COVENANT UNIVERSITY NIGERIA

TUTORIAL KIT
OMEGA SEMESTER

PROGRAMME: ESTATE MANAGEMENT

COURSE: ESM 524

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ESM 524: Feasibility and Viability Appraisal II

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Question No 1

A speculative developer has provided you with the following details of a proposed development of offices:

Details of Complete Building

Gross floor area 18,000 m^2

Non- Lettable area 22% of gross floor area

Estimated rent ₦17,000.00/m^2

Capitalisation rate of rents 9%

All outgoings to be recovered by service charge

Building Contract Details

Period 18 Months

Cost of similar project completed in year 2010 is N 18,000.00/m2

Project cost index from 2000 shows that for 2010 it was 116 while for 2014 it reads 2034

Project Specification remain the same

Project Quality also remain the same

Professional fees 15%

Short term finance 15%

Developer's profit 12% of gross development value

Land costs (including fees) N28,000,000.00

Advise your client on the allowable building costs.

Question No 2

Write a comprehensive note on the following with emphasis on their need and impact on feasibility and viability studies
   i. Time management

   ii. Risk management

   iii. Cash-flow generation

Question No 3

Identify and explain the steps to be taken in trying to develop the probable cash-flow of a project being embarked upon or project being subjected to discreet feasibility and viability analysis. Support your response with imaginary project of your choice. Then distinguish between approximate estimating and detailed estimating and in what areas of estate business will the two tools be of valuable use.

Question No 4

Identify the purpose(s) of feasibility and viability studies in project development and the constraints bedeviling effective practice of feasibility and viability studies in Nigeria? What then can we do as individual professional bodies and as a nation to improve the quality of feasibility and viability studies in Nigeria?

Question No 5

The objective of investors' wealth maximization could only be achieved through the use of an appropriate and operationally feasible criterion to choose among the alternative financial actions. Identify with applicable formula six of such feasible criteria and demonstrate how they could be engaged in solving investors' investment logjam.

Question No 6

In considering the mechanical ventilating system for the proposed Bell University Community Theater and Recreation Centre, the Heating and Ventilating Engineer has provided details of two systems as follows:

	System A	**System B**
Boiler	('m)	('m)
Initial cost	30.00	35.00
Overhaul	5.00 (5 yearly)	2.50 (3 yearly)
Major Replacement	10.00 (15th year)	1.25 (12 yearly)
Life of boiler	30 years	40 years
Heat Transfer		
Units and Pipework		
Initial cost	10.50	10.50
Repairs	0.50 p.a	0.50 p.a
Fuel	3.75p.a	3.50 p.a
Staff costs	3.00 p.a	2.00 p.a

The building is to be used for 30 years and then discarded. Bell University is regarded as a Charitable Trust who pay no tax and who have a cost of capital of 5% net of inflation. Fully evaluate the two options.

Question Seven

A property developer is considering developing proto-type 3-Bedroom flats at Agbara Estate and Dolphin Estate all in Lagos Metropolis. The cost of each unit at Agbara is N3,350,000.00 while at Dolphin it costs N4,650,000.00. The cost recovery plan is ten years land exclusive. The cash flow for each site is as shown below:

Table 1: Cashflow for Agbara Estate

Year	1	2	3	4	5	6	7	8	9	10
Rent	475200	475200	546480	546480	601128	601128	692000	692222	796000	796000
Repair	Nil	Nil	50000	Nil	70000	Nil	56000	40000	80000	Nil

Table 2: Cashflow for Dolphin Estate

Year	1	2	3	4	5	6	7	8	9	10
Rent	690000	690000	759000	759000	872850	872850	960000	960000	980000	980000
Repair	Nil	Nil	70000	Nil	90000	Nil	96000	98000	98000	Nil

The major problem of the developer is deciding on the most profitable site for a start if the cost of borrowing is 15%. Advise him with reasons.

Question Eight

Supposing the developer in Question 4 above is willing to go ahead with Agbara project with his own money. He is now interested in knowing the yield if the cash flow remains as in Table 1 above before venturing at all. Advise him.

