Iqra National University, Peshawar
Department of Electrical Engineering

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

Course Code:	HSS-460			Course Title:	Engineering E &M
Prerequisite:	None			Instructor:	Jehanzeb Khan
Module:	6	Program:	BEE	Total Marks: 50	Time Allowed: 6 Hours (online)

Note: Attempt all questions. Marks

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 How much money can be withdrawn from this bank account immediately after the 15th deposit?   5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'?

5

(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.

5

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.

10

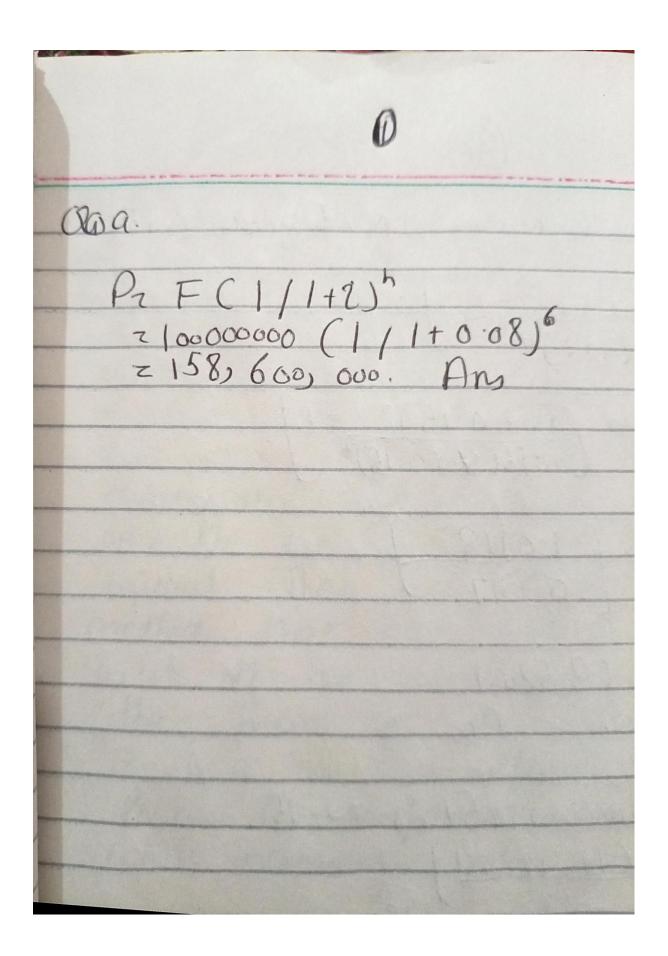|	
Land investment cost	$50,000
Building investment cost	$225,000
Study period	$20 years
Upkeep expenses per unit per month	$30
Property taxes and insurance per year	10% of the total investment

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Q6 a.

$$P = F(1/1+2)^n$$
$$= 100000000 \ (1/1+0.08)^6$$
$$= 158,600,000. \quad Ans$$

Q. (b)

$$P = A\left[(1+i)^n - 1 \,/\, i(1+i)^n\right]$$

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

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

$$1 \,/\, 0.4 = (1.06)^n$$
$$2.5 = (1.06)^n$$
$$\ln 2.5 = n \times \ln(1.06)$$

$$0.916 = n \times 0.0583$$
$$N = 0.916 \,/\, 0.0583$$
$$N = 15.7 \text{ years} . \text{ Ans}$$

(3)

Q2 (a). $A = 30$ Million, $N = 5$ years, $i = 15\%$.

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

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

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

$$= 30000000 \ (3.5200)$$
$$= 105,600,000. \quad \text{Ans}$$

Q2 (b). $A = 10,000$, $i = 5\%$, $N = 15$
$$F = A\left[\frac{(1+i)^n - 1}{i}\right]$$

$$F = 10,000\left[\frac{(1+.05)^{15} - 1}{.05}\right]$$

$$= 10,000 \ [21.57]$$

$$= \cancel{215,9860 \ Ans}$$
$$= 215,700 \ \text{Ans.}$$

Q3(a) Depreciation is the decrease in value of physical properties with the passage of time and use. 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 (in other words, they depreciate), 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 assets depreciation cost over the period of its useful life. Because it is a non-cash expense, depreciation lowers the company's reported earnings while increasing free cash flow.

