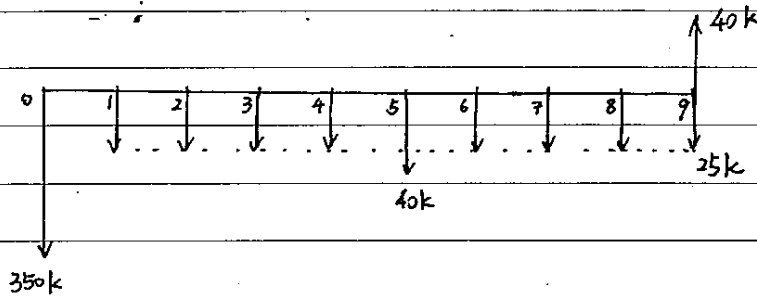


1(a)  $i = 10\%$ , annual worth analysis.

Equip. A



$$CR = 350k (A/P, 10\%, 9) - 40k (A/F, 10\%, 9)$$

$$= 350k \times 0.17364 - 40k \times 0.07364$$

$$= \$57828$$

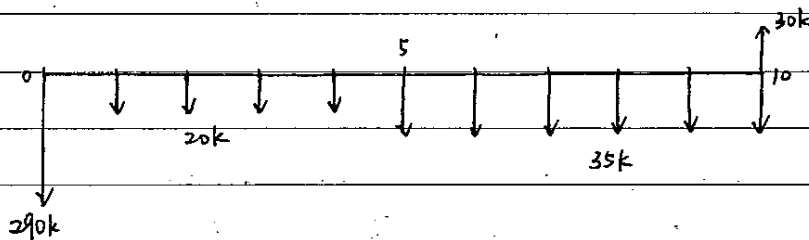
$$A = -25k - (40-25)k (P/F, 10\%, 5) (A/P, 10\%, 9)$$

$$= -25k - 15k \times 0.6209 \times 0.17364$$

$$= \$-26617$$

$$\therefore AW = -CR + A = -57828 - 26617 = \$-84445$$

Equip. B



$$CR = 290k (A/P, 10\%, 10) - 30k (A/F, 10\%, 10)$$

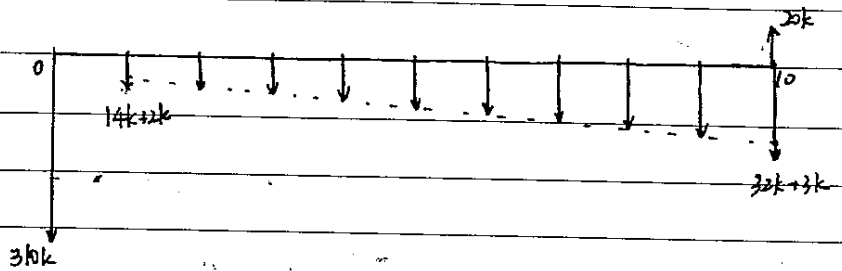
$$= 290k \times 0.16275 - 30k \times 0.06275 = \$45315$$

$$A = -20k - (35-20)k (F/A, 10\%, 6) (A/F, 10\%, 10)$$

$$= -20k - 15k \times 7.7156 \times 0.06275 = \$-20007$$

$$\therefore AW = -CR + A = -45315 - 20007 = \$-65322$$

Equip. C



$$G = 2k$$

$$CR = 30k (A/P, 10\%, 10) - 20k (A/F, 10\%, 10)$$

$$= 30k \times 0.16275 - 20k \times 0.06275 = \$49198$$

$$A = -14k - 2k (A/G, 10\%, 10) - [(16k - 14k)(F/P, 10\%, 9) + (35k - 32k)] (A/F, 10\%, 10)$$

$$= -14k - 2k \times 3.7255 - (2k \times 2.3579 + 3k) \times 0.06275 = \$-21935$$

$$\therefore AW = -CR + A = -49198 - 21935 = \$-71133$$

Therefore, Equipment B will be chosen.

Assumptions: ① Service provided by alternatives are needed for LCM of years or more (repeatability).

② Alternatives will be repeated over each life cycle of LCM.

③ Cash flow estimates will be the same in every life cycle.

