LEBANESE INTERNATIONAL UNIVERSITY

***School of Engineering***
**Department of Industrial Engineering**

**Semester: Spring 2016**

**IENG300 – Engineering Project Management Midterm**

**Instructors:** Mrs. O. Saleh, Mr. B. Abdallah, Mr. T. Abdul-Rida, Mrs. Manal Dimachk, Dr. Faysal Yatim, Dr. Ahmad Kassas and Dr. B. Hussein.

**Date:** Tuesday, April l2th, 2016 **Time:** 17:00 – 18:15 (75 minutes)

**Student Name:** _____ **Student ID:** _____ **Section:** ____

There are **5 questions** in the booklet; each has several parts. Please answer all parts of the questions to the best of your ability.

**Marking Scheme**

| Questions | Weight | Mark |
|---|---|---|
| **Question 1** | **10 points** | |
| **Question 2** | **30 points** | |
| **Question 3** | **15 points** | |
| **Question 4** | **25 points** | |
| **Question 5** | **20 points** | |
| **Total** | **100 points** | |

1. **This booklet contains 10 pages including this one. Make sure all these pages are attached.**
2. **Closed book examination. Formulas are provided as needed.**
3. **Do not take the staple out. The exam booklet must remain intact.**
4. **Cheating penalty will be an "F" grade on the exam.**
5. **Non-programmable calculators are allowed.**
6. **Mobile phones/devices are to be turned off and stowed away.**
7. **Students must sign out prior to leaving the exam room.**

**Good luck**

**Question 1 (10 points):**

**In the table below, mark the following statements as either TRUE (T) or FALSE (F). If you change your answer, scratch previous one and clearly re-write the new one. Questions with a confusing answer will automatically get a zero mark. Wrong answers do not penalize correct ones. The weight for each question is 1 point.**

1. NASA is building a new space shuttle and it expects the initiative to be completed by the year 2030. The initiative may be qualified as a project.

2. The pay back financial method would be considered sufficient to evaluate a fixed price contractual project with the government to build a new airport.

3. The strategy of an organization is typically implemented through a mission statement.

4. The three forms of matrix project management structure are weak, balanced and strong.

5. Considering this course as a project, completing the midterm of this course would be considered as a major milestone.

6. It is highly recommended that all the estimations of the different activities for a project are done solely by an experienced project manager.

7. An important stakeholder of any project would be the project manager.

8. The success criteria of a project may be assessed in terms of scope, budget and schedule.

9. A project network is a tool that is used in the defining phase of the project life cycle (PLC).

10. When a risk materializes, the project will be subject to change and a formal change management process will need to be used to handle such changes.

| **Question** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Answer** | | | | | | | | | | |

**Question 2 (30 points)**

**Choose the correct answer. Only one answer may be marked. Questions with more than one answer will automatically get a zero mark. Wrong answers do not penalize correct ones. The weight for each question is 2 points.**

1. From among the following activities, which is the best example of a project?
    a. Processing insurance claims.
    b. Producing automobiles.
    c. Getting married.
    d. Doing school homework.

2. In which of the following stages is a major portion of the physical and mental project work performed?
    a. Conceptualizing.
    b. Defining.
    c. Planning.
    d. Executing.

3. A series of coordinated, related, multiple projects that continue over extended time intended to achieve a common goal is known as:
    a. Strategy.
    b. Program.
    c. Campaign.
    d. Venture.

4. Which of the following is not one of the requirements for successful implementation of strategies through projects?
    a. Luck.
    b. Prioritizing of projects.
    c. Motivation of project contributors.
    d. Adequate planning and control systems.

5. Project selection criteria are typically classified as:
    a. Required and optional.
    b. Short-term and long-term.
    c. Financial and non-financial.
    d. Micro and macro.

6. Organizational culture may be best described as organizational:
    a. Hierarchy.
    b. Background.
    c. Personality.
    d. Management style.

7. The structure that manages projects within the existing organizational structure is:
    a. Functional.
    b. Projectized.
    c. Strong matrix.
    d. Ordinary.

