



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

COURSE NAME : ENGINEERING ECONOMY
COURSE CODE : BEE 31902
PROGRAMME CODE : BEV
EXAMINATION DATE : JUNE / JULY 2018
DURATION : 2 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

- Q1 (a)** As a new project engineer at DIC Epoxy, you and your team are asked by your superior to evaluate alternatives for producing a newly designed packaging machine. The old packaging machine couldn't meet the standard of efficiency required by a progressive production. DIC Epoxy has RM 80,000 as a budget for the start-up of the new product line from packaging machine. By using *the principles of Engineering Economy*, evaluate on the following information as in **Table Q1(a)**.
- (i) Define the problem. (3 marks)
 - (ii) List alternatives facing by DIC Epoxy. (3 marks)
 - (iii) Evaluate the alternatives by using consistent viewpoints. (3 marks)
 - (iv) Evaluate the alternative by using common unit of measure. (2 marks)
 - (v) Make risk and uncertainty explicit for the alternatives. (3 marks)
- (b)** An exclusive steel door factory has a production capacity of 5000 units per month. Financial records show the fixed cost of production is RM 500,000 per month and the variable cost is RM500 per unit. Doors priced at RM 1,000 per unit. If the plant operates at 90% of full capacity:
- (i) Calculate the profit / loss if all the goods produced can be sold. (3 marks)
 - (ii) Determine the coordinates of the breakeven point. (3 marks)
 - (iii) Calculate the percentage increase in the break-even point if fixed costs declined by 10% while the average variable costs increased by 20%. (3 marks)
 - (iv) Calculate the profit / loss of the company if only 50% can be sold and there is no value to unsold door. (3 marks)
 - (v) Calculate the profit / loss of the company based on question (iv) if the unsold door has a scrap value (salvage value) of RM500 per unit. (3 marks)

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- Q2 (a)** An IBS technology team is developing a weighted index for the price of a ton matrix of Portland cement *in* year 2011, when 2007 is the reference year having an index value of 935 as in **Table Q2(a)**. The weightage placed on *Portland Cement CEM I* is 3, *Portland Composite Cement CEM II* is 2 times, and *Portland Blast Furnace Cement CEM III* is 1 time to its quality compared.

Determine the corresponding 2013 prices of Portland cement from I_{2011} if the index value in 2013 to be 1,131.

(8 marks)

- (b) You are given an alternative to invest RM 250,000 for five (5) years in two schemes, firstly with 7% interest per annum (p.a.) using simple interest, and secondly for 6.5% per annum using compounded interest. Suggest the better investment.

(6 marks)

- (c) Calculate the total returns of your savings after five (5) years if you place the amount of RM 250,000 in a fixed deposit account with 5% interest per annum and added RM 50,000 beginning of the third year which received semi-compounded interest of 4.5% yearly.

(8 marks)

- (d) A committed young engineer is planning to collect RM 100,000 in 5 years from now to pay for his pre-planned honeymoon package. The bank is willing to give him an attractive 6% interest compounded monthly for the deposit. Calculate how much money he needs to deposit now to make his dream comes true. Your answer must also include the cash flow diagram.

(8 marks)

- Q3 (a)** Identify each of the following cash flows whether a benefit, disbenefit, or cost. Justify your answer.

- (i) RM 700,000 per year maintenance by Port Klang authority.

(2 marks)

- (ii) Expenditure of RM 45million for tunnel construction on East-West Highway.

(2 marks)

- (iii) Reduction of RM 375,000 per year in car accident repairs because of improved lighting.

(2 marks)

- (iv) RM 700,000 per year loss of revenue by farmers because of highway right-of-way purchases.

(2 marks)

- (v) RM 500,000 saving in toll gate payment for new federal road.
(2 marks)

- (b) A project is been considered by UTHM to construct a new runaway on the existing runaway at Tanjung Labuh Campus for the use of Aeronautical Course. The land acquisition is estimated to be RM 0.7 Million. Construction cost for the runaway is expected to be RM 1.2 Million with an additional annual maintenance cost of RM 80,000. Finally, the projected increase in flight will require an additional traffic controller with an annual cost of RM 36,000. Annual benefits of the runaway have been estimated as in **Table Q3(b)**. Apply the B-C ratio method for conventional cases using PW and AW methods with the study period of 10 years and a MARR of 12% per year to determine whether the runaway for UTHM should be erected.
(20 marks)

-END OF QUESTIONS-

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Table Q1(a): Alternatives for producing a newly designed packaging machine

<i>Factor</i>		External Modification (Alchem)	PurchaseNew Packaging Machine (Alchem)
<i>Purchased value (RM)</i>	150 000	150 000	370 000
<i>Modification cost (RM)</i>	25 000	45 000	-
<i>Project Punctuality</i>	On Time	On Time	Not sure. Need to pay any lost if late.
<i>Modification meets the full capacity</i>	Can't Guarantee	Guarantee	Guarantee
<i>Advantage</i>	Cheaper cost	Cheaper cost	Environmentally Safe
<i>Disadvantage</i>	Not Environmentally Safe	Not Environmentally Safe	Expensive & No Guarantee on Punctuality

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Table Q2(a): Price of Various Portland Cement

	Price (RM/Ton Matrix) in Year		
	2007	2008	2011
<i>Portland Cement - CEM I</i>	1,020	1,071	1,181
<i>Portland Composite Cement - CEM II</i>	935	982	1,082
<i>Portland Blast Furnace Cement - CEM III</i>	850	893	984

Table Q3(b): Annual Benefit of the UTHM Runaway Project

Rental receipt from local flying club	RM400, 000
Airport charge to passengers	RM50, 000
Convenience benefit to the UTHM community	RM35, 000
Additional tourism RM to UTHM	RM40, 000

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