An-Najah National University

Civil Engineering Department

Faculty of Engineering

Key

Construction Engineering & Management

Second Exam

Second Semester 2009-2010 date: 13/4/2010

Name: ---------- Student ID: ----------

Q1) Answer the following Sentences with True or False: (7 points)

1. --T---In Precedence diagram there will be one link in the network to denote each dependency between an activity and one of its immediately preceding activities.
2. --T---The normal convention in the use of precedence techniques is that an activity can be started after all links drawn to its left side have been traversed.
3. --F---Lag is the same as lead time or delay assigned to link.
4. --T---In Precedence diagram the traversing of a link does not require any time, but shows the dependency between activities.
5. --T---In Precedence diagram it is possible to assign a time to a link to indicate that the following activity can not be started until this specified amount of time after the preceding activity has passed, and this time is referred to as lead time.
6. --F-----Events consume time and they exist at a point in time.
7. --T---The use of sequence steps in laying out a precedence diagram assures orderly and structured presentation of the schedule logic.
8. --T---lag indicates the difference between the early finish of the activity preceding the link and the early start of the activity following the link.
9. --F---The independent float of one activity is available for use by any other activity.
10. --T---An activity can have independent float only if it has free float.
11. --T---Resource leveling is an attempt to eliminate the manpower peaks and valleys by smoothing out the period-to-period resource requirements.
12. --F---Resource Leveling applied to all types of projects and is dependent on the type of network being used.
13. --F---The lowest priority in resource allocation is given to the activity with highest number of days from the late start date to the project completion.
14. --T---From the quantities that have been estimated it is possible to determine the anticipated duration for each of the work items.

Q2) complete the following sentences:

1. Resource aggregation diagram is important to contractor due to: (1 point)
   a. ---To know the amount of needed resources to carry out the Job.
   b. ---The availability of resources,

   Show the fluctuation in the resource demand and enables the scheduler to obtain even resource demand.

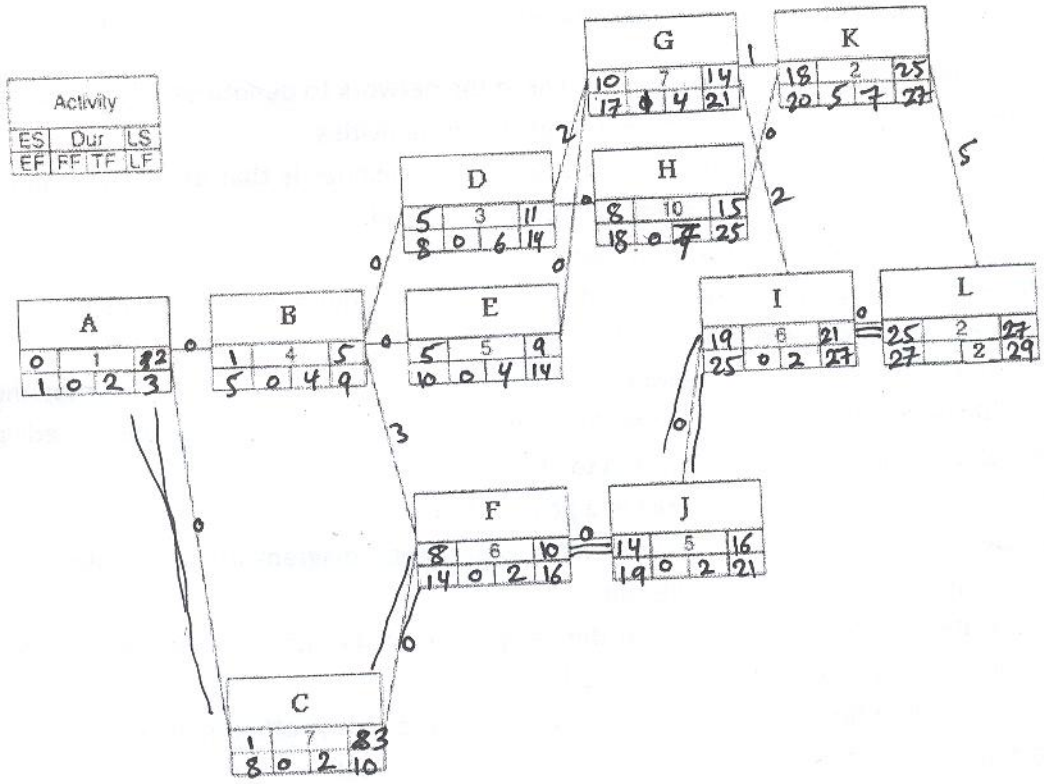
(1.5 points)

2. Construction Activities are:
   a. Production
   b. Procurement
   c. Management

(1.5 points)

3. The different solutions to apply resource leveling for networks are:
   a. All Normal
   b. Least Cost
   c. Least Time
   All Crash

Q3) the following figure represents the activities for a small project to be constructed:



a. The path that is considered more critical passes through A, C, F, J, I, L (1 point)

b. The Total duration of the project is 29 , 27 (1 point)

c. The EFD, LSD, and INTF for the following activity : (6 points)

Activity	EFD	LSD	INTF
B	5	5	4
H	18	15	7
J	19	16	2
G	17	14	3

Q4) The following table represents activity for small project:

Activity	IPAs	Duration	Sequence step
A	---	5	0 1
B	A	10	1 2
C	B,A	8	2 3
D	G,H,B,A	3	4 5
E	---	4	0 1
F	E	5	1 2
G	C,F,E,B,A	1	3 4
H	---	3	0 1

a. Remove the redundant dependency (1 point)
b. Find the sequence step for each activity. (1 point)
c. The total duration of the project is ------27------. (1 point)

