MAY / JUNE 2016 EXAM REVISION 1

Please attempt the INF3708 exercises as part of your exam revision. Note that the revision of assignments & past exam papers are also very crucial for better performance. In fact, proper understanding of the assignments & past exam papers almost guarantees a pass.

QUESTION 1:

The table below gives the estimated cash flow for three different projects (in rands R):

Year	Project 1	Project 2	Project 3
0	- R 195 000	- R 160 000	- R 295 000
1	+ R 15 000	+ R 15 000	+ R 30 000
2	+ R 30 000	+ R 15 000	+ R 35 000
3	+ R 55 000	+ R 20 000	+ R 50 000
4	+ R 50 000	+ R 35 000	+ R 120 000
5	+ R 55 000	+ R 55 000	+ R 110 000
6	+ R 50 000	+ R 90 000	+ R 115 000

1. Calculate the **Net Profit** of each project. (3)
2. Based on your calculation of the Net Profit, identify which project you would select to develop. Motivate your answer. (2)
3. Calculate of **Return on Investment (ROI)** of each of the projects given in the table above. (3)
4. Based on your calculation of the ROI, identify which project you would select to develop. (2)

QUESTION 2:

Consider the following project scenario and some questions related to it. The table below gives the estimated cash flow for three different projects (in South African rands R):

Year	Project 1	Project 2	Project 3
0	- R 170 000	- R 150 000	- R 280 000
1	- R 10 000	+ R 5 000	+ R 10 000
2	+ R 20 000	+ R 20 000	+ R 30 000
3	+ R 50 000	+ R 30 000	+ R 50 000
4	+ R 50 000	+ R 80 000	+ R 120 000
5	+ R 60 000	+ R 90 000	+ R 120 000
6	+ R 60 000	- R 10 000	+ R 120 000

1. Calculate the **Net Profit** of each project. (3)
2. Based on your calculation of the Net Profit, identify which project you would select to develop. Motivate your answer. (2)
3. Calculate of **Return on Investment (ROI)** of each of the projects given in the table above. (3)
4. Based on your calculation of the ROI, identify which project you would select to develop. (2)

QUESTION 3:

1. Consider the following list of tasks with dependencies and estimated durations reflected in table Draw a **CPM network (activity-on-arrow diagram)** to illustrate the interaction of activities. Include all the values in the nodes. Indicate the critical path on the diagram

Task	Precedents	Duration (weeks)
A	-	4
B	-	3
C	A, B	5
D	-	1
E	C	5
F	D	2
G	E, F	5
H	G	6

2. Write down the **critical path(s)** using the letters of the tasks and calculate and write down the duration of the project. How many paths are there in total? Identify them all and write them down.

QUESTION 4:

1. Draw a complete **Activity-on-arrow network diagram**. Include the event number, earliest date, latest date and slack on each node by completing both a forward and backward pass. Clearly indicate the total duration and **critical path.**

Task	Precedents	Duration (days)
A	None	8
B	None	10
C	None	8
D	A	10
E	A	16
F	D, B	17
G	C	18
H	C	14
I	F, G	9

QUESTION 5:

1. Draw a **CPM network** for the list of tasks in the table above to illustrate the interaction of activities. Clearly identify the **critical path** and its duration.

Activity	Precedents	Duration (weeks)
A	None	7
B	A	10
C	A	12
D	B	3
E	B	8
F	B	7
G	F	2
H	D, E	5
I	C	13
J	C	6
K	H	14
L	E, F	5

QUESTION 6:

1. Consider the following list of tasks with dependencies and estimated durations reflected in table **Draw a CPM network (activity-on-arrow diagram**) to illustrate the interaction of activities. Include all the values in the nodes. Indicate the critical path on the diagram

Task	Precedents	Duration (weeks)
A	None	6
B	None	2
C	A	3
D	B	2
E	C	4
F	D	1
G	E, F	1
H	G	6
I	H	3
J	H	1
K	I, J	1

2. Write down the **critical path(s)** using the letters of the tasks and calculate and write down the duration of the project. How many paths are there in total? Identify them all and write them down.

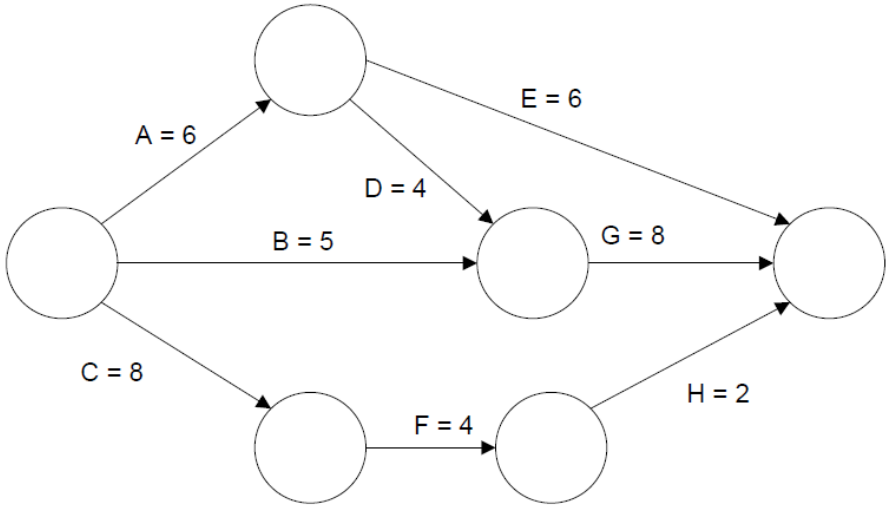
QUESTION 7:

1. Consider the following activities with their precedents and durations. Draw a complete **Activity-on-arrow network diagram**. Include the event number, earliest date, latest date and slack on each node by completing both a forward and backward pass. Clearly indicate the total duration and **critical path.**

Activity	Precedents	Duration (weeks)
A	None	3
B	A	4
C	B	3
D	B	10
E	D	8
F	D	4
G	D	6
H	C, E, F, G	8
I	H	5
J	H	5
K	I	4
L	J	2
M	K, L	4

QUESTION 8:

Consider the network diagram below indicating the most likely duration of each activity. The table gives the optimistic and pessimistic durations as well.