1(b) That's because there are noneconomic considerations (intangibles) in choosing the best alternative. The intangibles includes (but is not limited to) safety to employees, environmental concerns, goodwill, beliefs, etc. They are difficult to be valued in dollars.

2(a) \$500 / 6 months, 4% per quarter,

$$\text{interest per semi-annual} = \left(1 + \frac{4\% \times 2}{2}\right)^2 - 1 = 0.0816 = 8.16\%$$

$$\therefore y = 8.16, Z = 10.$$

2(b) For perpetual withdrawal from Year 12:

$$CC \text{ (at yr 11)} = 300 \div 5\% = \$6000$$

$$\therefore PW \text{ at Yr 11} = 6000 + 300 = \$6300 \text{ (Before the withdrawal of Yr 11)}$$

$$PW \text{ at Yr 7} = \underbrace{500 (F/A, 5\%, 7)}_{PW \text{ at Yr 6, 7 payments}} (F/P, 5\%, 1)$$

$$= 500 \times 8.1420 \times 1.0500 = \$4274.55$$

For Yr 7 ~ Yr 11:

$$4274.55 \times (1+i)^4 = 6300 \Rightarrow i = 0.1018 = 10.18\%$$

$$\therefore \alpha = 10.18$$

2(c) For Year 0, 2, 4, 6, ..., 16:  $i = [(1+0.05)^2 - 1]\%$   $G = \$10$ ,  $A = 0$  (from Yr 2)

$$\Rightarrow PW_1 = 10 (P/G, 100\% [(1+0.05)^2 - 1]\%, 8) \text{ from Yr 2 to Yr 16, there are 8 payments (Years of even \#)}$$

$$= 10 \times 15.8227 = \$158.227$$

For Year 1, 3, 5, 7, ..., 17:  $i = [(1+0.05)^2 - 1]\%$   $G = \$10$ ,  $A = 0$  (from Yr 3)

$$\therefore PW \text{ at Yr 1} = 10 (P/G, 100\% [(1+0.05)^2 - 1]\%, 8) \text{ from Yr 3 to Yr 17, 8 payments (Years of odd \#)}$$

$$= 10 \times 15.8227 = \$158.227$$

$$\Rightarrow PW_2 = 158.227 (P/F, 5\%, 1) = 158.227 \times 0.9524 = \$150.695$$

$$\therefore PW \text{ at Yr 0} = PW_1 + PW_2 = 158.227 + 150.695 = \$308.92$$

of sure - 2(d) (i) (MARR should be 13% instead of 12%?)

In this course, intangibles are ignored. As long as  $IRR < MARR$ , the project/investment is not worthwhile. In this question, Alternative A provides  $IRR = 12\% < MARR$ , therefore it's not worthwhile. For Alternative B,  $IRR = 14\% > MARR$ . Therefore, XYZ Corporation should invest Alternative B, and use the excess amount to invest at the company's MARR.

of sure - 2(d) (ii) Mutually exclusive alternatives mean that only one alternative can be finally chosen. Independent alternatives mean that multiple alternatives might be chosen subject to constraints. The alternatives which provide IRR bigger than MARR should be chosen when there is no budget constraint. In this question, Alternative B has an  $IRR = 14\% > MARR = 13\%$ , but Alternative A does not. Therefore, Alternative B should be the only choice to be invested.

Date

No.

3(a) (i)

Marine Corporation

Balance Sheet (31 Dec, current year)

Current Assets

Inventories 7000

Amount due from customers but  
payment to be received in the  
next one year 2000

Cash balance in bank 1500

10500

Fixed Assets

Plant and equipment 16500

Land 13000

Depreciation (3000)

26500

37000

Long-term Liability

Bonds maturing two years later 2000

2000

Current Liabilities

Amount owed to creditors payable  
in the next one year 1500

Interest owed to banks payable  
in the next one year 1500

Current income taxes payable 2000

5000

Shareholders' Equity

Capital 25000

Retained earnings 7500

Dividends payable (2500)

30000

37000

3(a) (ii) Current ratio = current assets ÷ current liabilities

= 10500 ÷ 5000 = 2.1

Quick ratio = quick assets ÷ current liabilities

= (10500 - 7000) ÷ 5000 = 0.7

Current ratio indicates the financial health & suitability for the investment and shows the ability to meet obligations and take advantage of opportunities. A current ratio of 2.0 is considered adequate in general to meet near term operating needs sufficiently. If the current ratio is high, then it's more attractive to conservative investors.

