

Answers

Page 6 (Other answers possible)

Activity and Description (Bake a cake)	Precedence ('Depends on')	Duration (mins.)
A Select recipe	-	10
B Preheat the oven	A	15
C Find and grease baking...	-	2
D Get ingredients	A	5
E Measure and mix ingre...	D	10
F Pour mixture into tin	C, E	1
G Bake cake in oven	B, F	25
H Place cake on tray to cool	G	45

Activity	Precedence ('Depends on')
A	-
B	-
C	A
D	B, C
E	-
F	D, E

Activity and Description (Make breakfast)	Precedence ('Depends on')	Duration (mins.)
A Get up and dressed	-	15
D Fill kettle with water	A	1
F Boil the kettle	D	3
E Make the tea	F	2
C Get bread	A	1
H Toast bread	C	3
G Put spread on toast	H	1
B Eat toast and drink tea	E, G	20

Page 7

Activity	Precedence ('Depends on')
A	-
B	-
C	-
D	B
E	A
F	A
G	B
H	C, D
I	E
J	E
K	F, G, I
L	K, H, J

Activity	Precedence ('Depends on')
A	-
B	-
C	-
D	A
E	A
F	B
G	B
H	C, D, E, F
I	E
J	E
K	I
L	I
M	G, H, J, K, L

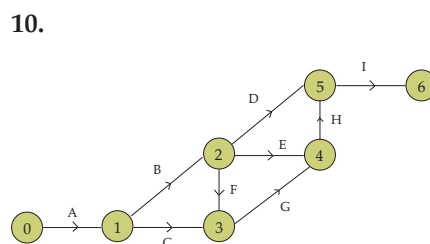
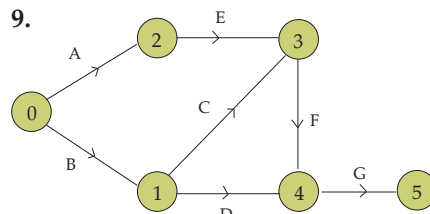
Page 8 (Other answers possible)

Activity and Description (Putting on a play)	Precedence ('Depends on')	Duration (weeks.)
A Choose play	-	1
B Print tickets	A	3
C Sell tickets	B	4
D Choose cast	A	2
E Hand out scripts to cast	D	1
F Rehearsals	E	4
G Make cast wardrobe	D	3
H Organise sound, props, lights	F	1
I Dress rehearsal	G, H	3
J Play season starts	C, I	1

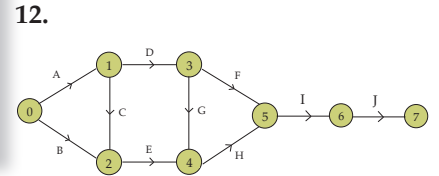
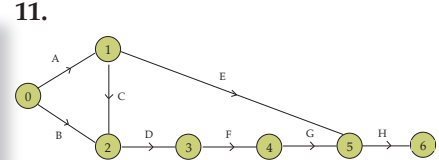
Activity and Description (Wooden deck chair)	Precedence ('Depends on')	Duration (hours.)
A Designs the chair	-	1
B Purchases materials required	A	1
C Makes the seat of the chair	B	2
D Makes the back of the chair	B	1
E Makes the legs of the chair	B	2
F Cuts foam for cushion	B	0.5
G Covers foam for cushion	F	1
H Assembles chair	C, D, E	2
I Stains chair	H	2
J Fixes cushion to chair	G, I	1

Activity and Description (Overseas holiday)	Precedence ('Depends on')	Duration (Hours)
A Decide time and destination of holiday	-	2
B Book flights	A	0.5
C Book accommodation	B	0.5
D Arrange travel documents	C	1
E Arrange currency	D	1
F Book transfers to/from accommodation	C	0.25
G Organise taxi to/from airport	B	0.25
H Book Tours	C	0.5
I Pack Bags	E, G, H	2

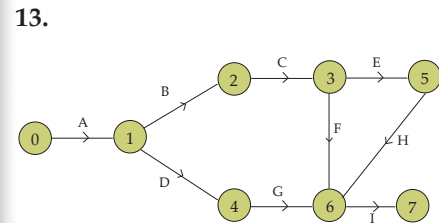
Page 17 (Other layouts possible)



