



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (ELECTRICAL ENGINEERING)

BACHELOR OF SCIENCE (MECHANICAL ENGINEERING)

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECU 401: PROJECT MANAGEMENT

DATE: 31/7/2019

TIME: 11.00-1.00 PM

INSTRUCTIONS: Answer questions **ONE** and any other **TWO** questions.

QUESTION ONE

- a) Using the balance quadrant, discuss project management's knowledge areas (10 marks)
- b) With the aid of a sketch, discuss the generic project life cycle (10 marks)
- c) Differentiate between operations management and project management. Hence or otherwise list the key skills that a project manager should be equipped with. (10 marks)

QUESTION TWO

- a) Every project, not just those in the construction industry, goes through a series of identifiable phases, wherein it is 'born', it matures, it carries through to old age and it 'expires'. By use of a graphical figure identify and discuss the six phases of the construction process. (15 marks)
- b) In presenting the contractor's activities on the construction site the responsibilities involve three basic areas: monitoring and control, resource management and documentation and communication. List five most important aspects of monitoring and controlling the work. (5 marks)

QUESTION THREE

- a) An owner is contemplating the design and construction of a high-rise apartment building in your region's capital city. Identify potential appropriate project delivery systems and construction contract options. Which might be preferred? Why? *(to be answered by Civil Engineering students only)* (20 marks)
- b) A utility company is contemplating the design and construction of a high-voltage power transmission line in your region's capital city. Identify potential appropriate project delivery systems and construction contract options. Which might be preferred? Why? *(to be answered by Electrical and Electronic Engineering students only)* (20 marks)
- c) A manufacturing company is contemplating the design and construction of a new product processing line in its factory. Identify potential appropriate project delivery systems and construction contract options. Which might be preferred? Why? *(to be answered by Mechanical Engineering students only)* (20 marks)

QUESTION FOUR

The construction of a sidewalk project consists of the activities given below;

Activity	Duration (working days)	Immediate predecessor(s)	Value (US\$)	Number of labourers
Move-in	2		500	3
Excavate	3	Move-in	1500	2
Grade surface	2	Excavate	800	2
Order and deliver forms	6		900	0
Order and deliver reinforcing	10		2200	0
Pre-fabricate forms	4	Order and deliver forms	2600	4
Install forms	3	Grade surface; prefab- ricate forms	2100	3
Place and compact base	2	Install forms	1100	2
Place reinforcing	1	Place and compact base; order and deliver reinforcing	600	2
Place concrete	1	Place reinforcing	4500	5
Strip forms	3	10 working days after completion of place concrete	1650	2
Cleanup and move-out	2	Strip forms	900	3

Note that there is a lag of 10 working days between the completion of 'place concrete' and the beginning of 'strip forms'.

- Draw an activity-on-node schedule network diagram for this project.
- Calculate the early and late start and finish time and the slack for each activity.
- Identify the critical path. (20 marks)

QUESTION FIVE

- List several potential risks that will be assumed by the sponsor of a build-own-operate-transfer project. Identify those risks on your list that would not fall upon a design-build organization if such a project were transferred to the owner upon completion of construction. (10 marks)
- Distinguish between a time-and-materials contract and a cost-plus contract. (5 marks)
- An owner and its design professional will pre-qualify general contractors for a remote marine docking facility in Lamu Port. What factors should be included in the prequalification criteria? (5 marks)