3(a) (ii) (cont'd)

Quick assets is a part of current assets that can be converted into cash within one month (including cash). Quick assets ratio shows the company's potential ability to meet current liabilities. For liquidity, quick ratio should be greater than 1.0.

3(b) Both bonds and stocks are investments in financial markets that allow assets to be sold/exchange.  
~~Stock~~ Stocks can be further divided into 2 types - preferred stock & common stock.

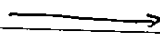
Bonds: issued by governments & government bodies or private enterprises. Investors can get regular interests from bonds. Bonds are usually long term debt security issued by borrower, so it's usually ~~with~~ less riskier than stocks and have lower interest than stocks.

Stock: also called share. It's a promise by the firm to pay the holders a portion of the profits, which is called dividends. However, dividends may not be guaranteed.

Preferred stock has a fixed dividends, but common stock doesn't.

Usually, common stock has a higher dividend than preferred stock, but it's also riskier.

Least risky



Most risky

Bonds

Preferred Stock

Common Stock

As the Corporation is risk adverse, it's recommended to invest bonds.

Date

No.

## A(a) (i) Existing Crane

Service life = 5 yrs.  $S = \$10000 \Rightarrow P - S = 160000 - 10000 = 150000$ .

SYOD =  $1+2+3+4+5 = 15 \Rightarrow \frac{5}{15}, \frac{4}{15}, \frac{3}{15}, \frac{2}{15}, \frac{1}{15}$ .

Yr	Depreciation	Book Value
0	-	160000
1	$\frac{5}{15} \times 150000 = 50000$	110000
Current year → 2	40000	70000
3	30000	40000
4	20000	20000
5	10000	10000 → SV.

Defender (for two years):

$$EUAC = 40000 (A/P, 12\%, 2) - 25000 (A/F, 12\%, 2)$$

$$+ [30000 (F/P, 12\%, 1) + 50000] (A/F, 12\%, 2)$$

$$= 40000 \times 0.59170 - 25000 \times 0.47170 + (30000 \times 1.12000 + 50000) \times 0.47170$$

$$= \$51309.62$$

Challenger:  $G = \$2000$ .

$$EUAC = 150000 (A/P, 12\%, 5) - 30000 (A/F, 12\%, 5) + 3000 + 2000 (A/G, 12\%, 5)$$

$$= 150000 \times 0.27741 - 30000 \times 0.15741 + 3000 + 2000 \times 1.7746$$

$$= \$43438.4$$

Therefore, it's better to make the replacement.

- 4(a) (ii) 1) Calculate the depreciation & EUOM.

2) Calculate the tax T.I., then calculate the tax payable using T.I.  $\times 40\%$ .

3) If there is a capital gain, i.e.  $SV > BV$ , then the difference should be taxed by 30%.

4) Calculate NRV and compare.

4(b) SYOD = 1+2+3+4+5 = 15.  $\Rightarrow$  Dep.:  $(80000 - 25000) \times \frac{5}{15} = 18333$ , Similarly  $\rightarrow 14667, 11000, 7333, 3667$

MARR = 12%, tax = 35%

Year	Net CF before-tax	Dep.	TI	tax <sup>tax credit</sup>	Net CF after-tax
0	-80000	-	-	+5% x 80000	-76000
1	24000	18333	+5667	-0.35 x 5667 = -1983	+22017
2	22000	14667	+7333	-2567	+19433
3	20000	11000	+9000	-3150	+16850
4	18000	7333	+10667	-3733	+14267
5	16000	3667	+12333	-4317	+11683

SV = 25000 (not subject to tax)

$$NPV = -76000 + 22017(P/F, 12\%, 1) + 19433(P/F, 12\%, 2) + 16850(P/F, 12\%, 3)$$

$$+ 14267(P/F, 12\%, 4) + (11683 + 25000)(P/F, 12\%, 5)$$

$$= -76000 + 22017 \times 0.8929 + 19433 \times 0.7972 + 16850 \times 0.7118 + 14267 \times 0.6355$$

$$+ 36683 \times 0.5674$$

$$= \$1025.41 > 0$$

Therefore, the investment is worthwhile.

All the best for your exam !!!

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