Model Answer First Mid-term Exam

GE 402 Management of Engineering Projects – 1st Semester 1431- 32H

Sunday, 1 DHU AL-HIJJAH 1431 H – 7 November 2010
Time allowed: 1.5 hrs

Student name	
Student number	
Section	
Student No. in class	

Total number of Questions: 3
Attempt all questions

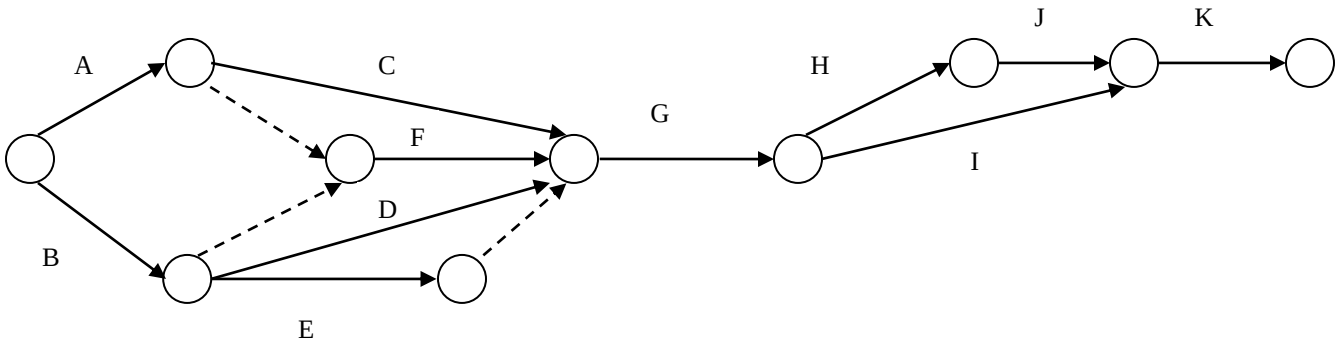
Questions	Maximum Marks	Marks obtained
Q # 1	36	
Q # 2	28	
Q # 3	36	
	Total marks	_____ 100

Total marks obtained (in words):_____

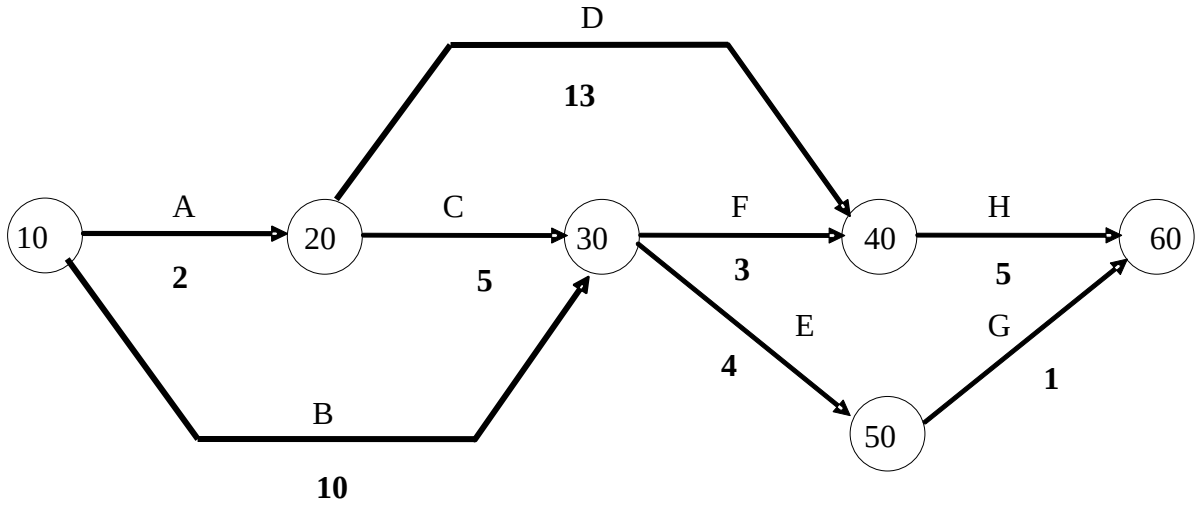
Question No. 1 (36% of max. credit)

a) For the following small engineering project, draw the AOA diagram (12% of max. credit).

