

BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE AND ENGINEERING

AEH503

Department of Engineering and Physics
Bachelor of Science (Honours) Degree in Electronic
Engineering

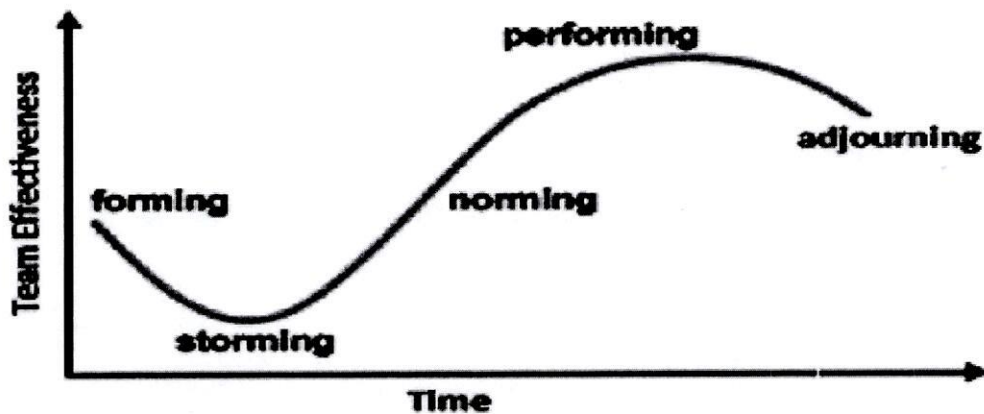
Agricultural Engineering Project Planning and Management

3 HOURS (100 Marks)

INSTRUCTIONS

Answer any **FOUR** questions. Each question carries **25** marks

1. a) Briefly explain, giving reasons the need for a team when undertaking a project. [5]
- b) State five advantages of teams. [5]
- c) Briefly explain the following five stages of team development. [15]



2. Using a table, carry out a comparative overview of projects, programs and portfolios. In the overview consider the following aspects:
 - i) Scope, [5]
 - ii) Change, [5]
 - iii) Planning, [5]
 - iv) Success, and [5]
 - v) Monitoring. [5]

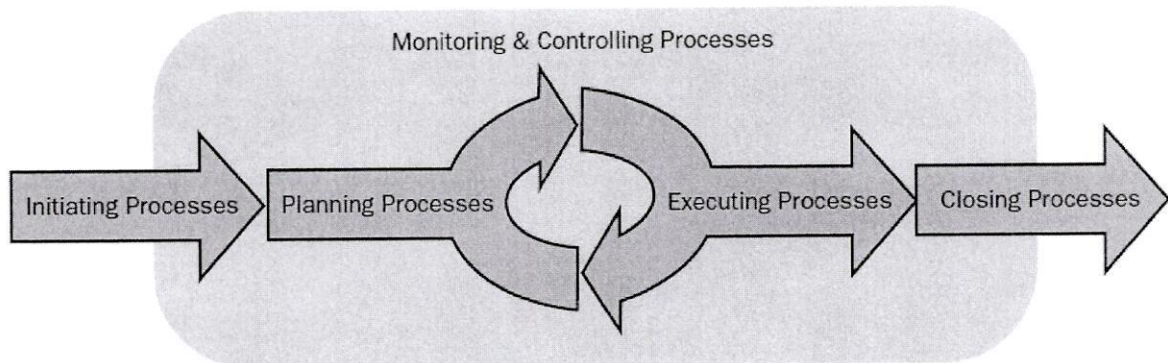
3. a) Briefly explain the following quality costs:
 [In your explanation state two examples of each]
- i) Prevention costs, [5]
 - ii) Appraisal costs, [5]
 - iii) Internal failure, and [5]
 - iv) External costs. [5]
- b) Briefly explain what you understand by ISO 9000. [5]
4. a) Chikuze farm, like most other farms, produces more than one product and would like to know its break-even point (BEP) in dollars. Information for the farm produce is shown in the table below. Fixed costs are \$3,000.00 per month.
 [Consider a 52 weeks at 6 days each]

ITEM	PRICE	COST	ANNUAL FORECASTED SALES UNITS
CABBAGES	\$5.00	\$3.00	9,000
TOMATOES	\$1.50	\$0.50	9,000
BUTTER NUT	\$2.00	\$1.00	7,000

- b) Determine the breakeven point in dollars. [4]
- c) Determine the total daily sales of the farm produce. [3]
- d) Complete the following table. [18]

1	2	3	4	5	6	7	8
<i>Item (i)</i>	<i>Selling Price (P)</i>	<i>Variable Cost (V)</i>	<i>(VIP)</i>	<i>1 - (VIP)</i>	<i>Annual Forecasted Sales (\$)</i>	<i>% of Sales</i>	<i>Weighted Contribution</i>
Cabbages	\$5.00	\$3.00	0.60	0.40	\$45,000	_____	_____
Tomatoes	\$1.50	\$0.50	0.33	_____	_____	0.186	_____
Butter Nut	\$2.00	\$1.00	0.50	_____	\$14,000	_____	_____
TOTAL					\$72,500	1,000	0.469

5. a) Briefly explain what you understand by project life cycle (PLC).
In your explanation include PLC characteristics and phases. [10]
- b) Briefly explain project phases shown in the diagram below. [15]



6. Guzha farm located in the surrounding areas of Bindura has long been delaying the expense of installing air pollution control equipment in its farm. The Environmental Management Agency (EMA) has recently given the farm 16 weeks to install a complex air filter system. The farm has been warned that it may be forced to stop operation unless the device is installed in the allotted time. The farm manager wants to make sure that the installation of the filtering system is progresses smoothly and on time.

Information on the farm for the project:

The farm has identified 8 activities that need to be performed in order for the project to be completed. When the project begins, two activities can be simultaneously started: building the internal components for the device (Activity A) and the modifications necessary for the floor and roof (activity B).

The construction of the collection stack (activity C) when the internal components are completed. Pouring the concrete floor and installation of the frame (activity D) can be started as soon as the internal components are completed and the roof and the floor have been modified.

After the collection stack has been installed, two activities can begin: building the high temperature burner (activity E) and installing the pollution control system (activity F).

The air pollution device can be installed (activity G) after the concrete floor has been poured, the frame has been installed, and the high-temperature burner has been built.

Finally, after the control system and pollution device have been installed, the system can be inspected and tested (activity H).

The durations of the activities are 2, 3, 2, 4, 4, 3, 5, and 2 respectively.

- a) Given the information above, develop a table showing activity precedence relationships. [6]
- b) Draw the activity on node for the farm project. [5]
- c) Determine the critical path for Chinyowa farm project. [5]
- d) Produce a table showing the ES, EF, LS, and LF for each activity. [5]
- e) Determine the slack for each activity. [4]