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End Sem Assignment

Q1

Factory (direct) labour = (labour/hour) * No. of hours

= $ 11.15 * 42

= $ 468.3 (1)

-> Factory overhead = 150% of factor labour

= 1.5 * 468.3

= 702.451 (2)

Outside manufacture -> $ 79.87 (3)

Production material -> $ 36.20 (4)

Penalty cost = 7% of factory cost

= (7/100) * 468.3 = $ 320781 (5)

Total manufactory = ① + ② + ③ + ④ + ⑤

= $ 468.3 + $ 702.45 + $ 79.87 + $ 32.70 + $ 32.78

= $ 1319.6

Unit cost = Total cost / overhead units = 1319.6 / 100 = $ 13.196

Selling Price = 1.12 × 13.196 = $ 14.78

OPTION NOT MATCHED

Q2

i) Loan @ 12% F = $ 5000 (F/P, 12%, 15) = $ 5,811.71

Loan @ 8.5% F = $ 5,000 (F/P 8.5%, 15) = $ 7,518.28

Difference = $ 1293.42

ii) EMI @ 12% = $ 500 (A/P, 12%, 15) = $ 111

EMI @ 8.5% = $ 5000 (A/P, 8.5%, 15) = $ 103

Difference = $ 8

Answer: Ans - A

Q3 using Prysul worth $P = A\left[\frac{(1+i)^n - 1}{i(1+i)^n}\right]$

$\therefore$

$$\$\,109.305 \text{ Million} = \$\,7\left[\frac{(1+i)^{25} - 1}{i(1+i)^{25}}\right] \text{ Million}$$

$$\frac{(1+i)^{25} - 1}{i(1+i)^{25}} = 15.6221$$

Solving equation by hit & trial with option we get

$i = 4\%$	OPTION – A Answer.

Q4 Amount Deposit in saving account every year = 1% of $20,000

$= \$\,200$

$\therefore$ Amount after 15 years $= \$200\,(F/A, 5\%, 10)$

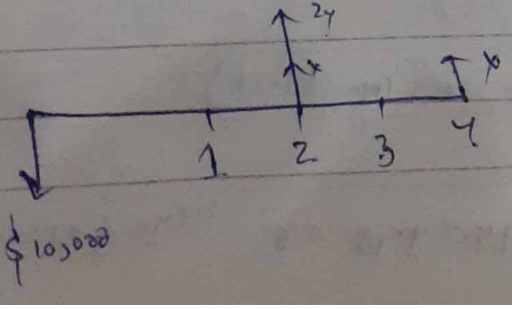
$= \$\,4,316.712$

Ans → OPTION C

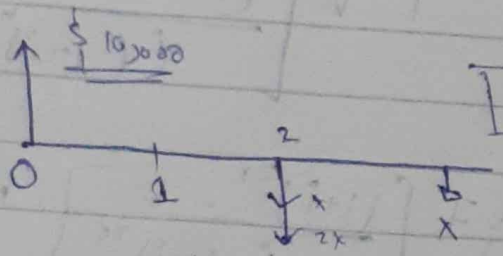
Q5

cash flow diagram for given information -

of Bank



for m2



$$10,000 = 2x\,(1+i)^{-2} + x\,(1+i)^{-4}$$

$$10,000 = x\,[2 \times 1.1^{-2} + 1.1^{-4}]$$

$$10,000 = x\,[2.355]$$

$$x = \$\ 4280.99$$

Answer - Option (A)

Q6 For simple interest

$$2P = P \times N_1 \times i + P$$

$$2 = N_1 \times (5/100) + 1$$

$$N_1 = 20 \text{ years}$$

for compound interest -

$$2P = P(1+i)^{N_2}$$

$$2 = \left(1 + \frac{5}{100}\right)^{N_2}$$

$$\log 2 = N_2 \log (1.05)$$

$$N_2 = 14.2 \text{ years or } 14 \text{ years } 72 \text{ days}$$

$N_1 - N_2$ = 5 years 285 days

Answer - OPTION C

Q7 Equating NPV 30 years with NPV of the actual expenses incurred.

