



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

BACHELOR OF ENGINEERING HONS IN INDUSTRIAL AND MANUFACTURING ENGINEERING

PROJECT MANAGEMENT EIE 5116

First Semester Phase II Main Examination Paper

December 2024

This examination paper consists of 5 printed pages

Time Allowed: 3 hours

Total Marks: 125

Special Requirements: Statistical Tables

Examiner's Name: Dr Nicholas Tayisepi (Pr Eng)

INSTRUCTIONS AND INFORMATION TO CANDIDATE

1. Answer All questions in section A. Choose and attempt a maximum of three (3) questions from section B
2. Use of calculators is permissible.

MARK ALLOCATION

QUESTION	MARKS
1.	10
2.	40
3.	25
4.	25
5.	25
6.	25
TOTAL MARKS ATTAINABLE BY CANDIDATE	125

SECTION A

QUESTION ONE

Case Scenario

“You work for a company that organises exhibitions, and you are the project manager for a team organising a two-day exhibition on computer graphics and animation. You are expecting visitors to attend from other companies, universities, as well as private individuals.

You have a list of companies who wish to contribute by displaying their hardware and software at the exhibition. Representatives from these companies will need to be invited to the event, and they will then require both travel arrangements as well as hotel facilities to be organised for them (these last two activities should be carried out at the same time).

As project manager, you will also need to investigate possible halls for the exhibition, and then hire the most appropriate one. After the hall has been hired, and the company representatives have been organised (including their hotel and travel arrangements), it will be possible to advertise the exhibition. After this, you will need to arrange for the exhibition guide to be printed. At the same time as advertising the exhibition and printing the exhibition guide, you will need to rent the display stands, and when they have been delivered you will need to erect them in the exhibition hall.

After the exhibition has taken place, you will need to calculate the income generated by visitors to the exhibition.”

- (a) Identify 10 (ten) project schedule activities that have been specified in the case scenario above by completing Table QU1 in your answer booklet. Note that the exhibition itself need not be considered as a project planning activity. **[5]**

Table QU1

Activity	Description	Predecessor
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		

- (b) Draw the network diagram for the Case Scenario conference planning project using the Activity-on-Arrow (AOA) convention, showing the activities succession and arrangement, without considering the start time or duration of each activity. **[5]**

QUESTION TWO

You have assigned, Lee Vundla, one of the team members on the CNC Machine control system programming project of which you are the manager, to prepare preliminary data for the project network. Lee produced details, of the project duration based on the most likely time for each activity, as outlined in the project planning Table QU2.

- (a) Draw the project PERT network diagram for the project using the Activity-on-Arrow (AOA) convention. [5]
- (b) Determine the project activities:
 - (i) Earliest event times (EET). [4]
 - (ii) Latest event times (LET). [4]
- (c) Compute the overall project completion normal time. [4]
- (d) Calculate the project float time associated with each activity. [5]
- (e) Identify the critical path for the project network. [3]
- (f) Compute the probability of completing the project in 22 days if standard deviation was determined to be 1.22. [6]
- (g) Comment on the use of most likely activity duration as compared to expected activity duration. [3]
- (h) Shorten the project by 5 days and determine the new project cost. [6]

Table QU2

Activity	Most likely normal time (Days)	Crash time (Days)	Predecessor	EET	LET	Float	Normal cost (US\$000)	Crash cost (US\$000)
A	2	2	-				10	10
B	5	3	A				6	9
C	6	3	B				4	6
D	4	3	C				14	18
E	3	2	A				9	11
F	9	6	E				7	9
G	8	6	A				13	15
H	7	5	G				11	14
I	1	1	D,F				20	20
J	3	2	I,H				12	15

SECTION B

QUESTION THREE

- (a) Explain the meaning of organisational structure as applied in the management of a project. [5]
- (b) With the aid of illustrative diagrams, discuss the five (5) organisational structures used in the management of projects. Cite typical practical cases in each category as well as stating the advantages and disadvantages of each type of organisational structure. [20]

QUESTION FOUR

- (a) Describe the process of a project feasibility study. [5]
- (b) Write brief discussion notes on the five (5) phases of a project management life cycle, particularly highlighting the issues which should imperatively be addressed in each phase. [20]

QUESTION FIVE

- (a) Explain the notion that project based approach is the best option to meeting the business challenges of enterprises in the 21st century. [6]
- (b) Tabulate the differences between a process and a project. Provide a minimum of 4 comparison factors. [5]
- (c) Discuss the importance of a project charter as an important document which must be generated during the initial phase of a project. [8]
- (d) Distinguish between top-down and bottom-up approaches in estimating project time and costs. [6]

QUESTION SIX

- (i) Explain the triple constraint concept in project management. [6]
- (ii) Discuss the aspects which should be covered during project appraisal. [7]
- (iii) Discuss the distinction of management and leadership in projects. [6]
- (iv) List the sources of power of influence enjoyed by engineering project managers as they lead projects. [6]

End of Examination

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