

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

JUN 2023

1. a) Briefly describe the following terms as used in project management:
 - i) Operations management, and [2]
 - ii) Project management. [2]
- b) State and explain five characteristics of project. [10]
- c) Briefly explain the functions of the following stakeholders in a project:
 - i) Project sponsor, [2]
 - ii) Project customer, [2]
 - iii) Project contractor, [2]
 - iv) Government, and [3]
 - v) Project suppliers. [2]
2. a) Describe the four (4) stages of the project life cycle (PLC). [16]
- b) Briefly describe the elements of PLC. [9]

3. a) Briefly describe the following methods of demand forecasting:
- i) Qualitative method, [5]
 - ii) Consumer Survey method, [5]
 - iii) DELPHI technique, and [6]
 - iv) Exponential smoothing method. [6]
- b) State three types of errors in demand forecasting. [3]

4. A company is considering which of the two projects it should undertake. The finance director thinks that the project with a higher net present value (NPV) should be chosen while the managing director thinks that the one with higher internal rate of return (IRR) should be undertaken especially as both projects have the same initial cash outlay and length of life of \$200 and 5 years respectively. The company anticipates a cost of capital of 10% and the net cash inflows of the projects are as shown in the table below.

Year	Project H (\$)	Project G (\$)
0	-200.00	-200.00
1	35.00	218.00
2	80.00	10.00
3	90.00	10.00
4	75.00	4.00
5	20.00	3.00

- a) Determine the NPV for project H. [6]
- b) Determine the IRR for project H. [5]
- c) Determine the NPV for project G. [6]
- d) Determine the IRR for project G. [5]
- e) Recommend with reasons which project should be undertaken by the two directors. Use IRR method. Given: [3]

$$PV = \sum_{t=0}^t \frac{R_t}{(1+i)^t} \text{ and } IRR = \sqrt[t]{\frac{R_t}{R_0}} - 1$$

5. a) Briefly describe break even analysis (BEA). [3]
- b) State the objective of BEA. [3]
- c) State two assumptions of BEA. [4]
- d) In a single product BEA, Museyamwa Farm Produce (Pvt) Ltd has a fixed cost of \$10,000.00, direct labour of \$1.50 per unit, material cost of \$0.75 per unit and a selling price of \$4.00 per unit as well. Determine:
- i) The minimum dollar volume to break even, and [5]
- ii) The unit volume needed to break even. [5]
- iii) The firm finds out that the fixed costs will increase to \$12,000.00, what will happen to the break-even in units and in dollars? [5]
6. A project has been defined to contain the following activities along with their time estimates for completion.

Activity	Time Estimates (Weeks)			Immediate
	a	m	b	Predecessor
A	1	4	7	-
B	2	6	7	A
C	3	4	6	A, D
D	0	12	14	A
E	3	6	12	D
F	6	8	16	B,C
G	1	5	6	E,F

- a) Calculate the expected time. [3]
- b) Calculate the variance for each activity. [5]
- c) Draw the critical path diagram/network. [4]

- d) Show the ES, EF, LS and the LF times. [4]
- e) Show the critical path of the network. [4]
- f) Calculate the variance and the standard deviation. [5]