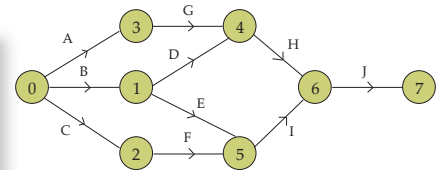
Page 18 (Other layouts possible)



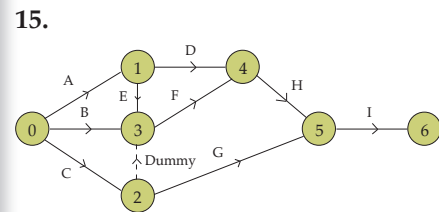
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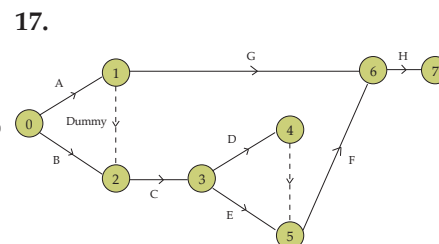
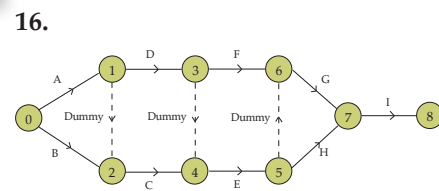
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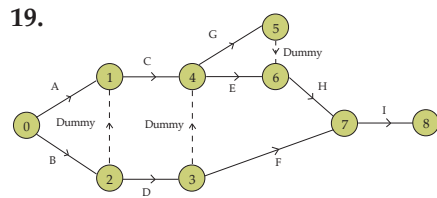
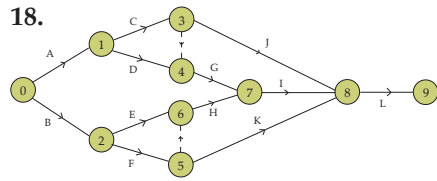
Page 25 (Other layouts possible)



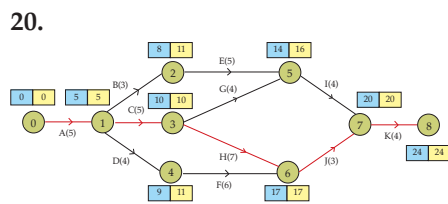
Page 26 (Other layouts possible)



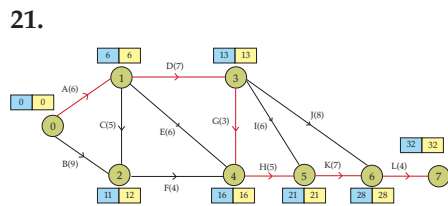
Page 27 (Other layouts possible)



Page 33

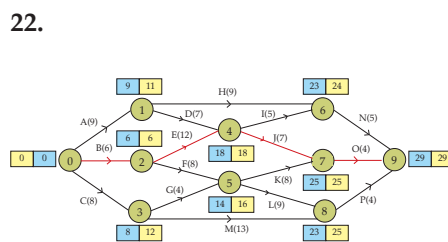


Critical events: A, C, H, J, K.
Critical path: 0 - 1 - 3 - 6 - 7 - 8.

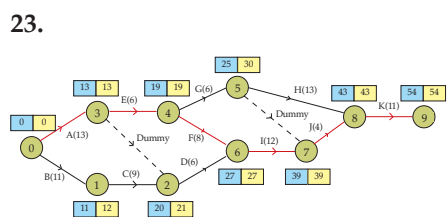


Critical events: A, D, G, H, K, L.
Critical path: 0 - 1 - 3 - 4 - 5 - 6 - 7.

