



**Strathmore**  
UNIVERSITY

**STRATHMORE BUSINESS SCHOOL**

MASTER OF SCIENCE IN DEVELOPMENT FINANCE

END OF SEMESTER EXAMINATION

**MDF 8109: PROJECT FINANCE AND MANAGEMENT**

**Date:** Wednesday 25<sup>th</sup> August 2021

**Time:** 3 Hours

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**Instructions**

1. This examination consists of FIVE questions.
2. Answer **Question ONE** and **ANY OTHER THREE** questions.
3. You are expected to work independently

**Question 1 (25 Marks)**

Lucky Star purchased a machine 5 years ago (y-5) at \$7000. The machine had an expected life of 15 years at the time of purchase and zero estimated salvage value at the end of 15 years. It was depreciated on a straight line method and has a present book value of \$5000 (y0).

A new machine can be bought at y0 for \$12000 (including delivery and installation) which, over its 10-year operational life will expand production income from \$10000 to \$11000 per year. Moreover, it will reduce operational costs from \$7000 to \$5000 per year. The new unit has an estimated salvage value of \$2000 at the end of 10 years. Old unit's current market value is \$1000. Taxes are at 40% per year. These two machines are "mutually exclusive" investments. Cost of capital = 10% per year (assume to be the WACC as discount rate).

- a) Calculate the net tax savings arising from the sale of the old machine. **(5 marks)**
- b) Calculate the net cash outflow (initial investment) arising from the purchase of the new machine. **(5 marks)**
- c) If it is given that the old machine generated after tax annual cash inflows of \$2000, while the new machine will generate an after tax annual cash inflows of \$4000, create a timeline of cash flows from Y0 to Y10. **(5 marks)**

d) Explain (no calculations) the next step in the process you would ordinarily undertake to be able to determine if Lucky Star should buy the new machine or not. **(5 marks)**

e) If the inflation rate was 2% p.a. for the period “year minus five until year zero”, but is expected to increase to 4% p.a. for the next 10 years, please explain what would change in the process as you have described in part “ d)” ? **(5 marks)**

### **Question 2 (25 Marks)**

Africa is a continent rich in natural resources and boasts a large young, ambitious, and entrepreneurial-minded population. Harnessed properly, these endowments and advantages could usher in a period of sustained economic growth and increased well-being for all Africans. However, a lack of modern infrastructure is a major challenge to Africa’s economic development and constitutes a significant impediment to the achievement of the Sustainable Development Goals.

Facing the dearth of infrastructure funding, an increasing number of countries in Africa, are turning to Public-Private Partnerships (PPPs) in order to tap private capital. Although PPPs cannot fully solve this problem, they can provide significant financing where viable projects are carved out. Yet PPPs in Sub-Saharan Africa remain a very small market, with projects concentrated in only a few countries namely, South Africa, Nigeria, Kenya, and Uganda.

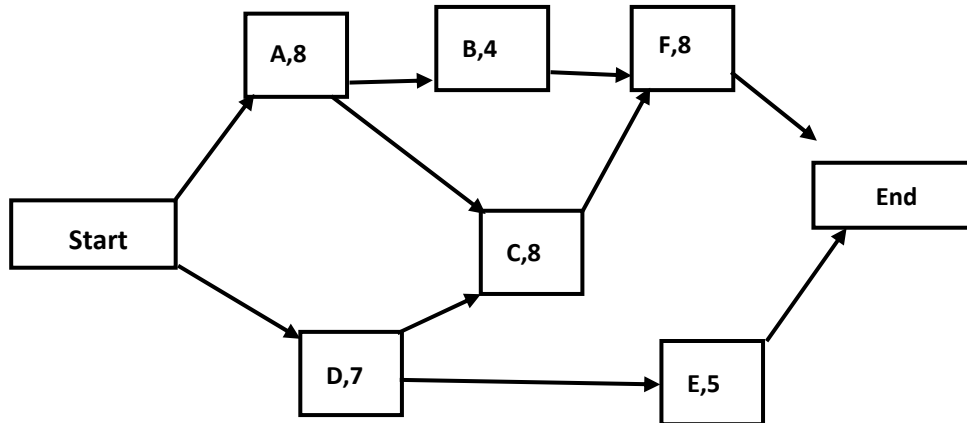
- a) List and explain 3 critical factors needed for the success of PPPs in a country such as Kenya. **(6 marks)**
- b) In PPPs, the parties negotiate a legal framework to govern their long term relationship in which the rights and obligations of the private sector partner and the government are included in a concession agreement. In Kenya and other emerging markets, there have been recent concerns related to possibility of attachment and hand over of critical national assets such as ports to the foreign private sector partner in the PPP arrangement.

Explain how this kind of risk can be avoided in future, giving 2 clear workable solutions as part of the discussion. **(10 marks)**

- c) List and explain 3 roles the government of Kenya needs to play so as to guarantee success in PPP projects in the country. **(6 marks)**
- d) Indicate 3 benefits of PPPs in Kenya, elaborating in each case why this is a significant benefit attributable to the PPP form of procurement. **(3 marks)**

### Question 3 (25 Marks)

Given the following network;



- What is the critical path? **(2 Marks)**
- How long will it take to complete this project? **(2 Marks)**
- Can activity 'D' be delayed without delaying the completion of the project? **(2 Marks)**  
If so, for how many days? **(2 Marks)**
- The cost of a project is not solely due to the direct costs associated with individual activities in the project, normally, there are indirect expenses as well. Elaborate on what constitutes indirect expenses, and how such expenses change with the length of time required to complete the project. **(6 Marks)**
- Define a Work Breakdown Structure, and list and explain 3 reasons why the WBS is important. **(5 Marks)**
- Explain and elaborate the difference between Program management and Project management. **(6 Marks)**

### Question 4 (25 Marks)

- In most Project environments, project team members build a lot of contingency (fat) reserves on estimates of activity time, then waste it. Indicate and explain 2 ways in which Project time is wasted. **(5 marks)**

- b) Illustrate with a sketch, and explain how a project buffer may be used to protect the project time. **(5 marks)**
- c) List and explain 3 advantages of Lump-sum (fixed price) contracts. **(5 Marks)**
- d) Explain what a reimbursable contract type is, and list and explain 2 distinct advantages **(5 Marks)**
- e) How would you ensure your contractor on a project does not overcharge for the cost of a turnkey project during the negotiations for the project? **(5 Marks)**

**Question 5 (25 Marks)**

A proposed project has the following activities and durations;

Activity	Optimistic Time	Most Probable	Pessimistic Time
1-2	3	6	15
1-6	2	5	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	17
4-5	3	6	15
6-7	3	8	31
5-8	1	4	7
7-8	3	17	37

- a) Draw an activity on Arrow (AOA) diagram, and please show the critical path. **(5 marks)**
- b) Calculate the probability of finishing the project in i) Not more than 43 days **(5 marks)**  
 ii) Not less than 30 days **(5 marks)**  
 iii) Not more than 47 days **(5 marks)**
- c) How would you approach this specific problem if you had near critical paths of similar risk than the so called official critical path? Explain. **(5 marks)**

Note: Probabilities for the standard normal distribution are given as *Appendix 1* on the last page.

*Appendix 1: Probabilities for the Standard Normal Distribution*

Cumulative Probabilities for the Standard Normal Distribution										
FIRST DIGIT OF $z$	SECOND DIGIT OF $z$									
$z$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990