So NPV of 30 years = $PV = C\left(1-(1+i)^{-n}\right)$

PV of actual expenses incurred.

$$= \$\ 30{,}000 \times \frac{\left(1-(1+0.07)^{-10}\right)}{0.07} + \frac{\$\ 80{,}000}{(1+0.07)^{15}}$$

$$+ \$\ \frac{80{,}000}{(1+0.07)^{20}}$$

$$= \$\ 260376.8$$

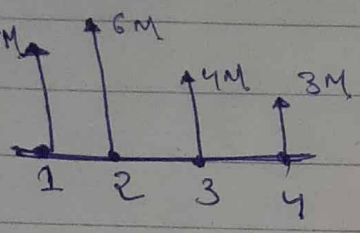
$$\therefore \frac{C \times \left(1-(1+0.07)^{-30}\right)}{0.07} = 260376.8$$

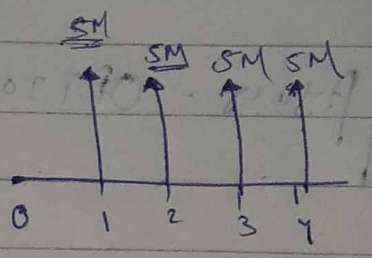
$$C = \frac{\$\ 260376.07 \times 0.07}{\left(1-(1+0.07)^{-30}\right)}$$

$$C = \$\ 20982.8$$

Answer → OPTION A

Q8 Solution

i) 

ii) 

PV of i) $= \frac{5}{(1+0.1)^1} + \frac{6}{(1+0.1)^2} + \frac{9}{(1+0.1)^3} + \frac{3}{(1+0.1)^4}$

$= 4.54 + 4.96 + 3.00 + 2.05$

$= \boxed{14.55\ M}$

PV of ii) $= \$\ 5\ M\ (P/A, 10\%, 4)$

$= \boxed{15.85\ M}$

So the Investment are not equal

Aw of i $= \$\ 14.55\ (A/P, 10\%, 4)$

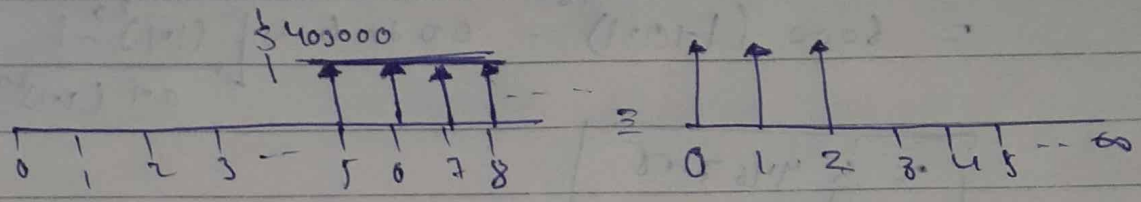
$\boxed{Aw_i = \$\ 4.59}$

$\boxed{Aw_{ii} = \$\ 5}$

$\$ \rightarrow \frac{5 - 4.59}{5} \times 100 \rightarrow 8.14\%$

Anyway → Option C

Q9 Solution



$$P(1/F) = A\left[\frac{(1+i)^4-1}{i(1+i)^4}\right] = x + x\left[\frac{(1+i)^2-1}{i(1+i)^2}\right]$$

$$40,000\left[\frac{1}{0.08} - \frac{(1.08)^4-1}{(.08)(1.08)^4}\right] = x\left[1 + \frac{(1.08)^2-1}{(.08)(1.08)^2}\right]$$

$$367,514.926 = x\,(2.78326478)$$

$$x = \$132,040.54$$

Answer - option D

Q10

$$0 = -50,000 + 2500\,[P/F, i\%, 24] + 11,000\,[P/F, i\%, 24]$$

$$50,000 = 2500\left[\frac{(1+i)^{24}-1}{i(1+i)^{24}}\right] + 11,000\,[1+i]^{-24}$$