Page 34

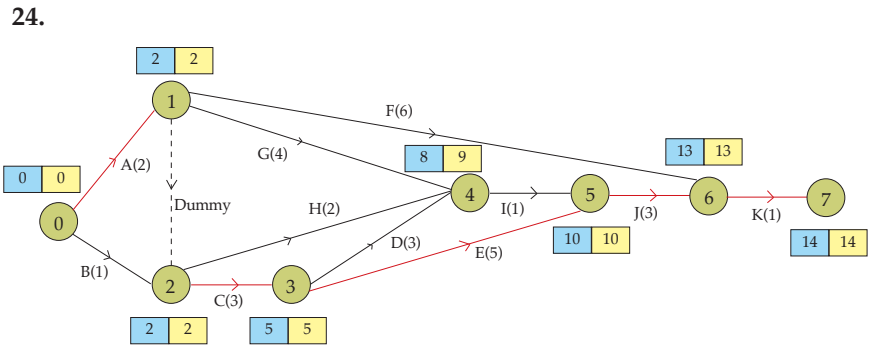


Critical events: B, E, J, O.
Critical path: 0 - 2 - 4 - 7 - 9.



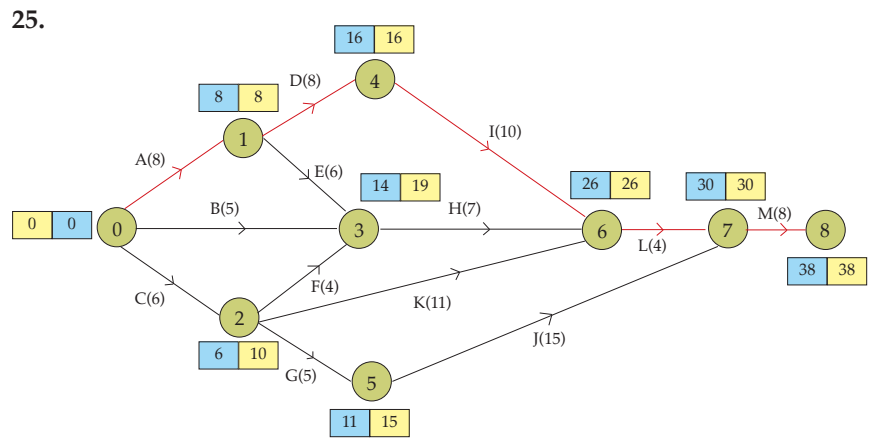
Critical events: A, E, F, I, J, K.
Critical path: 0 - 3 - 4 - 6 - 7 - 8 - 9.

Page 35



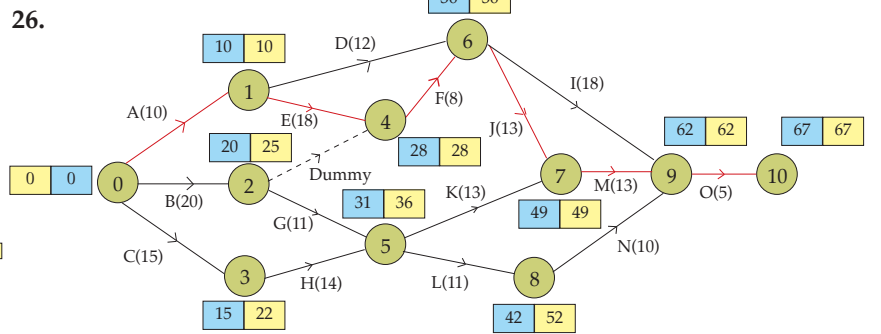
Critical events: A, C, E, J, K.
Critical path: 0 - 1 - 2 - 3 - 5 - 6 - 7.

Page 36



Critical events: A, D, I, L, M.
Critical path: 0 - 1 - 4 - 6 - 7 - 8.

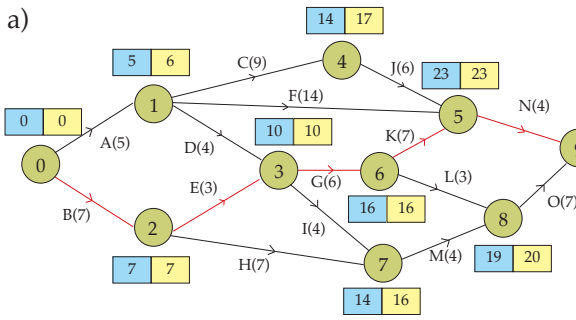
Page 37



Critical events: A, E, F, J, M, O.
Critical path: 0 - 1 - 4 - 6 - 7 - 9 - 10.