Property is depreciable if it meets the following basic requirements.
• It must be used in business or held to produce income.
• It must have a useful life and the life must be longer than one year.
• It must be something that wears out, decays, gets used up, becomes obsolete or loss value from natural causes.

Depreciable property is tangible or Intangible. It includes two main types called personal property or real property.

Personal property:- Machinery, vehicles, equipment, furniture and similar items.

Real property - land and anything erected or it, or attached to it —land itself is not depreciable because it does not have a determinable life.

Intangible property - copyright, patent, or franchise.

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.

$$(\text{Book value}) K = \text{adjusted cost basis} - \sum_{j=1}^{z} (\text{Depreciation Deduction})$$

K is for no. of years

Q3 (b)

Useful life = 10 years
Cost = 400,000
Salvage value = zero

Year	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

Fraction:-

$\frac{10}{55} \times 400000 = 72,727.27$

$\frac{9}{55} \times 400000 = 65,454.54$

$\frac{8}{55} \times 400000 = 58,181.81$

$\frac{7}{55} \times 400000 = 50,909.09$

$\frac{6}{55} \times 400000 = 43,68.36$

$\frac{5}{55} \times 400000 = 36,363.63$

$$\frac{4}{55} \times 400000 = 29,090.90$$

$$\frac{3}{55} \times 400000 = 21,818.18$$

$$\frac{2}{55} \times 400000 = 14,545.45$$

$$\frac{1}{55} \times 400000 = 7,272.72$$

Book value:

Year		
1	$= 400,000 - 7,272.72 =$	$392,727.28$
2	$= 400000 - 14,545.45 =$	$385,454.55$
3	$= -21,818.18 + 400000 =$	$378,181.82$
4	$= 400000 - 29,090.90 =$	$376,969.1$
5	$= -36363.63 + 400000 =$	$363,636.37$
6	$= -43636.36 + 400000 =$	$356,363.64$
7	$= -50969.09 + 400000 =$	$349,090.91$
8	$= -58181.81 + 400000 =$	$341,818.19$
9	$= -65454.54 + 400000 =$	$334,545.46$
10	$= -72727.27 + 400000 =$	$327,272.73$

Qu ⓐ Given: Gross income and expenses
as stated; income-tax rate = 40%.
Find: Net tox income.

Consider the purchase of the machine
to have been made at the end of year,
which is also the beginning of year one.

(Note that our example explicitly assumes
that the only depreciation charges for year
one are those for the X machine, a
situation that may not be typical)

Item	Amount
Gross income (Revenue)	$50,000
Expenses	
Cost of goods sold	$20,000
Depreciation	@ $4000
Operating expenses	$6000
Taxable income	$20,000
Taxes (40%)	$8,000
	$12,000

Q4 ⓑ

Benefits:-
            Improvement of the image of
Abbottabad city.
        Potential to attract conferences and
conventions to Abottabad city.
        Potential to attract professional sports
franchises to the city.
        Revenues from rental of the facility
Uses of facility for civic events.

Costs:- Architechtural design of the facility,
Construction of the facility, Design and
construction of packing facility, facility
operating and maintainance costs, insurence
Costs.

Disbenefits:- Loss of use portion of the park,
bike path natural trail and the pond.
Loss of wildlife habitat in urban area.

(10)

Q5

sol First to determine the equivalent
AW of all costs at the rate of
12%/year. To earn exactly 12%, the
annual rental income, adjustment for
90% occupancy, must equal the AW
of costs.

initial investment cost
   = 50000 + 225,000 = 275,000

Taxes and insurance per year
   = 0.1 (275000) = 27,500

Upkeep/year = 30 (12 × 30) 0.9 = 9720

Or Cost/year .275,000 $(A/P, 12\%, 20)$ - 50,000 $(A/F, 12\%, 20$
   = 36,123

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

Equivalent AW (of costs) = -27,500 - 9720,
   - 36,123
   = -73,343

Therefore minimum annual rental
required equals 73343 and with
annual compounding, the monthly
rental amount R is
   R = 73343/(12 × 30) (0.9) = 226.36
                                226.36