	OPTIMISTIC (a)	MOST LIKELY (m)	PESSIMISTIC (b)	EXPECTED (t_e)	STANDARD DEVIATION (s)
A	2	6	10		
B	4	5	9		
C	7	8	9		
D	2	4	12		
E	4	6	8		
F	3	4	11		
G	4	8	9		
H	2	2	5		

Suppose we must complete the project within **20 weeks** and suppose activity D must be completed by week 12 as the staff member is scheduled on another project after week 12. Use the table and calculate the following:

1. Calculate the **Expected (te) values** and **Standard Deviation (s)** for all the activities as well as for all the events and indicate all the (te) and (s) values on the diagram. (10)
2. Draw the **PERT network** to present this information. (4)
3. Calculate the **Z values** of event 4 as well as the last event. (4)
4. According to Figure 7.8 (p.181) in your textbook or Figure 2 (question 9 below), what is the probability of not meeting the final target date for the total project? (2)

QUESTION 9:

Refer to the **PERT** activity timetable in table below and answer the questions that follow.

	OPTIMISTIC (a)	MOST LIKELY (m)	PESSIMISTIC (b)	EXPECTED (t_e)	STANDARD DEVIATION (s)
A	4	5	6		
B	2	3	4		
C	3	4	5		
D	5	6	7		

1. Calculate the **Expected times (t_e)** for activities A, B, C and D. (4)
2. Calculate the **Standard Deviation (s)** for activities A, B, C and D. (4)
3. Use Figure 1 below as well as the (t_e) and (s) values calculated in Q9.1 and 9.2 above and calculate the values for (i), (ii), (iii) and (iv) in Figure 1. (3)

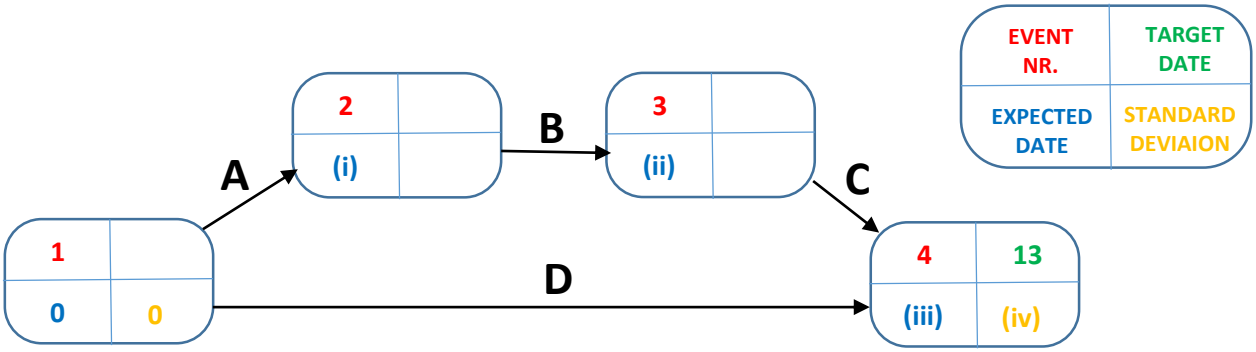


Figure 1 - question 9:

4. Use the calculations done in Questions 9.1, 9.2 & 9.3 above to **determine the Z value** for the fourth (4th) task. (7)
5. According to the figure 2, what is the **probability** of not meeting the target date. (2)

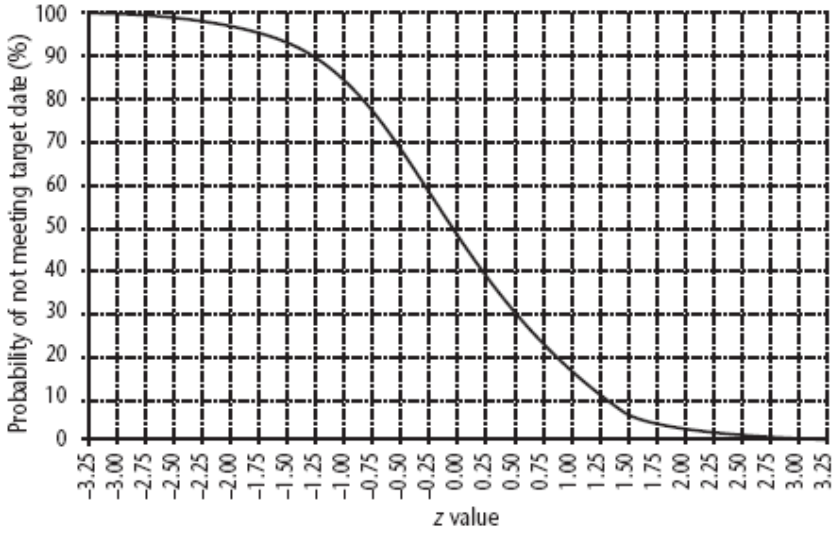


Figure 2 - question 9:

The probability of obtaining a value within z standard deviations of the mean for a normal distribution