Page 41

27.



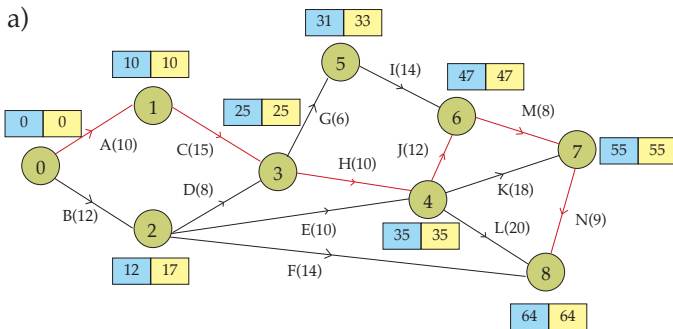
Critical events: B, E, G, K, N.
Critical path: 0 - 2 - 3 - 6 - 5 - 9.

b)

Non-critical activities	Free float time	Total float time
A	0	1
C	0	3
D	1	1
F	4	4
H	0	2
I	0	2
J	3	3
L	0	1
M	1	2
O	1	1

Page 42

28.



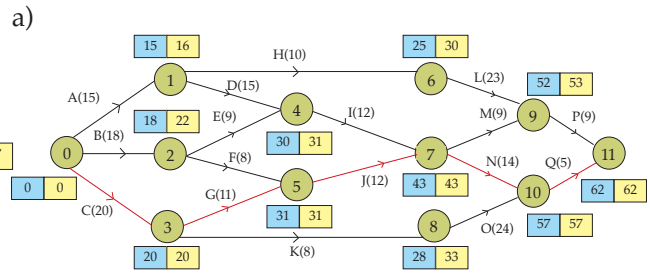
Critical events: A, C, H, J, M, N.
Critical path: 0 - 1 - 3 - 4 - 6 - 7 - 8.

b)

Non-critical activities	Free float time	Total float time
B	0	5
D	5	5
E	13	13
F	38	38
G	0	2
I	2	2
K	2	2
L	9	9

Page 43

29.



Critical events: C, G, J, N, Q.
Critical path: 0 - 3 - 5 - 7 - 10 - 11.

b)

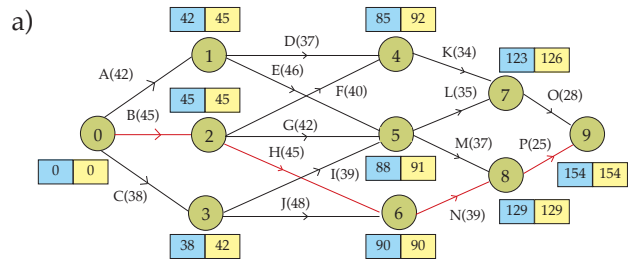
Non-critical activities	Free float time	Total float time
A	0	1
B	0	4
D	0	1
E	3	4
F	5	5
H	0	5
I	1	1
K	0	5
L	4	5
M	0	1
O	5	5
P	1	1

Page 44 Q29. cont

c) Critical events: B, F, J, N, Q.
Critical path: 0 - 2 - 5 - 7 - 10 - 11.
Extends the project time by 1 unit to 63 units.

Page 45

30.



Critical events: B, H, N, P.
Critical path: 0 - 2 - 6 - 8 - 9.

b)

Non-critical activities	Free float time	Total float time
A	0	3
C	0	4
D	6	13
E	0	3
F	0	7
G	1	4
I	11	14
J	4	4
K	4	7
L	0	3
M	4	4
O	3	3

Page 45 Q30 cont...

c) Critical events: B, G, L, O.

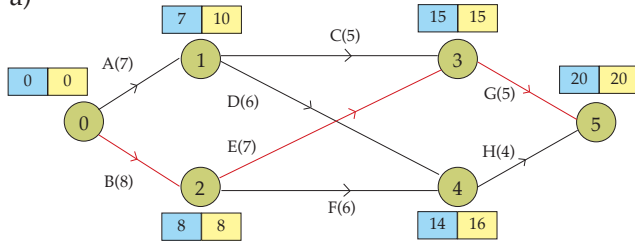
Critical path: 0 - 2 - 5 - 7 - 9.

