QUESTION 1 $31,744.77

QUESTION 2 3.79%

Cap ex	40
Depreciation per year	10
NWC investment	5
NWC as % of sales	50%
COGS as % of sales	30%
SG&A as % of sales	10%
Tax rate	40%
Cost of capital	10%

QUESTION 3

Balance Sheet

Year	0	1	2	3	4
Gross PP&E	40.0	40.0	40.0	40.0	40.0
Less accumulated depr	-	(10.0)	(20.0)	(30.0)	(40.0)
Net PP&E	40.0	30.0	20.0	10.0	-
Net working capital	5.0	10.0	12.5	10.0	-

Income Statement

Year	0	1	2	3	3
Sales		20.0	25.0	20.0	15.0
Less COGS		(6.0)	(7.5)	(6.0)	(4.5)
Less SG&A		(2.0)	(2.5)	(2.0)	(1.5)
Less depreciation		(10.0)	(10.0)	(10.0)	(10.0)
EBIT		2.0	5.0	2.0	(1.0)
Less taxes		(0.8)	(2.0)	(0.8)	0.4
EBIAT		1.2	3.0	1.2	(0.6)

Statement of Cash Flows

Year	0	1	2	3	4
EBIAT		1.2	3.0	1.2	(0.6)
Depreciation add back		10.0	10.0	10.0	10.0
Less cap ex	(40.0)	-	-	-	-
Less change in NWC	(5.0)	(5.0)	(2.5)	2.5	10.0
Net cash flow	(45.0)	6.2	10.5	13.7	19.4

Valuation

Year	0	1	2	3	4

Net cash flow	(45.0)	6.2	10.5	13.7	19.4
PV factor	100%	91%	83%	75%	68%
PV of cash flow	(45.0)	5.6	8.7	10.3	13.3
NPV	(7.1)				

QUESTION 4

Cap ex	40
Depreciation per year	10
NWC investment	5
NWC as % of sales	50%
COGS as % of sales	30%
SG&A as % of sales	10%
Tax rate	40%
Cost of capital	10%

Balance Sheet

Year	0	1	2	3
Gross PP&E	40.0	40.0	40.0	40.0
Less accumulated depr	-	(10.0)	(20.0)	(30.0)
Net PP&E	40.0	30.0	20.0	10.0
Net working capital	5.0	10.0	12.5	-

Income Statement

Year	0	1	2	3
Sales		20.0	25.0	20.0
Less COGS		(6.0)	(7.5)	(6.0)
Less SG&A		(2.0)	(2.5)	(2.0)
Plus salvage value				5.0
Less book value of equipment				(10.0)
Less depreciation		(10.0)	(10.0)	(10.0)
EBIT		2.0	5.0	(3.0)
Less taxes		(0.8)	(2.0)	1.2
EBIAT		1.2	3.0	(1.8)

Statement of Cash Flows

Year	0	1	2	3
EBIAT		1.2	3.0	(1.8)
Depreciation add back		10.0	10.0	10.0
Plus book value of equipment				10.0
Less cap ex	(40.0)	-	-	-
Less change in NWC	(5.0)	(5.0)	(2.5)	12.5
Net cash flow	(45.0)	6.2	10.5	30.7

Valuation

Year	0	1	2	3
Net cash flow	(45.0)	6.2	10.5	30.7
PV factor	100%	91%	83%	75%
PV of cash flow	(45.0)	5.6	8.7	23.1
NPV	(7.6)			

QUESTION 5

Past EBIAT	50
Past capex	40
Past depreciation	20
Past NWC	100
Growth rate	4%
Discount rate	10%

Next year's cash flow

EBIAT	52.0
Plus depreciation	20.8
Less cap ex	(41.6)
Less change in NWC	(4.0)
Cash flow	27.2

Value of company	$453.33

QUESTION 7

beta	1.25
mkt risk premium	8%
rf	2%
equity	3
debt	1
cost of debt	5%
tax rate	40%
cost of equity	12.00%
equity fraction	0.75
debt fraction	0.25
WACC	9.75%

