Kafrelsheikh University
Faculty of Engineering
Civil Engineering Department
3 th year, construction & project management
Dr rania fayed

Data: 30 / 5/ 2018
Time Allowed: 3 hr
Full mark: 85
Second term Exam: 2 pages
Course Code: HUM3219

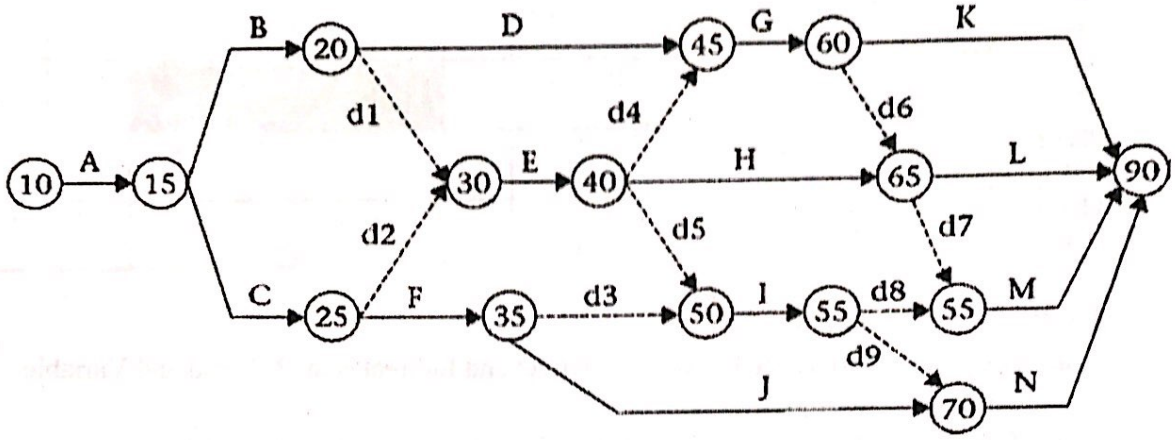
NOTE: 1- Exam is (1) paper (2) pages, 2- Assume any missing information 3- All calculations and graphs should be very clear.

This exam measures the following ILOS: a-7, a-9, a-11, a-15, b-9, b-7, b-16, c-1, c-6, c-8, c-11, d-2, d-6, d-8

Question 1: (30 mark)

a. What are the types of networks and their relationships? List two (2) main differences between the types of networks.

b. Convert the following arrow network into a node network



c. If the daily production rate for a crew that works in an activity is 175 units/day and the total crew cost per day is LE 1800. The material needed for daily work is 4.5 units at LE 100/unit.
   1. Calculate the time and cost it takes the crew to finish 1400 units.
   2. Calculate the total unit cost.

Question 2: (30 mark)

a. What are the different types of resources in a construction project? Give examples.

b. The table below shows the activities of a construction project, their dependencies, estimated durations and number of trucks needed. Develop the following items.

1. Develop Project plan using the Bar Chart.
2. Draw the distribution histogram and S-curve for early dates.
3. Calculate the efficiency of trucks if you know that 8 trucks are available throughout the project period.

Activity Code	Predecessors	Duration (weeks)	Trucks/ Week
A	-	4	2
B	A	6	2
C	A	4	3
D	C	7	4
E	D	5	2
F	C	5	1
G	E	4	1

c. The following table represents the different phases of a development project and the trucks needed per Week distributed throughout the project duration. Each phase needs 3 reinforcement crews per week and there is no problem to have any number of crews

in the project. Manually level your resources so that you may not use more than twenty trucks per week.

i) What is the new total project duration?
ii) Draw a bar chart with the new times.

Note that gray boxes represent total float for each phase.

Weeks

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Phase (A)	6	6	6	9	9									
Phase (B)	10	10	10	15	15	15	15							
Phase (C)						10	10	10						
Phase (D)								5	5	5	10	10		
Phase (E)													20	15

Question 3: (25 mark)

a. Discuss the difference between: 1) Direct and Indirect cost, 2) Fixed and Variable Cost? Give examples.

b. The table below shows the activities of a construction project, their dependencies, estimated durations and cost and amount of cement required for each activity per month. Develop the following items:

1. Draw activity on arrow with minimum number of dummy activities.
2. Draw activity on node.
3. Draw Precedence Diagram (Show: Early dates, late dates, total float and highlight critical path).
4. Draw bar chart (Show: Early dates, late dates, total float and highlight critical path).
5. Draw Cement histogram and S-Curve for early and late dates.
6. Draw: Cash out, Cash in and net cash flow for project. calculate the maximum amount of cash the contractor needs and when dose him/her requires this amount.

Activity	Predecessor	Duration (Month)	Cost (L.E)	Cement (ton) / Month
A	-	2	1,000	2
B	A	2	1,500	4
C	A	2	1,300	3
D	A	2	2,500	4
E	B	1	1,100	3
F	B, D	2	1,000	4
G	F	4	1,500	2

Project Data:
All relations are finish to start lag 0.
Indirect cost = 1,100 L.E / Month
Profit = 10 %
Advanced Payment = 15 %
Retention = 10%, 5% will be paid back with the last payment and the other 5% will be paid back after one year.
Payment Process cycle is 2 months.

Best wishes,
Dr. Rania Fayed