



THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

EXAMINATION QUESTION PAPER MASTER

PROFORMA

Semester: ONE (1) Academic Year: 2021

A. DEPARTMENT SECTION

I ACCEPT THAT THIS EXAMINATION PAPER SATISFACTORILY EXAMINES

Subject Code: CE 451 Title: ENGINEERING MANAGEMENT

Number of Questions: 22 Number of Pages: 9

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Signature: [Signature] Date: 16/06/2021

3. Departmental Examinations Co-ordinator: Checked: YES NO (Please tick)
Signature: [Signature] Date: 16/6/21

4. Head of Department and Chief Examiner: Checked: YES NO (Please tick)
Comments: -NIL-

Signature: [Signature] Date: 16/06/21

B. EXAMINATIONS OFFICE SECTION

Examination Masters Received: YES NO

5. Examinations Officer Signature: _____ Date: _____

6. Witness Signature: _____ Date: _____



THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

CE 451 – ENGINEERING MANAGEMENT: SEMESTER ONE (1) EXAMINATION

Thursday, 17th June, 2021 at SLT

TIME ALLOWED: 3 HOURS

08:20am – 11:20am

INFORMATION FOR STUDENTS

1. This is a closed book examination.
2. You may use a calculator.
3. Access to internet is prohibited.
4. No mobiles phones are allowed in the exam room.
5. You have 10 minutes to read the paper. Do not begin writing during this time.
6. There are THREE PARTS in this paper.

Part A is Multiple Choice Questions – True/False
Part B is Short Answer Questions
Part C is Calculations

7. There are 22 Questions. Attempt all.
8. All answers must be written on the answer book provided unless otherwise stated. No other written material will be accepted.

Write your NAME and ID on the front page. Kindly do that now.

9. You are not allowed to consult your assignments, lecture notes and books.
10. Be neat and clear.
11. Maximum possible mark is **100** in 180 minutes of examination.
12. Questions are not equal weight. Marks allocated to each question are indicated.

PART A – Multiple Choice Questions (True / False)

1. Construction Management is the management of methods and resources to achieve engineering project milestones within scope, time and budget.
 - a. True
 - b. False

2. In Project Management of civil engineering projects, construction management falls under the project implementation stage in the overall project cycle.
 - a. True
 - b. False

3. The role of the Client's Engineer Representative / Site Lead Engineer is to ensure that all engineering scope of works are adhered to on site and that the Client's interest is best contractually served during the construction of the project.
 - a. True
 - b. False

4. During project stakeholder meetings, the client's engineer representative has the responsibility to represent the site team and present any issues/agendas at the project site. It is on this platform that all stakeholders have the opportunity to learn more about the project performance on site through the client's engineer representative's account.
 - a. True
 - b. False

5. Tendering in construction management is the process of acquiring an external service and/or goods provider to aid with the delivery of a project.
 - a. True
 - b. False

6. Tendering for an engineering project can be done in three (3) main stages:
 - a. True
 - b. False

7. In construction projects, before any actual works are carried out, a contract is essentially signed to define the terms and conditions of agreement between the contractor and the client.
 - a. True
 - b. False

8. The terms and conditions of the contract govern the interest of both the contractor and the client. It becomes a legal binding agreement once it is signed and any breach of the clauses within the document can result in penalties imposed against the contractor or the client.
- a. True
 - b. False
9. Subcontracting in construction occurs when the main contractor transfers the following technical, financial, contractual, or other compliance obligations/risks of the project to a third party to perform.
- a. True
 - b. False
10. An example of a sub-contractor is a company providing security services.
- a. True
 - b. False

Marks: 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 10

PART B – SHORT ANSWER QUESTIONS

11. Illustrate the Project Cycle

12. State the responsibilities of the following project personnel in a construction engineering project.

a. Project / Construction Manager

b. Site Engineer

c. Finance Officer

d. Surveyor

e. Health, Safety and Environment (HSE) Officer

f. Administration Officer

g. Document Controller

h. Procurement Controller

i. Social Safeguards Officer

j. Lands Officer

13. The role of the Client's Engineer Representative is to ensure that all engineering scope of works are adhered to on site and that the Client's interest is best contractually served during the construction of the project.

Briefly explain further on the following tasks which the role entails:

a. Engineering Drawing reviews

b. Technical Decision-making

c. Contractor's Claim verification as per work delivered

d. Overseeing the engineering site team

e. Representing the client in stakeholder meetings

14. State the two (2) main reasons why machinery and equipment are being used.

a.

b.

15. In the 1960s, Kepner and Tregoe developed a decision-making procedure which was adopted and to some extent modified to suit its application in the construction industry. State the seven (7) factors that are to be considered in a decision-making situation:

16. You are the project manager of a newly awarded project. The project is in need of new plant to carry out earthworks. Name three (3) personnel you would involve in the decision-making of purchasing the new plant.

a.

b.

c.

17. What two (2) categories are the objectives of selecting a plant classified into so that the final analysis shows the importance of both categories is demonstrated?

a.

b.

18. In terms of importance, according Kepner and Tregoe's decision making procedure, name the two (2) categories that the objectives are further classified into:

- a.
- b.

19. In stage four (4) of the decision-making procedure, having selected machines on the market which satisfy the MUST objectives, state the documentation that should be stored in a good plant department to aid the search for the preferred selected model.

20. The plant manager's decision to choose a preferred plant is also influenced by factors relating to the technical and performance standards. However, for other factors the answers are more intangible and more subtle resources of information must be found.

Give three (3) examples:

- a.
- b.
- c.

Marks: 10 + 20 + 10 + 2 + 7 + 3 + 2 + 2 + 1 + 3 = 60

PART THREE (3) – CALCULATIONS

21. It is decided to purchase a mechanical excavator costing K200,000 to work an average 200 hours per year. The life of the machine is expected to be ten (10) years.

Using the Declining Balance Depreciation Method, determine the salvage value of the mechanical excavator annually till year 10 in the table below.

Formula:

$$d = (1 - n\sqrt{L/P}) \times 100$$

where;

L = salvage value,

P = purchase price,

n = life of asset

d = percentage depreciation

Declining balance depreciation % is 23.2%

End of Year	Depreciation (%)	Dep. For year (PGK)	Book Value (PGK)
0	23.2	0	200,000
1	23.2		
2	23.2		
3	23.2		
4	23.2		
5	23.2		
6	23.2		
7	23.2		
8	23.2		
9	23.2		
10	23.2		
Total Annual Depreciation			

Marks: 15

22. Calculate the marginal hourly hire rate for the mechanical excavator given the following information:

Initial cost	K200,000
Resale Value	K9585.03
Average working hours per year	2,000 hours
Years of life of machine	10
Insurance premiums per year	K10,000
Licenses and tax per year	K1000
Fuel at 20 litres per hour	0.10 per litre
Oil and grease	10% of fuel cost
Repairs and maintenance	15% of initial cost per year
Required rate of return on capital	15%

Note: Overheads not included for simplicity

Item	PGK per annum
Depreciation – Straight Line	
Interest on finance, expressed in terms of an annual mortgage type payment	
Insurance and Tax	
<i>Ownership cost</i>	
Fuel (litres) per annum	
Oil and grease	
Repairs	
<i>Operating Cost</i>	
<i>Total Cost</i>	
MARGINAL HIRE CHARGE	

Marks: 15

END OF EXAMINATION