| Menoufiya University<br>Faculty of Engineering<br>Shebin El-Kom<br>Second Semester Exam<br>Academic Year: ٢٠١٤-٢٠١٥ | Minufiya University | Department: Architectural Eng.<br>Year: Graduation – ٤ th year<br>Subject/Code: Project Management<br>ARC ٤٢٤<br>Time Allowed: ٣ hours<br>Date: ٢٣/٥/٢٠١٥ |
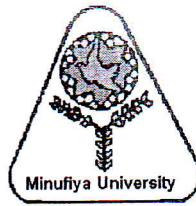
**Allowed Tables and Charts:** *(None)*
This exam measures ILOS no. :( a١, a١٢, b٧, c٤, d٣)

**Total Mark** [٨٠ Marks]

**Answer all the following Questions** *Marks*

*Question (١)* [٢٠]

    a. What does the Concept of Engineering Economics mean? And what is The Economic Efficiency?

    b. Explain The Law Of Supply & Demand and The Factors Influencing Supply.

    c. List the Elements Of Cost and explain the difference.

    d. Analysis and Draw the Break-Even Analysis?

*Question (٢)* [١٠]

The chief engineer of refinery operations is not satisfied with the preliminary design for storage tanks to be used as part of a plant expansion programme. The engineer who submitted the design was called in and asked to reconsider the overall dimensions in the light of an article in the Chemical Engineer, entitled "How to size future process vessels?" The original design submitted called for ٤ tanks ٥.٢ m in diameter and ٧ m in height. From a graph of the article, the engineer found that the present ratio of height to diameter of ١.٣٥ is ١١١% of the minimum cost and that the minimum cost for a tank was when the ratio of height to diameter was ٤ : ١. The cost for the tank design as originally submitted was estimated to be Rs. ٩,٠٠,٠٠٠. What are the optimum tank dimensions if the volume remains the same as for the original design? What total savings may be expected through the redesign?

*Question (٣)* [١٥]

The activities of a project have the following durations (in weeks), dependencies and resources operatives:

١) Draw the network.
٢) Calculate all the total floats
٣) Calculate all the free floats
٤) Mark the critical path on the diagram
٥) Draw the bar chart from the network
٦) Draw the histogram for the resources

| Activity | Duration (Week) | Dependency | Resources (Operation /Week) |
|---|---|---|---|
| A | 2 | - | 3 |
| B | 4 | A | 6 |
| C | 6 | B | 4 |
| D | 3 | A | 2 |
| E | 7 | B&D | 8 |
| F | 5 | C | 5 |
| G | 2 | F | 4 |
| H | 1 | C&E | 6 |
| J | 4 | E | 8 |
| K | 6 | H | 3 |
| L | 3 | J | 2 |
| M | 2 | K&L | 4 |
| N | 4 | G&K | 5 |
| O | 2 | N&M | 6 |
| P | 2 | O | 2 |

١- A granite company is planning to buy a fully automated granite cutting machine. If it is purchased under down payment, the cost of the machine is Rs. ١٦,٠٠,٠٠٠. If it is purchased under installment basis, the company has to pay ٢٥% of the cost at the time of purchase and the remaining amount in ١٠ annual equal installments of Rs. ٢,٠٠,٠٠٠ each. Suggest the best alternative for the company using the present worth basis at i = ١٨%, compounded annually.

٢- A company must decide whether to buy machine A or machine B:

|  | Machine A | Machine B |
|---|---|---|
| Initial cost | Rs. 4,00,000 | Rs. 8,00,000 |
| Useful life, in years | 4 | 4 |
| Salvage value at the end of machine life | Rs. 2,00,000 | Rs. 5,50,000 |
| Annual maintenance cost | Rs. 40,000 | 0 |

At ١٢% interest rate, which machine should be selected? (Use future worth method of comparison).

٣- A company is planning to expand its present business activity. It has two alternatives for the expansion programme and the corresponding cash flows are tabulated below. Each alternative has a life of five years and a negligible salvage value. The minimum attractive rate of return for the company is ١٢%. Suggest the best alternative to the company.

|  | Initial investment (Rs.) | Yearly revenue (Rs.) |
|---|---|---|
| Alternative 1 | 5,00,000 | 1,70,000 |
| Alternative 2 | 8,00,000 | 2,70,000 |

A company wants to buy a production device for their new factory. They have two alternatives, whose cash flows are given in the following table. According to these cash flows, determine the no return payback period of these alternatives

|  | Alternative A | Alternative B |
|---|---|---|
| Cost | 3 000 000 SR | 3 500 000 SR |
| Annual income | 1 200 000 SR first year, decreasing by 300.000 SR per year thereafter | 100 000 SR for the first year, increasing 300 000 SR per year thereafter. |
| Useful life | 4 years | 8 years |

With best wishes,,
Dr Ibrahim sedky Ibrahim.  Prof.Dr Ahmed El Kholie
Prof.Dr. Mahmoud Ami     Dr.Mohamed Ibrahim