Extends the project time by 6 units to 160 units.

Page 53

31.

a)

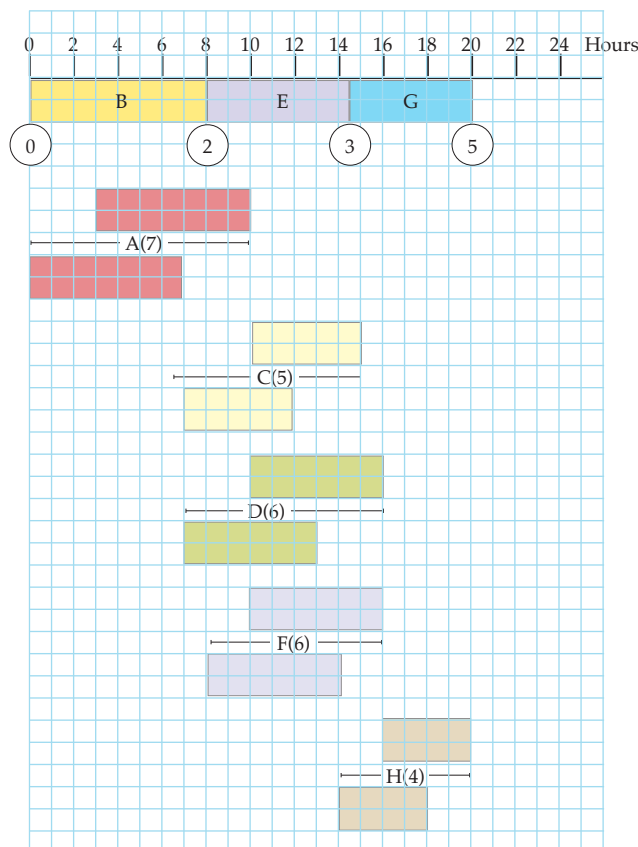


Critical events: B, E, G.

Critical path: 0 - 2 - 3 - 5.

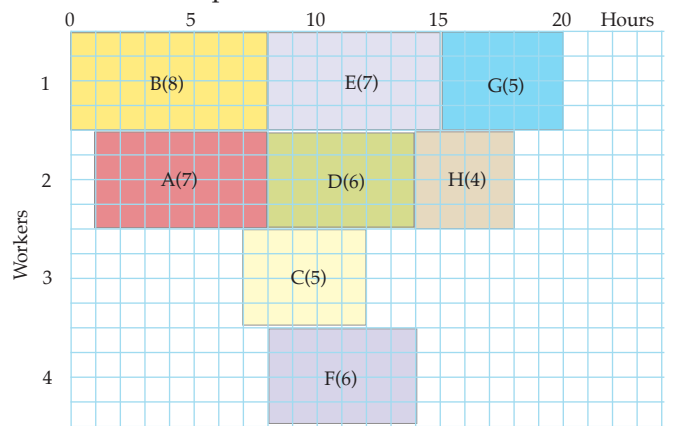
b)

Activity	Duration (D)	EST	EFT	LST	LFT	Total float time
A	7	0	7	3	10	3
B	8	0	8	0	8	0
C	5	7	12	10	15	3
D	6	7	13	10	16	3
E	7	8	15	8	15	0
F	6	8	14	10	16	2
G	5	15	20	15	20	0
H	4	14	18	16	20	2



Page 53 Q31b) cont...

Other schedules possible.



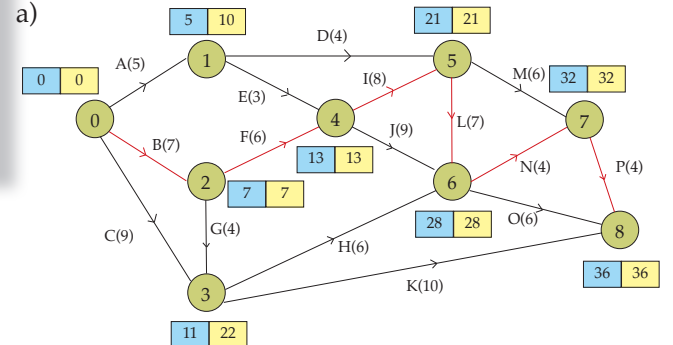
c) Will require 4 workers to complete the project in the critical time of 20 hours.