Question Nine

The cost of a building project can be written in the form $C_{bp} = f(x_1, x_2, x_3, x_4...x_n)$ where x_i is a variable and C_{bp} is Cost of Building Project. From your knowledge of building economics, identify five of such variables and do a critical analysis of each.

Question Ten

Of what use is a developer's budget analysis to an estate surveyor and valuer and in what areas of his business can he make use of it?

A speculative developer has provided you with the following details of a proposed development of one office complex:

Details of Complete Building:
Gross floor area   28,000 m2
Non- lettable floor area   20% of gross floor area
Estimated rent   ₦35,000.00/m**Capitalization rate of rents   8%**

All outgoings to be recovered by service charge

Building Contract Details:
Completion Period   **24 Months**
Professional Fees   **15%**
Short term finance   **15%**
Developer's Profit   **12% of Gross development Value**
Land Cost (including fees)   **₦35,000,000.00**

Advise your client on the allowable building cost.

Question Eleven

Compare and contrast approximate and detailed estimating processes. Interestingly, each stage of 'design – construct' continuum is very crucial, important and decisive as far as tendering and estimating is concerned. By way of schematic diagram present R.I.B.A Management Handbook Terminology showing the specific term for each stage of the design and construction process and indicate at each stage whether approximate or detailed estimating will be required. Justify your decision with cogent reasons

Question Twelve

Write short notes on the following and explain their usefulness to feasibility and viability study reports:
Efficiency Ratio
Legal Encumbrances on Development
Plot Ratio
Value for money
Approximate Estimating

Question Thirteen

From psychological, sociological, economical and managerial points of view do a comparative analysis of cellular office space and open plan office space in commercial property development. Bearing in mind your training as space manager irrespective of the nomenclature given to you, which option will you recommend to a university for adoption? Justify your recommendation with concrete reasons

Question Fourteen

In order to adapt a cost analysis of an existing 5000m^2 single storey school building at Ota built five years ago to produce a cost plan for a proposed 7500m^2 double storey school building to be built at Lekki in Lagos in 2015, certain important variables must be considered and adjusted. Identify these variables and by way of figurative analysis accompanied with sketches (if any), show how these adjustments are achieved in order to get accurate results.

Question Fifteen
Relying on R.I.B.A plan of work as a template, indicate cost control activities involved with each step of design – construction continuum
By way of explanatory note, detail what you are expected to do including tools you will use at each level of activity
Of what relevance is this R.I.B.A plan of work to the operation of a feasibility report consultant?

Question Sixteen
'An element is that part of a building which always performs the same function. Therefore cost analysis by elements is more useful in cost planning than cost analysis by trade section.' Discuss this statement. Of what use is cost analysis in feasibility and viability studies?

Question Seventeen
The foundation for a bungalow built in 2000 was destroyed in 2006 by a recalcitrant land speculator. For the purpose of litigation, the reinstatement cost was estimated to be 3, 220,000.00 Naira in year 2009 for the land owner. The Court now requires that the cost be split into material and labor. In order to meet this requirement, materials' prices for year 2000 and 2009 were compiled by a builder and shown in the table below. From this data, the following information are required on the assumption that the bill remain the same and proportionally between labor and materials whatever year is under review:
   a. Total materials' cost in year 2000
   b. Total materials' cost in year 2009
   c. Total labor cost in year 2000
   d. Total labor cost in year 2009
   e. Total cost of the foundation in year 2000.

S/No	Description	2000(Prices) Naira	2009(Prices) Naira	Unit	Requirements
1	Anti-termite solution	776.00	2,280.00	Tin	8
2	2000 litres of water	416.00	2,083.00	Nr	12 Water Tanker
3	Lateritic Filling	2,667.00	8,000.00	Nr	32 Tipper 10 yd^3
4	Boulders	5,585.00	16,924.00	Nr	8 Tipper 10 yd^3
5	1 X 12 X 12 soft wood	150.00	450.00	Nr	75
6	2 X 3 X 12	83.00	250.00	Nr	150
7	2 X 2 X 12	27.00	80.00	Nr	120
8	4 inches Nail	1.155.00	3,500	Bag	1
9	3 inches nail	1,172.00	3,550.00	Bag	1
10	2 inches nail	1,200.00	3,600.00	Bag	1
11	Cement	450.00	1,350.00	Bag	200
12	Sand	2,100.00	8,000.00	5 yd^3 Tipper	5
13	Gravel	7,000.00	15,000.00	5 yd^3 Tipper	7
14	6 Inches Blocks	40.00	100.00	Nr	935
15	9 inches Blocks	45.00	120.00	Nr	1892

