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      5
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?

     (b)  MR. Hamza an employee of Iqra national university on retirement from service      5
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?

Q.2  (a)  Four Generators installed at Turbela Dam, if undergoes a major overhaul now, its      5
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?

     (b)  Suppose Mr. Zafar make 15 equal annual deposits of $10,000 each into      5
Summit bank account paying 5% interest per year. The first deposit will be
made one year from today. How much money can be withdrawn from this
bank account immediately after the 15$^{th}$ deposit?

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      7
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.

Q4   (a)   A company buys a Digital controlled (DC) machine for $28,000 (year zero) and     5
          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     5
          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     10
          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 |

Question no1:- part A:-

Solution:-

$$P = F(1/1+i)^n$$

$$P = 100m(1/1+0.08)^6$$

$$P = 100m(0.92)^6$$

$$P = 100m(0.6063)$$

$$\boxed{P = 60.63m}$$

Ans:-

Question no 1 :- part B.

Solution:-    $p = 10m$ , $A = 1m$ , $i = 6\%$.

As we know that

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

$$10\,m = 1m\left[\frac{(1+0.06)^n - 1}{0.06(1+0.06)^n}\right]$$

$$10 = \frac{(1.06)^n - 1}{0.06(1.06)^n}$$

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

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

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

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

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

$$2.5 = (1.06)^n$$

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

$$0.916 = n \times 0.0583$$

$$N = \frac{0.916}{0.0583}$$

$$\boxed{N = 15.7 \ \text{years}}$$

ano2:- part (A).

Solution:-

Given data:

$A = 30$ millions

$N = 5$ years

$i = 15\% \longrightarrow 0.15$

we know that

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

Putting values in eq ①

$$P = \frac{30m\ (1+0.15)^{5} - 1}{0.15\ (1+0.15)^{5}}$$

$$P = \frac{30m\ (2.011 - 1)}{0.15\ (2.011)}$$

$$P = 30m\ (3.3525)$$

$$\boxed{P = \$\ 100.575\ \text{millions}}\ \mathcal{A}ns:-$$

Raham zeb     ④     13074

Question no2; part "B".

Solution:-

$$A = 10,000$$
$$N = 15 \text{ years}$$
$$I = 5\%$$

formula

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

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

putting the values

$$F = 10000\left[\frac{(1+0.05)^{15} - 1}{0.05}\right]$$

$$= 10000\left[21.5786\right]$$

$$= 215786 \$.$$

Ans.

Qno3

part "A":-

Answer:-

A 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, becomes obsolet or loss value from national causes.

Question no3

=> part (B)

Solution:- we know that

from

$$dv = (B - svn) \left[ \frac{2(n-k+1)}{n(n+1)} \right]$$

$$BvK = B - \left[ \frac{2(B-svn)}{N} \right] K + \left[ (B-svn/N(n+1)) \right] K(k+1)$$

Putting value for sample ①

$$d1 = 400000 \left[ \frac{2(10+1-1)}{10(10+1)} \right]$$

$$d1 = 400000 \left[ \frac{2 \quad (10)}{10 \quad (11)} \right]$$

$$d1 = 400000 (0.1818)$$
$$d1 = 72720$$

$$Bv1 = $$
$$400000 - \left[ \frac{2(400000) \times 1}{10} \right] + \left[ \frac{400000}{10(11)} \right] 1(1+1)$$

$\Rightarrow 400000 - [80000] + \left[\dfrac{400000}{110}\right] \times 2$

$400000 - 80000 + 7272.7$

$\Rightarrow 327272.7$

for d2

$d2 = 400000 \left[ \dfrac{2(10-2+1)}{10(10+1)} \right]$

$d2 = 400000 \left[ \dfrac{2(8+1)}{10(11)} \right]$

$d2 = 400000 \left[ \dfrac{2(9)}{110} \right]$

$d2 = 400000 \left[ \dfrac{18}{110} \right]$

$d2 = 65454.5$

$B1/2 =$

$400000 - \left[ 2\left(\dfrac{400000}{10}\right) \right] \times 2 + \left[ \dfrac{400000}{10(11)} \right] 2 \times 3$

$400000 - 80000 \times 2 + \left[ \dfrac{400000}{110} \right] \times 6$

$400000 - 160000 + 3636.36 \times 6$

$400000 - 160000 + 2118.16$

$\boxed{\Rightarrow 261818.16}$ Ans..

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ano 4:
part "A"

Given:-

Gross income & expenses
as stated; income - tax rate = 40%
finding
net income.

Consider the Purchase of the
machine to have been made at
the end of years, zero which
is also the begining of year one.

| Item | amount |
|---|---|
| Gross income (Revenues) | $ 50,000 |
| Expenses | |
| Cost of good sold | $ 20,000 |
| Depreciation | $ 2,000 |
| operating expenses | $ 6000 |
| Taxable income | 20,000 |
| Taxes (40%) | $ 8,000 |

net income  12,000.

Question no4:
    Part "B"

Solution :-

    Benefits:- Improvement of the image of the area of Abbotabad - city.
    potential to attract conferences and conventions to abbotabad city.
potential to attract professional sports - franchises to the city.
    use of facility for civic events.

Costs:-

    Architectural design of the facility, Construction of the facility Design and Construction of parking facility, Facility operating and maintenance costs, insurance costs.

Disbenefts:-

    Loss of use of portion of the park, bike path natural trial, and the pond. Loss of wildlife habitat in urban area.

Ans 5:-
Part "A"

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Solution: AW of cost = $50,000 + 225000 $

$$= \$275000.$$

taxes insurance

$$= 0.1(\$275000)$$
$$= \$27,500$$

up keep/year $= 30(12 \times 30)(0.9)$

$$= 30(360)(0.9)$$
$$= 30(324)$$
$$= 9720 \$$$

CR cost/year = ~~$275000~~

$275000 (A/p, 12\%, 20) - \$50000(A/F, 12\%, 20)$

$$= \$36123$$

Assume that investment in land is recoid
at year 20.

Equivalent Aw (of costs) $= -27500 - 9720 - 36123$

$$= -73343$$

therefore

minimum annual rental required equals
73343 $

with annual compounding the mothly rental
R   is   R = $73343(12 \times 30)(0.9)$

$$= 73343(360)(0.9)$$
$$= 73343/324$$
$$= 226.36 \$.$$