Q5) The following activities represent a small project to be constructed: (4 points)

Act No.	Depends Upon	Normal Time	Crash time	Crash cost	Normal Cost
A	-	7	3	3600	3000
B	A	8	7	2000	1700
C	A	10	6	2400	2200
D	A	5	2	3000	2400
E	B,C,D,A	7	3	2500	1900
F	C,D,A	5	4	1000	800
G	E,F,A,B,C,D	3	1	900	500

a. The duration that 1 can ~~can't~~ decrease so that the cost of crashing does not exceed 400 $ is ------4------
b. The cost of decreasing the project duration by six days is ---700----------
c. The minimum duration of the project is ---15---------
d. The Total cost of the project at minimum duration is ------14600------

Q6) The following activities represent a small project to be constructed: (4 points)

Act No.	Activity Name	Depends Upon	T	Total Cost
5	A	-	3	12000
10	B	5	6	6000
15	C	5	4	1500
20	D	5	8	10000
25	E	10, 15, 20,8	5	1400
30	F	15,20,8	8	800
35	G	25, 30,10,15,20	2	300

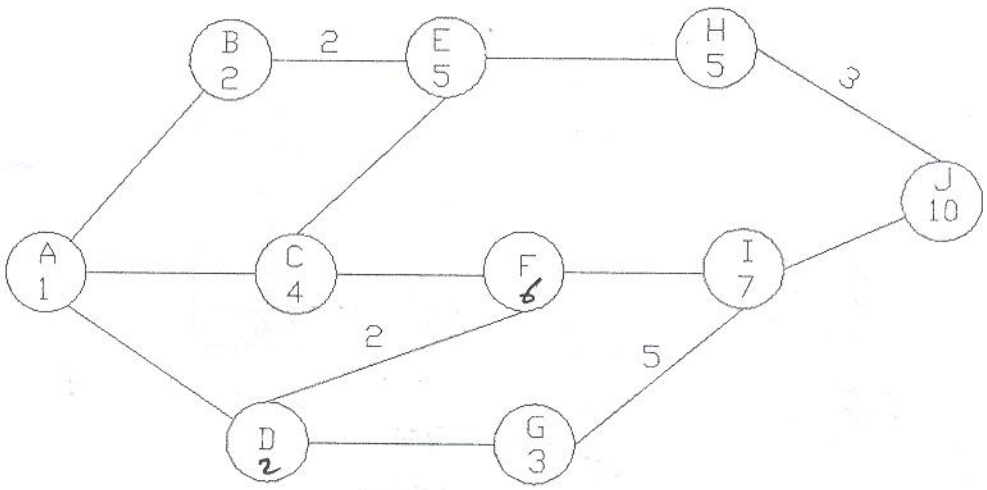
a. The total cost of the project in day 8 is 24750 & in day 18 is ---31600------
b. The total duration of the Project is --------21------and the total cost of the project is --32,000---

Q7) the following activities represent a small project to be constructed (2 points)

Activity	IPAs	Duration	Resources/day
A	---	5	3
B	A	2	1
C	A	2	1
D	A	2	1
E	A	11	2
F	A	2	2
G	A	4	2
H	A,B,C,D,E,F,G	3	3

a. The optimal resources per day needed is ---------4----------
b. If the cost of resource per day is 20 JD/day the cost of the project from resources is ---1520---

Q8) The following activities represent a small project to be constructed: (5 points)

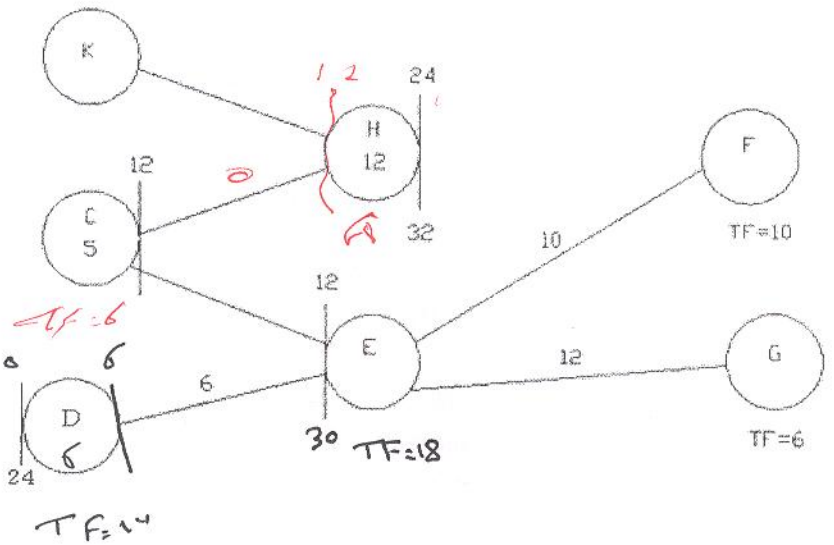


a. The critical path passes through ----A → C, F, I, J----
b. The total duration of project is ---------28----------
c. The duration of activity D is ---------2----------
d. The LSD of activity F is ----------5----------
e. The TF for activity G is ---------5----------

Q9) The following Figure represent an activity that removed from Precedence diagram. (3 points)
compute the following:

LSD for activity E ----------30------- LSD for activity C ---------~~8~~ 15

Duration for activity D --------6--------



8 = LFD - EFD

= LS

LFD = 18 − 5

= 13

TF = 8 TF = LFD − EFD

8 = LFD − 12

LFD = 20

LFD = 15