the only depreciation charge for year 1 one or those for de machine a situation that may not be typical

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<u>Items</u>	<u>Amount</u>
Gross income (Revenue)	\$ 50,000
Expenses	
Cost of goods sold	\$ 20,000
Depreciation	\$ 4,000
Operating expense	\$ <u>6,000</u>
Taxable income	\$ 20,000
Taxes (40%)	\$ <u>8,000</u>
	\$ 12,000

— x — x — x — x —

Q4 (b)

Benefits:-

Improvement of the image of  
abbotabad city

Potential to attract conferences and  
to abbotabad city

Potential to attract professional sports  
to the city

Revenues from rental of the facility  
of facility for civic events.

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Costs :- Architectural design of the facility  
construction of the facility, Design and  
construction of parking facility, facility operating  
and maintenance costs, insurance costs.

Dis Benefits:

loss of use portion of the ~~park~~<sup>Park</sup>,  
bike path natural trails and the bond. loss  
of wildlife habitat in urban areas.

OR

Solution :-

First to determine the equivalent AW  
of all cost at the ~~M~~<sup>M</sup>ARR of 12% per year.  
to earn exactly 12%, the annual rental  
income, adjustment per 90% occupancy must  
be equal the AW of costs.

initial investment cost

$$= 50000 + 225000 = 275,000$$

Taxes and insurance per year

$$= 0.1 (275000) = 27500$$

$$\text{upkeep / year} = 30 (12 \times 30) 0.9 = 9720$$

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$$CR \text{ cost / year} = 275000 (A/P) 12\% (20)$$

$$509000 (A/P) 12\% = 36123$$

Assume that the investment in land is covered at the year of 20)

$$= -275000 - 9720 - 36123$$

$$= 73473.343$$

Therefore minimum amount rental required equals 73,343 and with annual compounding the monthly rental amount R is

$$R = 73343 / (12 \times 30) (0.9) = 226.36 \text{ Ans}$$

————— x ————— x ————— x ————— x