By trial & error or Excel

$i \approx 2.06\%$ Per Month ROI

Answer → option A

(a) $VN = C\left(\frac{P}{F}, i, N\right) + 7\%\,(P/A, i, N)$

$= 6000\,(1+0.1)^{-20} + 0.07 \times 6000\left[\frac{(1+0.1)^{20}-1}{0.1\,(1+0.1)^{20}}\right]$

$= \$\,4467.66$

(b) If $VN = \$\,4800$ $i = ?$

$4800 = 6000\,(1+i)^{-20} + 420\left[\frac{(1+i)^{20}-1}{i\,(1+i)^{20}}\right]$

on solving by hit & trial

$i \approx 9.3\%$

Answer - Option [C]

Q12 continuous compound formula

$$A = Pe^{rt}$$

given $r = 18\%$ $t = 1$ year

$$\rightarrow P\left(1+\frac{i}{N}\right)^{t\times N} = Pe^{0.18}$$

$$\rightarrow \left(1+\frac{i}{N}\right)^{N} = 1.09721736$$

→ If $N=2$ then i/N will be interest half yearly.

$$\left(1+\frac{i}{N}\right) = 1.094174 28$$

$$\left(\frac{i}{N}\right) = 9.4174\%$$ half yearly

→ If $N=4$ then i/N will be interest quarterly

$$1+i/N = 1.04607786$$

$$(i/N) = 4.6\%$$ quarterly

∴ option C 4.6% per quarter

Q13 Question Repeated || SAME AS question 10

Ans → A 2.6% per month

Ply Incremental cash flow sheet.

Details	Improvement	Treated	Incremental cash value
→ First cost, $1000	-6500	-5000	-1500
Annual cost $1000/year	-650	-1000	350
Salvage value $1000	200	100	100
Life years	5	5	

T - I > N

$0 = -5000 + (2500 - 1000)(P/A, i, 5) + 100 (P/F, i, 5)$

$0 = -5000 + 1500 (P/A, i, 5) + 100 (P/F, i, 5)$

by hit of total $i^* = 15.7\% < MARR$

I - D > N

$0 = -6500 + (2500 - 650)(P/A, i, 5) + 200 (P/F, i, 5)$

$0 = -6500 + 1850 (P/A, i, 5) + 200 (P/F, i, 5)$

$i^* = 13.7\% < MARR$

So both 'Treatly' & 'Impregnly' are rejected

because value in both cases < MARR = 25%

Hence option A

16

year	P	Q	R	S
0	-30,000	-36000	-41000	-53000
0-8	+4000	5000	8000	10,500
8	+1000	2000	500	-2000

Q-P

$0 = -6000 (A/P, i, 8) + 1000 + 1000 (A/F, i, 8)$

by hit & trial we get i b/w 8% & 10% which is less than 11% MARR so Q is rejected.

R-P

$0 = +1000 (A/P, i, 8) + 4000 + (-500) (A/F, i, 8)$

So by hit & trial we get (C) bigger than 25% which is well above 11+ MARR so P is Rejected

S-R

$0 = -12000 (A/P, i, 8) + 2500 - 2500 (A/F, i, 8)$

$P = 11.98\% > MARR$

Answer - OPTION (C)

Q16 For EC

FC = 38000

NAB = Benefits - M + O - D

= 110000 - 49000 - 26000 - 35000

PV of NAB = 35000 (PVAF, 7,10) = 35000 (7.02358)

= 2458253

B/C = 2458253 / 38000 = 6.47

For NS

FC = 87000

NAB = 160000 - 64000 - 71000 = 25000

~~PV of NAB = 35000 (PVAF, 7,10) = 35000 (7.02358)~~

~~= 2458263~~

(A) PV of NAB = 75000 (PVAF, 7,10) = 75000 × 7.02358

= 526768.5

B/C = 6.06

For ST -

FC = 99000

NAB = 74000 - 42000 - 32000 = 0

B/C = 0

For AC -

FC = 61000

NAB = 52000 - 38000 - 14000 = 0

B/C = 0

B/C is Positive for EC & MT

Ans → Option B

Q17

Let OHV of Low tech MRT be C

⇒ AW of Low techs = AW of Tesla Machine

$$\therefore -C\left(\frac{A}{P},20,3\right) - 272000 + 150000\left(\frac{A}{F},20,3\right) = 255000 + 800000\left(\frac{A}{F},20,3\right) - 2200000\left(\frac{A}{P},20,3\right)$$

$$= \left(-C \times 0.4747\right) - 272000 + 150000 \times 0.2747$$

$$= 255000 + 800000 \times 0.2747 - 2200000 \times 0.4747$$

0.04747 C = 338785

$$C = 713682.326 \simeq 713738$$

So replacement value is higher than Market value.