8. A project team that operates with a full-time project manager as a separate unit from the rest of the organization is structured as:
    a. Functional.
    b. Projectized.
    c. Strong matrix.
    d. Ordinary.

9. The project manager has the responsibility to answer:
    a. Who will do the task?
    b. How will the task be done?
    c. How well has the functional input been integrated?
    d. What task has to be done?

10. Maya is looking at a document that outlines the specific tasks and subtasks required to complete the writing of a technical support manual. The method that was probably used to develop the document is most likely:
    a. Responsibility matrix.
    b. Organization breakdown structure (OBS).
    c. Work breakdown structure (WBS).
    d. Priority matrix.

11. In practice, estimating processes are frequently classified as:
    a. Top down/bottom up.
    b. Primary/developed.
    c. Precise/order of magnitude.
    d. Draft/final.

12. Adam has just been assigned a project to develop a new advertising campaign for an established product. His first step should be to:
    a. Define the project scope.
    b. Verify the budget available.
    c. Assign team members to work on the project.
    d. Determine the required completion date.

13. Which of the following is a good condition for bottom-up estimating?
    a. Strategic decision making.
    b. Internal, small project.
    a. Fixed price contract.
    b. High uncertainty.

14. The amount of time an activity can be delayed and yet not delay the project is termed:
    a. Slack.
    b. Critical float.
    c. Float pad.
    d. Lag.

15. The attempt to recognize and manage potential and unforeseen trouble spots that may occur when a project is implemented is known as:
    a. Risk forecasting.
    b. Risk management.
    c. Contingency planning.
    d. Disaster protection.

**Question 3 (15 points):**

Cortas® Company, one of the oldest food industries in Lebanon, has decided to invest in beverages production. As the head of the selection team in this company, you have to choose which new project should be funded between the two proposed projects (Soda beverage project or the Juice beverage project). Your analysts predict that inflation rate in Lebanon will be a stable 8% over the next 5 years. Required rate of return (RoR) is 20%.

Given the following information for each project:

**Project 1: Juice Beverage**

| Year | Inflow | Outflow |
|---|---|---|
| Y0 | 0 | $150,000 |
| Y1 | $250,000 | $50,000 |
| Y2 | $270,000 | $125,000 |
| Y3 | $300,000 | $75,000 |
| Y4 | $330,000 | $60,000 |
| Y5 | $350,000 | $60,000 |
| **Total** | **$1,500,000** | **$520,000** |

**Project 2: Soda Beverage**

| Year | Inflow | Outflow |
|---|---|---|
| Y0 | 0 | $300,000 |
| Y1 | $350,000 | $60,000 |
| Y2 | $350,000 | $75,000 |
| Y3 | $450,000 | $50,000 |
| Y4 | $450,000 | $40,000 |
| Y5 | $450,000 | $55,000 |
| **Total** | **$2,050,000** | **$580,000** |

**Question 3 Solution**

a. Taking the time value of money into consideration, which project would you fund if the decision is based only on financial information? **(10 points)**

b. Assuming that upper management has allocated a maximum budget of $200,000 for this initiative, which project would you choose? Why? **(5 points)**

**Question 4 (25 points):**

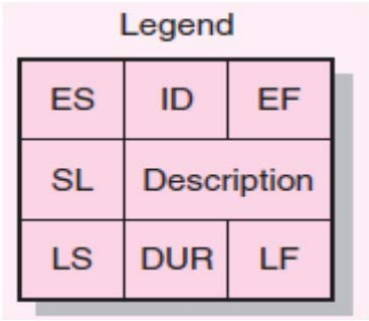
The project office (**PO**) of your company is asking you to:

a. Draw the Activity on Node (AoN) network. **(5 points)**
b. Calculate the early start (ES), early finish (EF), late start (LS), late finish (LF) and slack (SL). **(10 points)**
c. Identify the critical path (CP). **(3 points)**
d. How soon can the project be finished? **(2 points)**
e. When the critical path is known, explain what does it mean to the project manager? **(5 points)**