Question Eighteen

1m³ of concrete is composed of 300Kg of cement, 0.5m³ of sand, 1m³ of granite and 20 litres of water. The prices for each item of the materials for the given quantities in year 2011, 2012 and 2013 are given in the table below:

S/No	Materials	Quantity	Unit	2011	2022	2013
1	Cement	300	Kg	7200	8700	10800
2	Sand	0.5	M3	3500	4200	4725
3	Aggregate	1	M3	3920	5460	6900
4	Water	20	Litres	600	750	970

    a. Determine the concrete price index trend within the period under review.

    b. In what areas of feasibility and viability appraisal can trend analysis be of significant use?

    c. Identify the likely areas where most problems are likely to arise in the use of index-linked contracts

Question Nineteen

Demonstrate how the following analytical tools could be engaged in solving investors' investment logjam:

    (i) Ratio analysis

    (ii) Internal Rate of Return

    (iii) Breakeven point

    (iv) Profitability Index and

    (v) Decision Tree

Question Twenty

The objective of shareholders' wealth maximization is an appropriate and operationally feasible criterion to choose among the alternative financial actions. Identify with applicable formula six of such feasible criteria and demonstrate how they could be engaged in solving shareholders' investment logjam. Are such criteria employable in property investment decisions?

ANSWERS

Question 17

S/No	Description	Quantity	Unit	2000(Prices) Naira	2009(Prices) Naira	2000 (Amount)	2009 (Amount)
1	Anti-termite solution	8	Tin	776.00	2,280.00	6208	18240
2	2000 litres of water	12	Nr	416.00	2,083.00	4992	24996
3	Lateritic Filling	32	Nr	2,667.00	8,000.00	85344	256,000
4	Boulders	8	Nr	5,585.00	16,924.00	44680	135,392
5	1 X 12 X 12 soft wood	75	Nr	150.00	450.00	11250	33,750
6	2 X 3 X 12	150	Nr	83.00	250.00	12450	37,500
7	2 X 2 X 12	120	Nr	27.00	80.00	3240	9600
8	4 inches Nail	1	Bag	1.155.00	3,500	1155	3500
9	3 inches nail	1	Bag	1,172.00	3,550.00	1172	3550
10	2 inches nail	1	Bag	1,200.00	3,600.00	1200	3600
11	Cement	200	Nr	450.00	1,350.00	90,000	270,000
12	Sand	5 yd^3 Tipper	Nr	2,100.00	8,000.00	10500	40,000
13	Gravel	7 yd^3 Tipper	Nr	7,000.00	15,000.00	49000	105,000
14	6 Inches Blocks	935	Nr	40.00	100.00	37,400	93,500
15	9 inches Blocks	1892		45.00	120.00	85,140	227,040
	Total					443,731	1,261,668

From the Table Total Materials' cost in year 2000 is ₦443,731.00 and ditto for 2009 is N1,261,668.00 Five marks eash.

In year 2009,

Materials (M) + Labour (L)   = 3,220,000.00

Therefore, 1,261,668 + L = 3,220,000

Labour + 3,220,000 – 1,261,668.00 = ₦1,958,332.00 ----------Labour Cost in 2009

From here, one can see that labour is 1.552 of materials

Therefore for year 2000;