so retain it

Ans → OPTion B

Q18

For Break even point initial investment is recovered by the annual earns by the Project

∴ Let breakeven quality be Q_{BE}

$$\therefore -150{,}000{,}000\,(A/P)_{(0.1,10)} + Q_{BE} \times 250 = 0$$

$$Q_{BE} = 97620$$

$$\therefore 12{,}500 \times (X)^{0.5} = 97620$$

$$(X)^{0.5} = 7.8096$$

$$X = (7.8096)^2$$

$$X = 60.98 \simeq 61\%$$

Ans → option C

Q19 Inflation adjusted interest rate

= Real interest rate + Inflation Rate

+ (Real rate × Inflation Rate)

= 0.10 + 0.07 + (0.1 × 0.07)

= 0.177 = 17.7%

Now

PV = $ -150,000 - $ 60,000 (P/A, 17.70%, 5) + $ 30,000 (P/F, 17.70%, 5)

PV = $ -325,631.18 = $ -325630

Ans → OPTION B

Q20

cost depletion factor = $\frac{\text{B}}{\text{capicity}} = \frac{2,100,000}{350,000} = \$6/\text{ounce}$

total cost depletion = Depletion factor × ounce of silver sold

= 6 × 175,000

TCD = $ 1050,000

undepleted amount = 2,100,000 − 1050,000 = $ 1050,000

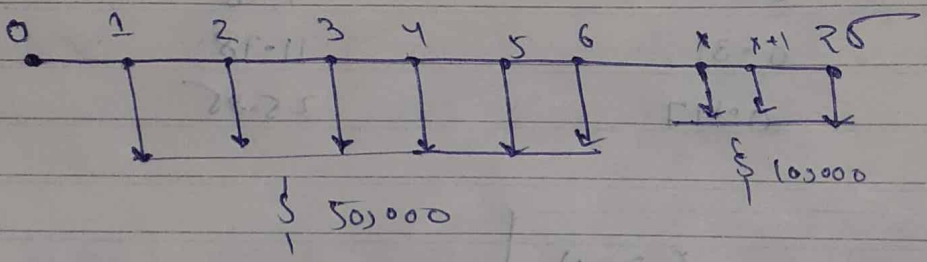
$$CDF = \frac{B}{\text{new capacity}} = \frac{1050,000}{100,000} = \$10.5 \text{ per owner}$$

Any → Option → ▷

Q 24

Given couple investing $50,000 for per 5 year

So cash flow diagram, accordly to question –



Let x be the last year of after when Park engin
Sister to child.

∴

$$50,000\,(F/A, 10\%, x) * (1+i)^{25-x} + 10,000\,(F/A, 10\%, 25-x) \geq \$3 \text{ Million}$$

$$50,000\left[\frac{(1+0.1)^{x}-1}{0.1}\right](1.1)^{25-x} + 10,000\left[\frac{(1+0.1)^{25-x}-1}{0.1}\right] \geq \$3 \text{ million}$$

By hit & trial we get $x = 7$ After which there investment decision will not be effected by child birth

∴ They should wait for added 2 years.

