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**TCET 4140 Telecommunication Network Management**

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**Project 1**

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1. Use the factor technique to estimate the cost of installing a local area network in a factory environment having the following characteristics: One large building on a single level will require a total of 3000ft of coaxial (broadband) cable to network its six departments. Six network interface units (NIUs) will be required, and a total of 50 taps will have to be made to connect all the anticipated workstations and programmable devices. Two modems are needed, in addition to one network manager/analyzer that costs $30000. The information necessary to make the estimate may be obtained from the worksheet shown in the table below. How accurate do you think such an estimate would be?

|  |  |  |  |
| --- | --- | --- | --- |
| Component | Cost per unit | D |  |
| 1.Interbuilding connections | $100-$150 per foot | X | = |
| 2.Intrabuilding connections | $20-$50 per foot | X | = |
| 3.Cable installation | $20 per foot | 3000 ft | = $60,000 |
| 4.Equipment |  |  |  |
| a) Broadband CATV amplifier | $500-$1500 | X | = |
|  Taps | $17-$20 each | 50 | = $850 - $1,000 |
|  Splitters  | $5-$15 | X | = |
|  NIUs | $500-$1000 per port | 6 | = $3000 - $6,000 |
|  Modems | $1000 each | 2 | = $2,000 |
| b)Basebands |  |  |  |
|  NIUs | $600 per port | X | = |
|  Repeaters | $ 1200-$1500 each | X | = |
|  Taps/transceivers | $200-$300 | X | = |
| c)Network manager | $10000-$30000 |  |  |
|  Network analyzer | $30000 | 1 | = $30,000 |

The Cost Factor Technique

C= $\sum\_{d}^{}C\_{d}$ + $\sum\_{m}^{}f\_{m}C\_{m}$

C (minimum) = (3000 ft. \* $20 per ft.) + (50 \* $17) + (6 \* $500) + (2 \* $1000) + $30,000

 = $60,000 + $850 + $3000 + $2000 + $30,000

= $95,850

C (maximum) = (3000 ft. \* $20 per ft.) + (50 \* $20) + (6 \* $1000) + (2 \* $1000) + $30,000

 = $60,000 + $1000 + $6000 + $2000 + $30,000

 = $99,000

The estimated cost using the cost factor technique ranges from $95,850 to $99,000 using the information given.

2. If a nominal interest rate of 8% is compounded continuously, determine the unknown quantity in each of the following situations:

a) What uniform end-of-year amount for 10 years is equivalent to $8000 at the end of year 10?

(A/F, r%, N) = F $\frac{e^{r}-1}{e^{rN}-1}$

(A/8000, 8%, 10) = $8000 $\frac{e^{.08}-1}{e^{.08\*10}-1}$ = $543.67

b) What is the present equivalent value of $1000 per year for 12 years?

(P/ A, r%, N) = A $\frac{(e^{rN}-1)}{e^{rN}(e^{r}-1)}$

(P/ 1000, 8%, 12) = $1000 $\frac{(e^{.08\*12}-1)}{e^{.08\*12}(e^{12}-1)}$ = $7,409. 39

c) What is the future equivalent at the end of the sixth year of $243 payments made every six months during the sixth year?

(F/A, r%, N) = A $\frac{(e^{rN}-1)}{(e^{r}-1)}$

(F/243, 4%, 12) = $243 $\frac{(e^{.04\*12}-1)}{(e^{.04}-1)}$ = $3,668. 30

d). Find the equivalent lump-sum amount at the end of year nine when P0=$1000 and a nominal interest rate of 8% is compounded continuously.

(F/P, r%, N) = P $(e^{rN})$

(F/P, 8%, N) = $1000 $(e^{.08\*9})$ = $2,054. 43