Worker 1 works 20 hours, worker 2 works 17 hours, worker 3 works 5 hours and worker 4 works 6 hours.

Page 55

32.

a)



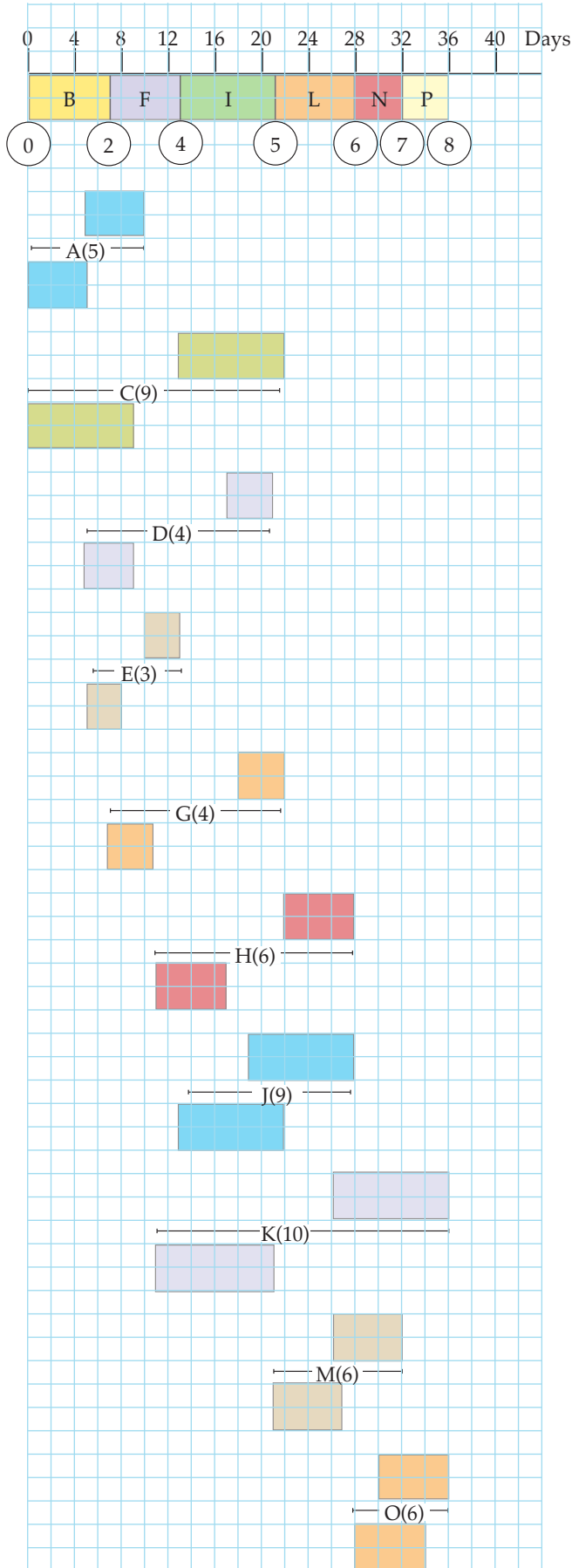
Critical events: B, F, I, L, N, P.

Critical path: 0 - 2 - 4 - 5 - 6 - 7 - 8.

b)

