



First Semester Examination
2021/2022 Academic Session

February/March 2022

EPM201 – Engineering Economy

Duration : 3 hours

Please check that this examination paper consists of THREE[3] printed pages before you begin the examination.

INSTRUCTIONS : Answer **ALL FOUR[4]** questions.

In the event of any discrepancies, the English version shall be used.

1. An additive manufacturing company recently purchased new 3D printing equipment used for rapid prototyping and modelling industrial parts from CAD models. The equipment cost RM23,750 and has a useful life of 5 years. Each year the equipment will generate in income of RM7,500. The cost incurred to operate the equipment is estimated to be RM1,100 per year. The company's MARR is 9.3%.
- [a] Provide THREE (3) decisions that are usually made for an investment.
(15 marks)
- [b] Calculate the future worth of the equipment cost.
(15 marks)
- [c] Calculate the future worth of the income and costs incurred to operate the equipment.
(30 marks)
- [d] If the equipment is disposed of it is expected to have a salvage value of RM1,300, calculate the net future worth of the equipment.
(30 marks)
- [e] State whether the purchase is a wise investment and your reasoning.
(10 marks)
2. AutoCAM and RoboCAM Projects have initial costs of RM8,250 and RM19,500 respectively. The AutoCAM Project has net annual benefits of RM3,100 for each year throughout its 4 year useful life that can be replaced identically. The RoboCAM Project has net annual benefits of RM4,300 for each year throughout its 8 year useful life. Each project has an interest rate of 11.2%.
- [a] State any THREE (3) common steps for economic decision making process.
(15 marks)
- [b] Sketch the cash flow diagrams for both projects in this case.
(15 marks)
- [c] Calculate the present worth of AutoCAM Project.
(30 marks)
- [d] Calculate the present worth of RoboCAM Project.
(30 marks)
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- [e] Which alternative would you choose? State ONE (1) reason for your choice.
(10 marks)
3. [a] There are many reasons for an asset to be depreciable. Choose TWO (2) reasons and elaborate it with example or situation.
(40 marks)
- [b] A machine has a 5 year life. Its initial cost is RM 30,000 and it has a salvage value of RM 5,000. Its annual operating cost is RM 7,000. Calculate the depreciation charge in Year 3 according to the straight line method.
(30 marks)
- [c] Elaborate THREE (3) reasons to conduct replacement analysis on a defender.
(30 marks)
4. [a] Discuss TWO (2) basic types of alternatives in comparison analysis and state the cash flow condition for each type when selecting the best alternative.
(30 marks)
- [b] Three mutually exclusive alternatives are being evaluated, and their costs and revenues are itemized as in Table Q4. If the MARR is 15% per year and the analysis period is 12 years, use the present worth (PW) method to determine which alternatives are economically acceptable. State the best alternative that should be selected.

Table 4

	I	II	III
Capital Investment	RM 100,000	RM 152,000	RM 184,000
Annual revenues less expenses	RM 15,200	RM 31,900	RM 35,900
Market value (end of useful life)	RM 10,000	0	RM 15,000

(70 marks)

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