Activity	A	B	C	D	E	F	G	H	I	J	K
Depends on	None	None	A	B	B	A, B	C, D, E, F	G	G	H	J, I



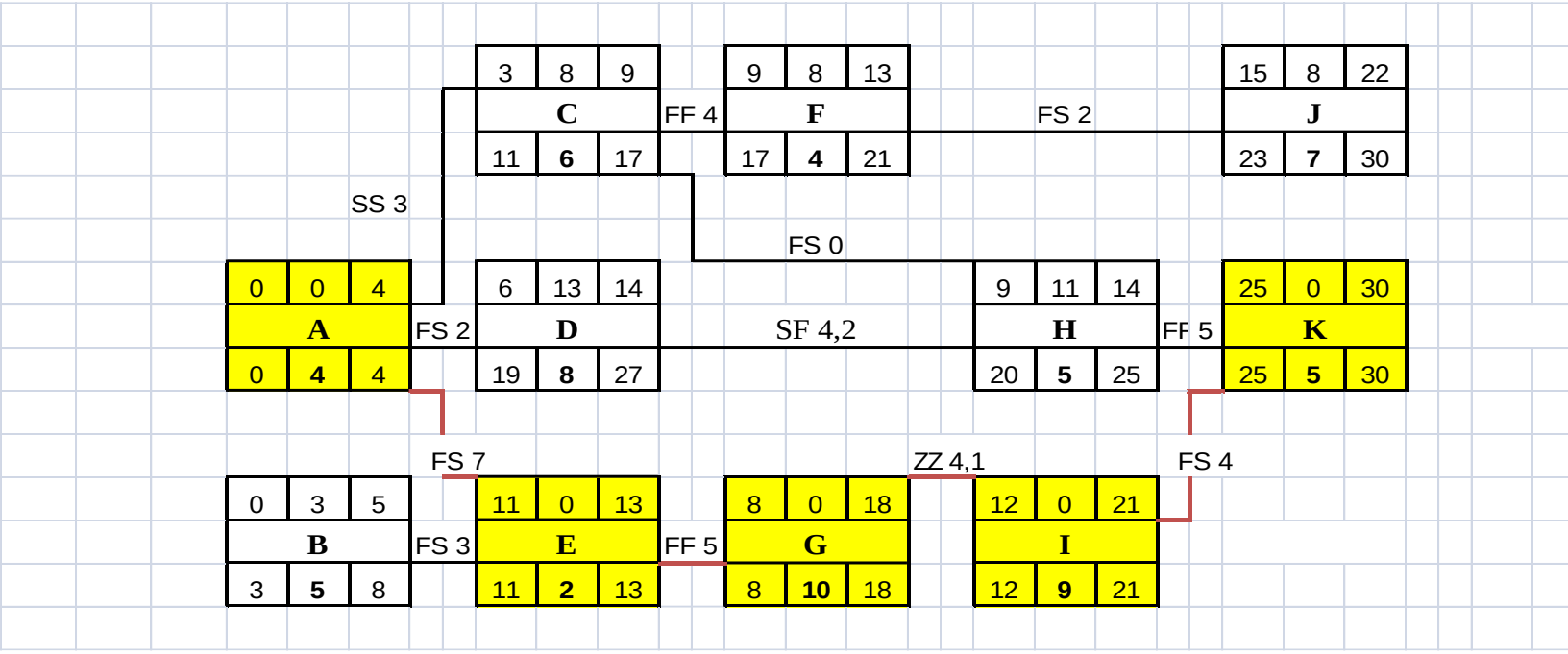
b) The following AOA diagram represents the activities and activities' durations (in days) of a small engineering project. It is required to complete the below table (24% of max. credit).



Activity	Early start	Early finish	Late start	Late finish	Total float	Free float
A	0	2	0	2	0	0
B	0	10	2	12	2	0
C	2	7	7	12	5	3
D	2	15	2	15	0	0
E	10	14	15	19	5	0
F	10	13	12	15	2	2
G	14	15	19	20	5	5
H	15	20	15	20	0	0

Question No. 2 (28% of max. credit)

The precedence network shown below represents the activities of a small engineering project. The activity durations are in working days. It is required to compute the activity times (ES, EF, LS, and LF) and total floats (TF) and then indicate the critical activities.



$$[1]\ ES_j = \underset{\text{all } i}{\text{MAX}} \left\{ \begin{array}{l} \text{Initial Time} \\ EF_i + FS_{ij} \\ ES_i + SS_{ij} \\ EF_i + FF_{ij} - D_j \\ ES_i + SF_{ij} - D_j \end{array} \right\}$$

$$[2]\ EF_j = ES_j + D_j$$

$$[3]\ LF_i = \underset{\text{all } j}{\text{MIN}} \left\{ \begin{array}{l} \text{Terminal Time} \\ LS_j - FS_{ij} \\ LF_j - FF_{ij} \\ LS_j - SS_{ij} + D_i \\ LF_j - SF_{ij} + D_i \end{array} \right\}$$