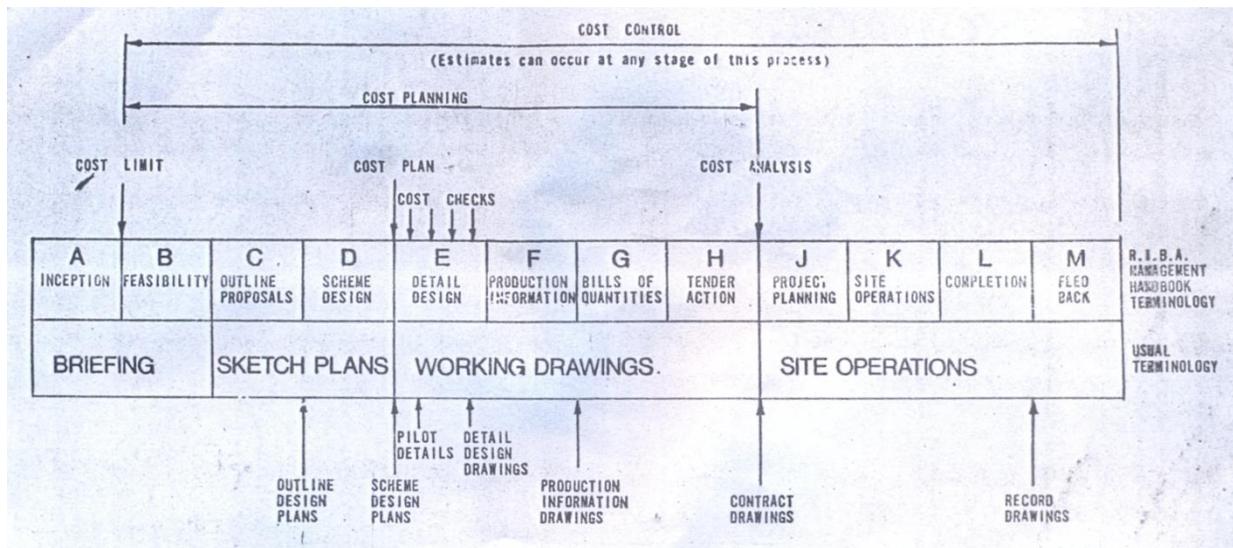 Cost of foundation would be 443,731 + 1.552 (443,731) = 1,132,402.00 -------------

Cost of Labour in 2000 = 1.552(443,731) = 688,671.00 --------

Question No 15

(15.a).

It is below organogram that is required.

10 Marks Allotted.

(15.b)

Candidates are expected to pick each cost control activity and explain what they have to do and the tools they have to use to achieve their objectives' Examples as follows:

Cost Limit: Cost limit could be established based on client's budget for the work with concurrent elemental cost limit based on cost analysis of completed similar project; or approximate estimates for outline or scheme design reviewed and approved and consented to by the client with elemental cost limit established as earlier enunciated. Whatever figures are arrived at would continue to be worked

upon as information trickles in. So what we need here is outline or better still scheme design; cost analysis of completed but similar project and approximate estimate for would be project.

(Candidates to do similar thing for the remaining variables)

Cost Plan

Cost Checks

Cost Planning

Cost Analysis

(15.c). Relevance of R.I.B.A plan of work includes the followings:

Presents an overview of activities involved in design – construct continuum and corresponding cost activities along with the specific time that each activity is to be carried out.

Question 18

Table 1 to be generated

Prices Per Unit in					
Item	Quantity	Unit	2001	2002	2003
Cement	300	Kg	7200	8700	10800
Sand	0.50	M^3	3500	4200	4725
Aggregae	1	M^3	3920	5460	6900
Water	20	Litres	600	750	970
Price Total			15,220	19110	23395

Table 2 to be generated

Weighted Prices Per Unit in					
			Q_0P_0	Q_0P_1	Q_0P_2
Item	Quantity	Unit	2001	2002	2003
Cement	300	Kg	2,160,000	2,610,000	3,240,000
Sand	0.5	M^3	1,750	2,100	2,362.50
Aggregate	1	M^3	3,920	5,460	6,900

Water	20	Litres	12,000	15,600	19,400
	Total		2,177,670	2,632,560	3,268,662.50
Price Index Trend			2,177,670/2,177,670 X 100	2,632,560/2177670 X100	3,268,662.50/2177670 X 100
Price Index Trend			100	121	150

Question One (a)

Year	Ct	$1/(1+i)^n$	C_tA_t
1	475,200.00	0.8695	413,186.40
2	475,200.00	0.7561	359,298.72
3	496,480.00	0.6575	326,435.60
4	546,480.00	0.5717	312,422.62
5	531,128.00	0.4971	264,023.73
6	601,128.00	0.4323	259,867.63
7	636,000.00	0.3759	239,072.40
		$\sum C_tA_t$	2,174,307.10
		C_o	3,350,000.00
		$\sum C_tA_t - C_0$	-1,175,693.00

Key

$NPV = \sum(C_tA_t) - C_o$

Where At is given as $1/(1 + i)^n$

And i is 15% or 0.15

Decision and Recommendation : Since NPV is negative, project is likely not to be profitable. Therefore, MD would be advised to jettison the Gbagada project.