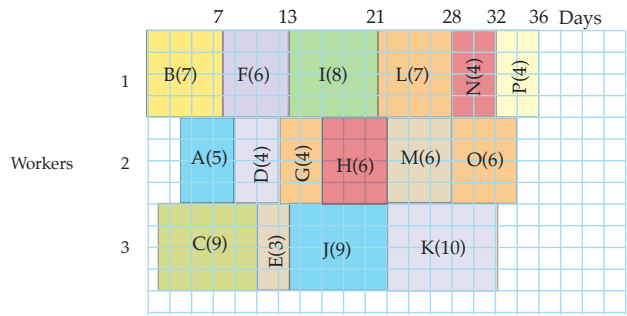
Activity	Duration (D)	EST	EFT	LST	LFT	Total float time
A	5	0	5	5	10	5
B	7	0	7	0	7	0
C	9	0	9	13	22	13
D	4	5	9	17	21	12
E	3	5	8	10	13	5
F	6	7	13	7	13	0
G	4	7	11	18	22	11
H	6	11	17	22	28	11
I	8	13	21	13	21	0
J	9	13	22	19	28	6
K	10	11	21	26	36	15
L	7	21	28	21	28	0
M	6	21	27	26	32	5
N	4	28	32	28	32	0
O	6	28	34	30	36	2
P	4	32	36	32	36	0

Page 55 Q32b) cont...



Page 55 Q32b) cont...

Other schedules possible.

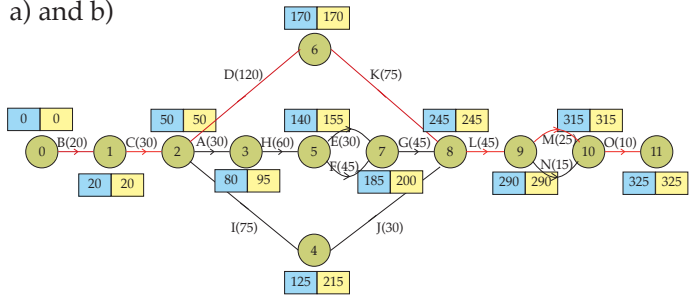


- c) Will require 3 workers to complete the project in the critical time of 36 days. Worker 1 works for 36 days. Worker 2 works from day 3 to day 34 for a total of 31 days. Worker 3 works from day 1 to day 32 for a total of 31 days.
- d) If the manager was to visit on days 6 to 10 he/she would see activities A, B, C, D, E and F being undertaken.

Page 57

33.

a) and b)