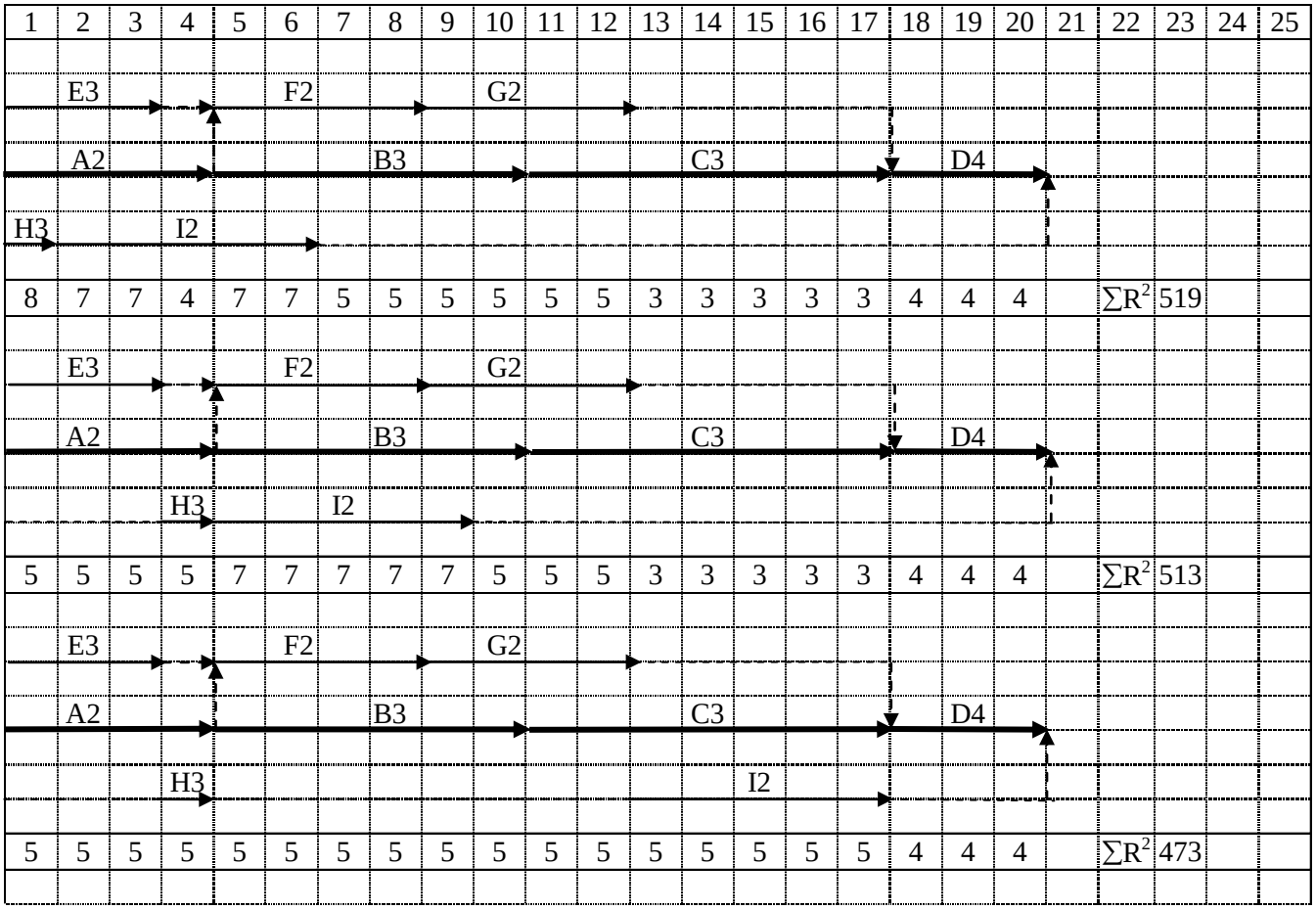
$$[4]\ LS_i = LF_i - D_i$$

Question No. 3 (36% of max. credit)

For a small Engineering project listed below, it is required to do the following:

Act.	Depends on	Time	Resource Work./day	Act.	Depends on	Time	Resource Work./day	Act.	Depends on	Time	Resource Work./day
A	None	4	2	D	C, G	3	4	G	F	4	2
B	A	6	3	E	None	3	3	H	None	1	3
C	B	7	3	F	A, E	4	2	I	H	5	2

a) Draw the Early Start project schedule using Time- scaled network?
b) Within only two trials, level the project Resource?
c) How many Worker(s)/day you should use in this project?



c) I should use 97/20 = 4.85 workers → use 5 workers