Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015

COURSE NAME	:	ENGINEERING ECONOMY
COURSE CODE	:	BPK 30902
PROGRAMME	:	1 BFF / 2 BFF / 3 BFF / 4 BFF/ 3 BDD / 4 BDD / 3 BEV / 3 BEJ / 4 BEV
EXAMINATION DATE	:	JUNE 2015/JULY 2015
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 (a) Seven (7) years ago, MEE Company has invested in an equipment costing RM425,000 with allocation of a fixed depreciation value of RM42,500 or 10 % per year. The company is about to replace the old equipment with a brand new fully computerised machinery. The old machinery was sold at RM 25,000 to a BEE company.

Compute the followings:

(i) Cash Cost

(1 mark)

(ii) Book Cost

(1 mark)

(iii) Sunk Cost

(1 mark)

(iv) Opportunity Cost

(1 mark)

(v) Standard Cost

(1 mark)

(b) Your construction firm, U&I Builder was awarded with a job to carry out road surfacing of a new Ledang-Segamat Highway. **Table Q1(b)** shows the costs involved if you set up your asphalt-mixing plant equipment at the site. Estimated cost will be RM4.50 per cubic metre (m^3) to haul the asphalt-paving material from the mixing plant to the job location.

Table Q1(b): Set Up Cost of Asphalt-Mixing Plant Equipment

Cost factor	**Parameter**
Average hauling distance	6 km
Monthly rental of site	RM5,000
Cost to set up and remove equipment	RM34,000
Hauling expense	RM4.50/m^3
Flag person	RM100/day
Authority permit	RM500
Monthly administration staff salaries	RM900.00

The job requires 200,000 cubic meters (m^3) of asphalt-paving material for every kilometre. Your company are given 28 weeks (6 working days per week).

Compute the total fixed costs and variable costs respectively for the project.

(10 marks)

(c) Cost for a 1200-KW boiler set was RM 125,000 15 years ago while the cost index for this generator was 201 and is now 623 with 0.90 cost capacity factor. Your company is considering a 3000-KW and 3600-KW unit of the same general design to power plant machineries. All the models required an additional component, which currently costs RM 80,000 each.

(i) Compute the total cost of the 3000-KW unit and 3600-KW unit.
(8 marks)

(ii) Suggest the best alternative if given limited budget of RM 1 million only.
(2 marks)

Q2

An automotive manufacturing company is planning to introduce a new car in the market. The best competitor sells a similar product at RM50,000 per unit. The relevant manufacturing costs estimated include direct labor cost of RM1,500 per hour, factory overhead of 120% of direct labor, materials cost of RM30,000 per unit and miscellaneous costs of 20% of direct labor. It has been found that a 90% learning curve applies to the labor required. The time to complete the first unit has been estimated to be 6 hours. The company decides to use the time required to complete the 20th unit as a standard for cost estimation purposes.

(a) Calculate:

(i) The time to assemble the 20th car.
(4 marks)

(iii) The total time required to assemble the first 20 cars.
(4 marks)

(iv) The cumulative average assembly time for the first 20 cars.
(4 marks)

(v) The total cost per unit.
(4 marks)

(b) Determine the sale price per unit if the company desires a profit margin of 25%.
(4 marks)

(c) Determine the maximum profit margin that the company can have to remain competitive.
(5 marks)

Q3 You are 30 years old today and are planning your retirement needs. You expect to retire at the age of 60 and your actuarial tables suggest that you will live to be 100. You want to move to Langkawi Island when you retire. You estimate that it will cost you RM400,000 to make the move (on your 60th birthday) and that your living expenses starting at the end of year 61 and continuing through the end of year 100 will be RM40,000 a year after that. For these needs, you plan to make an investment in a unit trust scheme. The unit trust rate of return is 12% compounded monthly.

(a) Draw the cash flow diagram that represents the retirement plan.

(6 marks)

(b) Calculate the effective interest rate per year.

(4 marks)

(c) Determine the money you need to have saved on your retirement date (on your 60th birthday) to be able to afford this course of action.

(5 marks)

(d) Determine the money would you need to save each year for the next 30 years to be able to afford this retirement plan if you now already have RM50,000 in a unit trust scheme.

(5 Marks)

(e) Assume that you did not have any current savings and do not expect to be able to start saving money for the next 5 years.

Determine the money would you have to set aside each year after that to be able to afford this retirement plan.

(5 marks)

Q4 (a) The government is planning a multi-purpose hydroelectric project for a river basin. The estimated benefits and costs that are expected to be derived from the three alternatives under consideration are shown in **Table Q4(a)**. The interest rate is 7.81% and the life span of each project is 37 years.

Table Q4(a): Estimated benefits and costs for a multi-purpose hydroelectric project

Initial Cost	A	B	C
Annual benefits and costs	RM35,000,000	RM45,000,000	RM55,000,000
Power sales	RM1,900,000	RM1,550,000	RM2,100,000
Flood control saving	RM230,000	RM305,000	RM505,000
Irrigation benefits	RM8,100,000	RM550,000	RM700,000
Recreation benefits	RM525,100	RM150,100	RM350,100
Operation and maintenance costs	RM222,000	RM232,000	RM352000

(i) Evaluate each project using the benefit - cost analysis.

(9 marks)

(ii) Choose project according to benefit – cost analysis evaluation.

(2 marks)

(iii) Rank project in the order of best to worst.

(3 marks)

(iv) Assume each project involved intangible benefits that required considerable judgment in assigning their values.

Recommend which project should be chosen.

(2 marks)

(b) A firm is trying to decide which of two devices to install to reduce costs in a particular situation. Both devices cost RM1000 and have useful lives of 5 years and no salvage value. Device A can be expected to result in RM300 savings annually. Device B will provide cost savings of RM400 the first year, but savings will decline by RM50 annually, making the second-year savings RM350, the third-year savings RM300, and so forth. Assume the interest rate is 7%.

(i) Evaluate each device proposal and recommend the device that should be chosen.

(5 marks)

(ii) Explain your recommendation in **Q4(b)(i).**

(4 marks)

-END OF QUESTIONS-