The activities time estimates and their dependencies are summarized in the following table:

| ID | Description | Predecessor | Duration |
|---|---|---|---|
| **1** | Define requirements | None | 2 |
| **2** | Team composition | 1 | 1 |
| **3** | Code software | 2 | 4 |
| **4** | Build and test hardware | 1 | 10 |
| **5** | Develop prototype | 1 | 28 |
| **6** | Test software | 3 | 8 |
| **7** | Deploy the system | 4, 5, 6 | 5 |

Use the following legend to represent the node:




**Question 4 Solution**

a. Draw the Activity on Node (AoN) network. **(5 points)**
b. Calculate the early start (ES), early finish (EF), late start (LS), late finish (LF) and slack. **(10 points)**

c. Identify the critical path (CP). **(3 points)**

d. How soon can the project be finished? **(2 points)**

e. When the critical path is known, explain what does it mean to the project manager? **(5 points)**

**Question 5 (20 points)**

# Kleensu Waste Management Company:

Lebanon has been recently suffering from the mis-management of solid waste (Garbage). Many attempts have been made to solve this problem without real success.

The government asks interested companies to submit proposals for potential solutions. You work for a local waste management company, Kleensu Company, as a project manager. Kleensu assigns you to lead this project and submit the proposal.

Based on the presented facts, address the questions in the solution section.

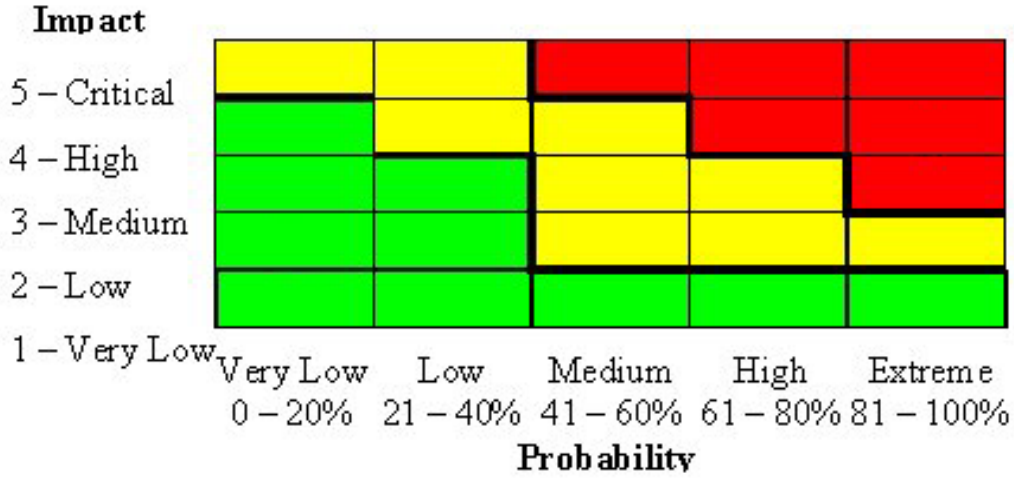
**Question 5 Solution**

a. What is the first step that you would do in order to kick start this project? Explain what is involved in this step? **(5 points)**

b. Identify three risk events that might impact the scope, cost, time, or quality of this project. **(5 points)**

| | |
|---|---|
| **Risk 1** | |
| **Risk 2** | |
| **Risk 3** | |

c. Using the provided Risk Severity Matrix below, place each identified risk in its appropriate location. **(5 points)**




d. Develop a WBS for this project (4 levels only). **(5 points)**

# FORMULAS

**The Payback Formula**:

Payback period (yrs) = Estimated Project Cost/Annual Savings

**The Net Present Value (NPV) Formula**:

$$\text{Project NPV} = I_0 + \sum_{t=1}^{n} \frac{F_t}{(1+k)^t} \quad \text{where}$$

$I_0$ = Initial investment (since it is an outflow, the number will be negative)
$F_t$ = Net cash inflow for period $t$
$k$ = Required rate of return

**AoN Calculations Formulas**:

- **Forward Pass Computations:**
  - EF = ES + Duration
    Where EF is Early Finish & ES is Early Start
- **Slack Computations:**
  - LS = LF – Duration
    Where LS is Late Start & LF is Late Finish
- **Backward Pass Computations:**
  - SL = LS – ES
  - SL = LF – EF
    Where SL is Slack