Ans- Option - C

Q23 The Expected value of Probability is

$$E = \sum x_i \cdot P(x_i)$$

Cost x_i	Probability $P(x_i)$	$x_i * P(x_i)$
34	0.22	7.48
38	0.31	11.78
55	0.47	25.85

Expected cost = $\sum x_i * P(x_i)$

= 45.11

Ans → Option - D

Q24

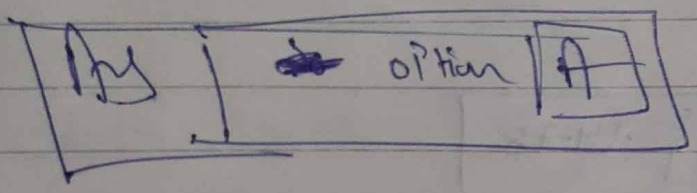
Cost x_i	Probability $P(x_i)$	$x_i * P(x_i)$
0	0.98	0
2	0.025	0.05
5	0.016	0.075
10	0.0093	0.093
100	0.0007	0.07

Expected cost = $\sum x_j^* P(x_j) = 1.0288$

cost/ticket = 2.

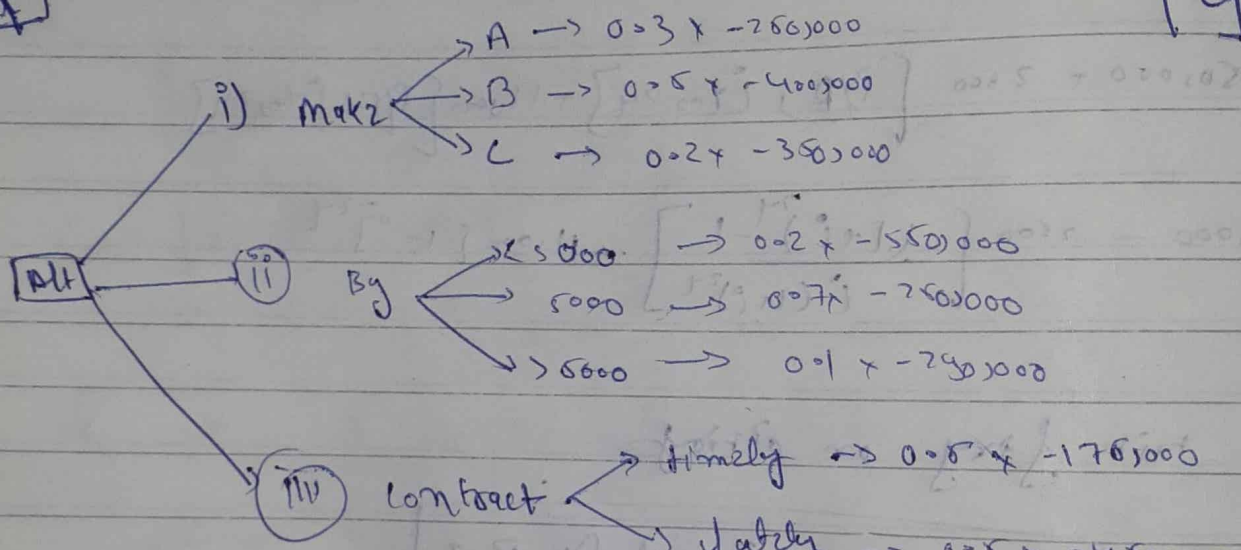
winning ticket = 2

Profit/ticket = $2 - 0.0288 = \$1.9712$.



Q12

1922


All
i) Make
A → 0.3 x -250,000
B → 0.5 x -400,000
C → 0.2 x -350,000
ii)
By
< 5000 → 0.2 x -550,000
5000 → 0.7 x -250,000
> 5000 → 0.1 x -290,000
iii)
Contract
Timely → 0.5 x -170,000
Lately → 0.5 x -480,000

∴ EMV (Make)

$\Rightarrow -0.3 \times 250{,}000 - 0.5 \times 400{,}000 - 0.2 \times 360{,}000$

EMV (Make) = $-\$\ 348{,}000$

EMV (Buy)

$\Rightarrow -0.2 \times -850{,}000 - 0.7 \times 250{,}000 - 0.1 \times 290{,}000$

EMV (Buy) $\Rightarrow -\$\ 314{,}000$

EMV (Contract)

$\Rightarrow -0.5 \times 175{,}000 - 0.5 \times 450{,}000$

EMV (Contract) = $-\$\ 312{,}500$

Least cost alternative is of EMV (Contract)

Answer → OPTION [A]