(15 Marks)

Question One (b)

Year	Ct	$1/(1+i)^n$	C_tA_t
1	690,000.00	0.8695	599,955.00
2	690,000.00	0.7561	521,709.00
3	689,000.00	0.6575	453,017.50
4	759,000.00	0.5717	433,920.30
5	782,850.00	0.4971	389,154.74
6	872,850.00	0.4323	377,333.06
7	864,000.00	0.3759	324,777.60
		$\sum C_tA_t$	3,099,867.20
		C_o	4,650,000.00
		$\sum C_tA_t - C_0$	-1,550,132.80

Key

$NPV = \sum(C_tA_t) - C_o$

Where At is given as $1/(1 + i)^n$

And i is 15% or 0.15

Decision and Recommendation: Since NPV is negative, project is likely not to be un- profitable. Therefore, MD would be advised to jettison even the Dolphin project.

Question 10

Gross floor area   28,000 m^2

Non – lettable floor area 20% of GFA and this gives 5,600 m^2

Lettable floor area   28,000 – 5,600 = 22,400 m^2

Generatable income per annum 22,400 * 15,000 which yields ₦336,000,000.00

Generatable income less Marketing and Managing Cost would give ₦[336 – 0.10* 336] million

This gives N302.40 million

Other data as given are as follows:

Completion period 24 Months

Professional fees   15%

Short term finance   15%

Developer's profit   0.12 * 336 million which gives ₦40,320,000.00

By formula

Gross Development Value – (Cost of development + Developer's Profit) = Cost of land

Substituting for the known ones:

302.4 m – (cost of development + 40,320,000) = 35,000,000.00

302.4m – c of d – 40,320,000 = 35,000,000.00

302,400,000.00 – 40,320,000.00 – 35,000,000.00 = Cost of Development

Cost of Development = ₦227,080,000.00

Therefore, the allowable building cost for the MD's notice would be ₦227, 080,000.00

Question 2

Demonstration of 'risk analysis' in the context of the commercial office development would have to focus on the following:

    i.   Identification of risks

   ii.   Analysis of identified risks

  iii.   Sensitivity analysis of the identified risks

  iv.   Management of the identified risks

Identification of risks associated with the commercial office development

    i.   Pre –contract risks (design error, not marching need with design, in-competency of consultants, lack of proper cost control, lack of proper feasibility and feasibility studies, lack of adequate documentation

   ii.   Post Contract risks (Poor contract management, claims management, project delay, funding problem, management of variations, extension of time, legal issues, LAD, etc)

  iii.   Physical construction risks (weather problem, lack of plant and machineries by contractor, lack of commitment by contractor, un-controlled variations etc)

iv.   Commercial risks (risks in estimating, pricing errors, market inflation, misuse of advance payment, payment default by the client, mis-interpretation of specification, specification of archaic product, risks associated with subcontract payment, human management problem, etc)

Risks categorization, ranking and sensitivity analysis

Risks Management and control

Physical Risk Control

Risk Avoidance

Risk Reduction

    Physical devices

    Education and safety

    Procedural devices

Financial risk control

    Risk Retention

    Risk Transfer

Etc.