FinalExam

December 23, 2021

[31]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
sns.set_style('whitegrid')

meanA = 0.1
stdA = 0.2
meanB = 0.14
stdB = 0.25
cor = 0.5

m = pd.Series([meanA,meanB],index=['A','B'])
cov = stdA*stdB*cor
C = np.array([[stdA**2, covariance],[covariance, stdB**2]])
C = pd.DataFrame(C,index=['A','B'],columns=['A','B'])
```

0.0.1 Question 6 (a)

[33]:
```
w = pd.Series([0.5,0.5],index=['A','B'])
w @ m
```

[33]:
```
0.12000000000000001
```

0.0.2 Question 6 (b)

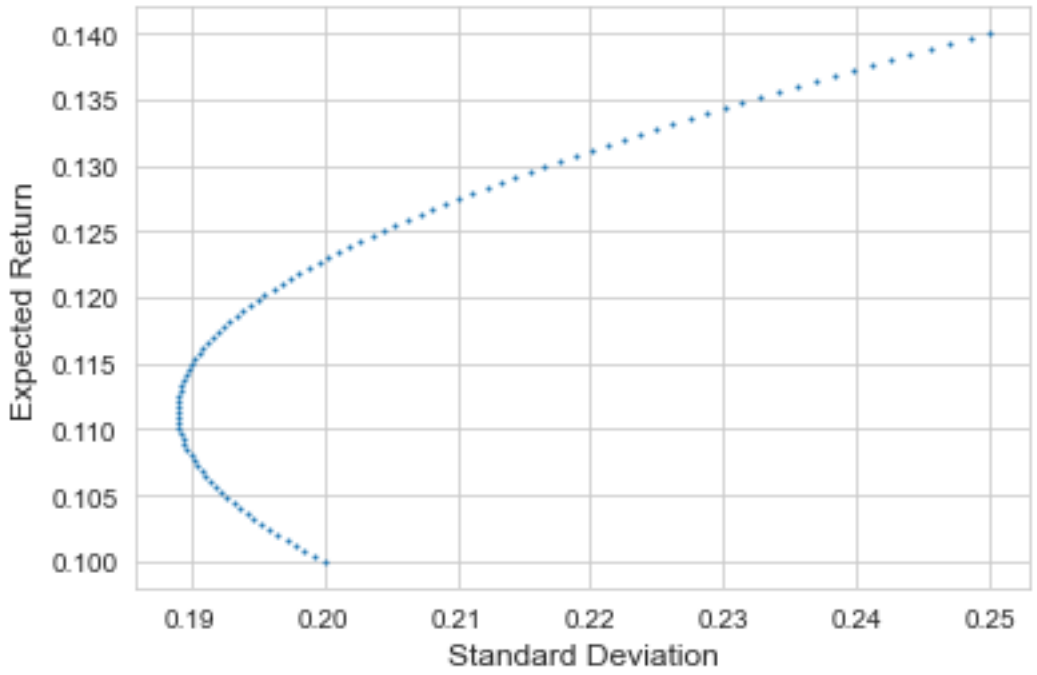
[34]:
```
np.sqrt(w @ C @ w)
```

[34]:
```
0.19525624189766635
```

0.0.3 Question 6 (c)

[35]:
```
ports = [np.array([x,1-x]) for x in np.linspace(0,1,100)]
means = [w@m for w in ports]
stdevs = [np.sqrt(w@C@w) for w in ports]
plt.scatter(stdevs,means,s=1)
plt.xlabel('Standard Deviation', fontsize=12)
plt.ylabel('Expected Return', fontsize=12)
```

[35]:
```
Text(0, 0.5, 'Expected Return')
```



0.0.4 Question 6 (d)

[37]:
```
def tangency(rprem,cov) :
    w = np.linalg.solve(cov,rprem)
    return pd.Series(w/np.sum(w), index=rprem.index)

rf = 0.02

w = tangency(m-rf,C)
w
```

[37]:
```
A    0.416667
B    0.583333
dtype: float64
```

[38]:
```
w@(m-rf) / np.sqrt(w@C@w)
```

[38]: 0.514328040586291

[ ]: