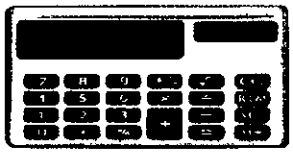
UNIVERSITY EXAMINATIONS



UNIVERSITEITSEKSAMENS

UNISA university of south africa

# INF3708

October/November 2014

## SOFTWARE PROJECT MANAGEMENT

Duration 2 Hours

80 Marks

EXAMINERS :

| | |
|---|---|
| FIRST : | MR EO OCHOLA |
| SECOND | MR MC MALOMA |
| EXTERNAL | PROF MO OHANGA |

**Use of a non-programmable pocket calculator is permissible**

**Closed book examination**



## INSTRUCTIONS

- **This paper consists of 6 pages.**
- Non-programmable calculators may be used
- Show all calculations
- Round off all your calculations to two decimal places
- Answer ALL the questions.

GOOD LUCK!!

**QUESTION 1** **[5]**

Select the appropriate answer. Write only the appropriate letter next to the question number in your answer book

| | |
|---|---|
| 1 1 | Which of the following is (are) true regarding project products?<br><br>A Each project product has an activity(ies) that creates it<br>B All the deliverables are handed over to the client at the end of the project<br>C. Deliverables are used to create intermediate products<br>D All of the above<br>E. 1 & 2 |
| 1 2 | The classical life cycle model of software development is<br><br>A a reasonable approach when requirements are well defined.<br>B a good approach when a working program is required quickly<br>C. the best approach to use for projects with large development teams<br>D. an old fashioned model that is rarely used any more<br>E. none of the above |
| 1 3 | The spiral model of software development<br><br>A ends with the delivery of the software product<br>B is more chaotic than the incremental model<br>C. includes project risks evaluation during each iteration.<br>D all of the above.<br>E. none of the above. |
| 1 4 | Net Present Value takes into consideration the following items:<br><br>A Cash flow timing<br>B Net Profit<br>C Discount rate<br>D 1, 2 and 3<br>E None of the above |
| 1 5 | The prototyping model of software development is:<br><br>A. The best approach to use for projects with large development teams.<br>B A risky model that rarely produces a meaningful product<br>C. A reasonable approach when requirements are well defined<br>D A useful approach when a customer cannot define requirements clearly<br>E. None of the above |

**QUESTION 2** **[20]**

2.1 The cash flows of Projects A, B and C is given in the table 1 below (in ZAR, South African rand, R)

| Year | Project A | Project B | Project C |
|---|---|---|---|
| 0 | -R 250,000 00 | -R 300,000 00 | -R 200,000 00 |
| 1 | R 25,000 00 | R 25,000 00 | R 40,000 00 |
| 2 | R 25,000 00 | R 50,000 00 | R 40,000 00 |
| 3 | R 50,000 00 | R 75,000.00 | R 40,000 00 |
| 4 | R 50,000 00 | R 50,000 00 | R 40,000 00 |
| 5 | R 100,000 00 | R 50,000 00 | R 80,000 00 |
| 6 | R 100,000 00 | R 75,000 00 | R 80,000 00 |

**Table 1 for Question 2**

a) Give the formula to calculate Net Profit Calculate the Net Profit of all the projects Which of the projects have the highest Net Profit? (3)

b) Give the formula to calculate Return on Investment Calculate the Return on Investment (ROI) of all the projects. Which of the projects have the highest return on investment? (7)

c) Give the formula to calculate the pay back period. Calculate the pay back period of all the projects. Which of the projects pay back the quickest? (3)

d) Calculate the net present values of all the projects using a discount factor of 12% Which project has the best NPV? (7)

| Year | 8% discount rate | 10% discount rate | 12% discount rate |
|---|---|---|---|
| 0 | 1 | 1 | 1 |
| 1 | 0 9259 | 0.9091 | 0 8929 |
| 2 | 0 8573 | 0 8264 | 0 7972 |
| 3 | 0 7938 | 0 7513 | 0.7118 |
| 4 | 0 735 | 0 683 | 0 6355 |
| 5 | 0 6806 | 0 6209 | 0 5674 |
| 6 | 0.6302 | 0 5645 | 0 5066 |

**Table 2 for Question 2.d: Table of Net Present Value Discount Factors**

**QUESTION 3** **[14]**

3. In the PERT network illustrated in the figure below, the target date for the completion of the project is 15 weeks

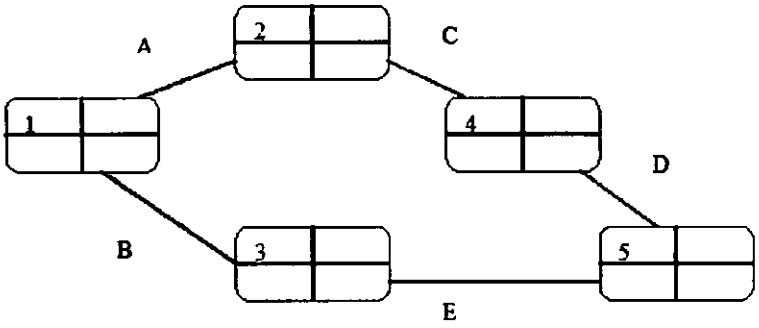



**Figure 1: Pert network for Question 3**

| | Optimistic (a) | Most Likely (m) | Pessimistic (b) | Expected ($t_e$) | Standard Deviation (s) |
|---|---|---|---|---|---|
| A | 4 | 6 | 8 | | |
| B | 1 | 4 | 5 | | |
| C | 2 | 3 | 5 | | |
| D | 2 | 5 | 6 | | |
| E | 3 | 4 | 5 | | |

**Table 3 for Question 3**

Use the table above to calculate the following

3 1 Calculate the Expected ($t_e$) values and Standard Deviation (s) and indicate the ($t_e$) and (s) values on the diagram. (10)

3 3 Calculate the Z value on the last event (4)

## QUESTION 4 [28]

4 1 Consider the following list of tasks with dependencies and estimated durations reflected in the table. Draw a CPM network (activity-on-arrow diagram) to illustrate the interaction of activities (8)

| Task | Precedents | Duration (weeks) |
|---|---|---|
| A | None | 5 |
| B | None | 7 |
| C | B | 16 |
| D | B | 7 |
| E | A | 6 |
| F | A | 9 |
| G | D, E | 10 |
| H | F, G | 8 |

**Table 4 for Question 4**

4.2 Write down the critical path 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 (3)

4.3 What will the effect on the project be if the duration of activity A changes to 8 weeks? (2)

4.4 Due to the advent of new technology the following changes will occur:

- Task A duration changes to 6 weeks
- Task G duration changes to 5 weeks
- Task C is no longer dependent on the completion of Task B
- Task C duration changes to 28 weeks

Draw the activity-on-node network (precedence network) diagram for the tasks as given in the table, incorporating these changes. Indicate **all** the node values on the nodes. Indicate the critical path with a * on each task in the path. (12)

4.5 Summarise the overall effect of the changes in 4 4 compared to the scenario in 1.1 and indicate whether the change in technology should be implemented or not (3)

## QUESTION 5 [13]

5.1 Below is partial precedence network for an IT project. Specific individuals have not been allocated to activities yet, but all the activities will be carried out by 'standard' analysts or software developers. Draw up a bar/Gantt chart and resource histogram for the information given in the precedence network below (10)

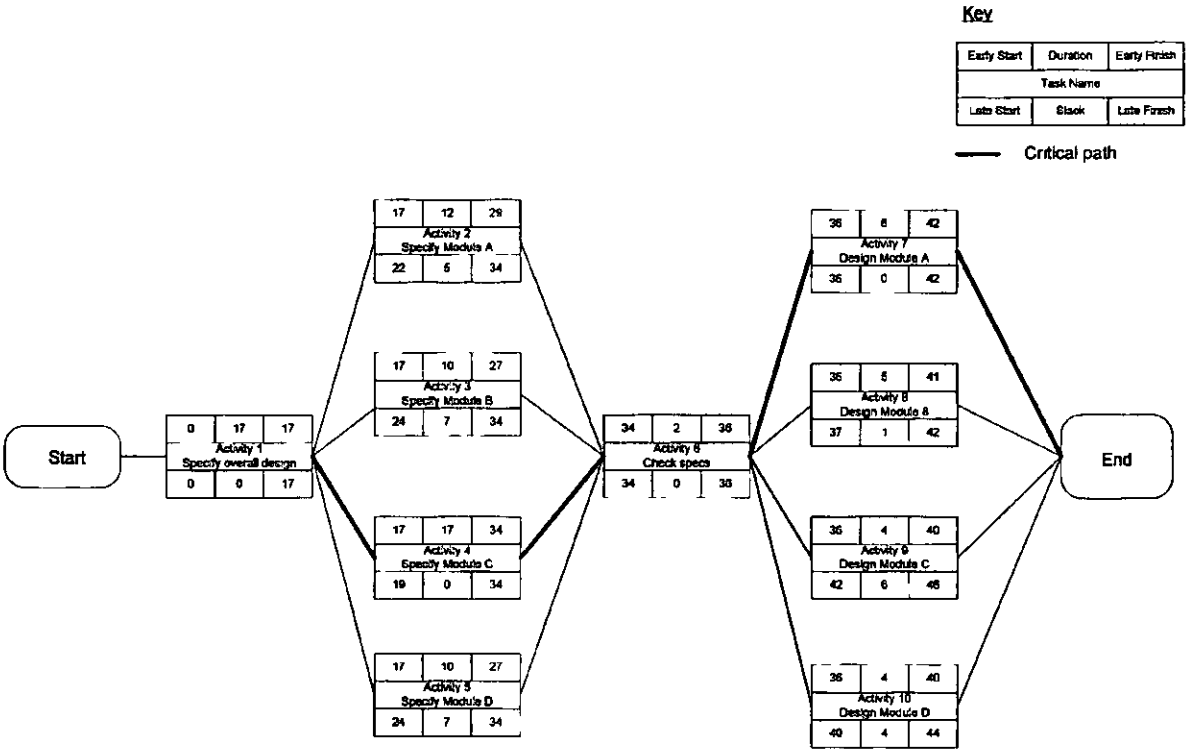



**Figure 2 for Question 5: Partial precedence network**

5 2 Name and describe three ways that a manager can use to visualize projects progress. (3)