Question 8

In this case, what we have to look for is the yield. That is determine the Internal Rate of Return or what is called IRR. This is given by the formula:

$\sum(C_t A_t) - C_{o = 0}$

Where At is given as $1/(1 + i)^n$

Usually determined by trial and error but a short cut formula is given as:

$IRR = r_1 + [\ NPV_1\ X\ (r_2 - r_1)/\ (NPV_1 + NPV_2)]$ . . . . . .(i)

Where;

NPV_1 = Positive NPV

NPV_2 = Negative NPV

And r_1 = rate of interest when NPV is positive

And r_2 = rate of interest when NPV is negative

Since 15% rate of interest has already yielded negative NPV as shown below:

Year	Ct	$1/(1+i)^n$	C_tA_t
1	475,200.00	0.8695	413,186.40
2	475,200.00	0.7561	359,298.72
3	496,480.00	0.6575	326,435.60
4	546,480.00	0.5717	312,422.62
5	531,128.00	0.4971	264,023.73
6	601,128.00	0.4323	259,867.63
7	636,000.00	0.3759	239,072.40
		$\sum C_tA_t$	2,174,307.10
		C_o	3,350,000.00
		$\sum C_tA_t - C_0$	-1,175,693.00

Key

$NPV = \sum(C_tA_t) - C_o$

Where At is given as $1/(1 + i)^n$

And i is 15% or 0.15

Then the negative NPV is now our NPV2 and the r2 is 15%

We now try lower r say 1% and see where we are

Year	Ct	$1/(1+i)^n$	C_tA_t
1	475,200.00	0.9900	470,448.00
2	475,200.00	0.9802	465,791.04
3	496,480.00	0.9705	481,833.84
4	546,480.00	0.9609	525,112.63
5	531,128.00	0.9514	505,315.17
6	601,128.00	0.9420	566,262.57
7	636,000.00	0.9327	593,197.20
		$\sum C_tA_t$	3,607,960.45
		C_o	3,350,000.00

		$\sum C_t A_t$ - C_0	257,960.45

Key

NPV = $\sum(C_t A_t)$ - C_o

Where At is given as $1/(1 + i)^n$

When I = 1%, NPV is positive; this is now NPV_1 and r_1 is 0.01

Substituting in equation (i) above, the

IRR = 0.01 + 257,960.45 * (0.15 -0.01)/ 257,960.45 + (-1,175,693.00)

IRR = -0.02935

The IRR is negative at 2%.

It is better that the project is not embarked upon.

 Question 5

Office block floor area would be:

450 X 13 + 600 = 6450 m2

Shopping Mall floor area:

3[15(24) + 15(24) + 3(60)]

3[360 + 360 +180] = 2700 m2

Likely cost of project would be:

68,200 (6450) + 59,500 (2700)

439,890,000.00 + 160,650,000.00

₦600,540,000.00

(10 Marks)

(b) Factors for consideration in appraising the financial feasibility of the complex are as follows:

Market and Demand Analysis

Technical feasibility: manpower, machines, equipment and raw materials' requirements

Project financing, financial evaluations and financial projections (cash-flows)

Project implementation

Project Appraisal (Financial)

The reliability of the report is anchored to the following:

The sources of information used and the degree of reliability

Major assumptions made and the degree of reliability

Cash-flow projections for at least 5 years

Financial viability indices.

    (a) Project Implementation

    (c)Post – Investment evaluation

(2). Market analysis

> Determinants of market demand

> Data required for market analysis

> Sources of data

> Size of total market demand

> Total supply of the product and supply-gap

> Market demand and market share projections

> Production Programme

> Competitive environment

> Marketing plan

(3). Technical feasibility

Product description

> Plan layout

> Choice of technology

> Selection of machinery and equipment

> Structures and civil works

> Raw materials requirements

> Infrastructural facilities

> Manpower and training requirements and

➢ Plant Location

(4). Financial Feasibility and Viability (divisible into two namely Total investment and Financial Evaluation).

(a). Total Investment (include Capital Investment, Net working Capital)

(b). Financial Evaluation. Tools that could be used include:

➢ Payback Period

➢ Simple Rate of Return

➢ Net Present Value (NPV)

➢ Internal rate of return (IRR)

➢ Break- even Analysis

➢ Sensitivity Analysis

➢ Ratio Analysis

➢ Decision tree

➢ Profitability Index

(5). Project Financing

➢ Financing Structure

➢ Equity Financing

➢ Debt Financing

(6). Financial Projections

➢ Income statement projections

➢ Cash-flow Projections

➢ Balance sheet Projections

➢ Assumptions underlying the projections