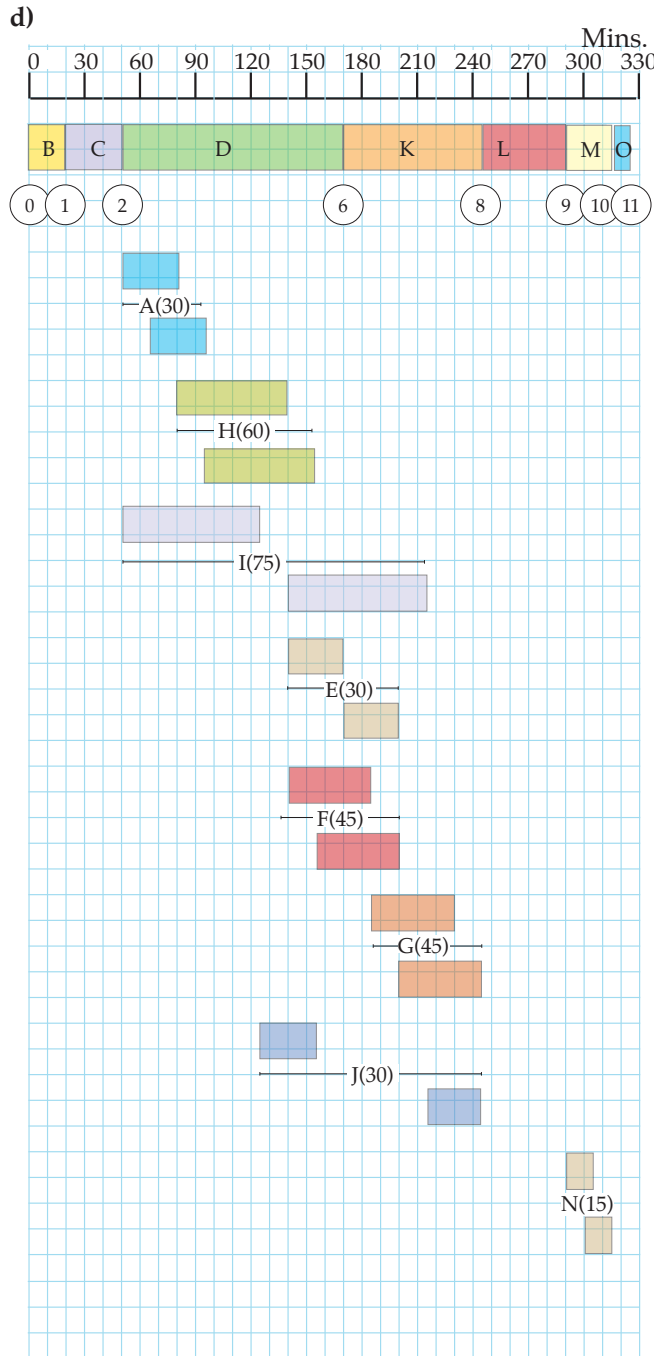


- c) Critical events: B, C, D, K, L, M, O.
Critical path: 0 - 1 - 2 - 6 - 8 - 9 - 10 - 11.

d)

Act.	D	EST	EFT	LST	LFT	TFT
A	30	50	80	65	95	15
B	20	0	20	0	20	0
C	30	20	50	20	50	0
D	120	50	170	50	170	0
E	30	140	170	170	200	30
F	45	140	185	155	200	15
G	45	185	230	200	245	15
H	60	80	140	95	155	15
I	75	50	125	140	215	90
J	30	125	155	215	245	90
K	75	170	245	170	245	0
L	45	245	290	245	290	0
M	25	290	315	290	315	0
N	15	290	305	300	315	10
O	10	315	325	315	325	0

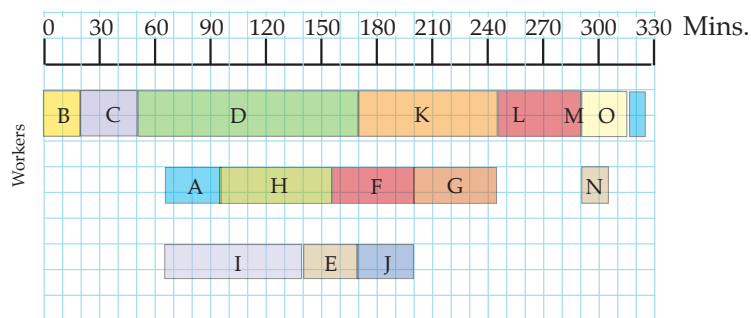
Page 57 Q33 d) cont ...



Page 57 Q33 e) cont ...

e) The minimum time for the BBQ is 325 minutes and it requires three people. One working for 325 minutes, the second 180 minutes then a break and then working for 15 minutes and the third working for 135 minutes.

Other schedules possible.



Pages 59 – 63

Practice Internal Assessment Task – Critical Path Analysis

Achievement

The student has used critical path analysis in solving problems. This involves selecting and using appropriate methods to solve the problem, demonstrating knowledge of concepts and terms associated with networks, and communicating using appropriate representations.

Examples of possible student responses:

The students has:

Identified a suitable project that has been broken down into a series of at least 10 tasks (with durations) some of which have to be undertaken simultaneously.

Described their project.

Drawn up a precedence table for the project and attempted a labelled network diagram that includes most/all of the tasks in the precedence table.

Merit

The student has used critical path analysis with relational thinking, in solving problems. This involves one or more of selecting and carrying out a logical sequence of steps, connecting different concepts or representations, demonstrating understanding of concepts and forming and using a model. The student has related their findings to a context, or communicated thinking using appropriate mathematical statements.

Examples of possible student responses:

The students has:

Correctly drawn and labelled a network diagram from their precedence table.

From the diagram they have conducted a forward and backward pass and have identified the critical path, critical events and the minimum completion time for the project.

Tabulated the EST, LST, EFT, LFT and total float time for each activity in the project and drawn up a Gantt chart as well as attempted to draw up a time schedule using a minimum number of workers by assigning workers based on the smallest LST.

Made an appropriate attempt to discuss the number of workers required for the project based on their time schedule as well as the effect of a delay in one critical and one non-critical activity.

Excellence

The student has used critical path analysis with extended abstract thinking, in solving problems. This involves one or more of: devising a strategy to investigate a situation, identifying relevant concepts in context, and developing a chain of logical reasoning. The student has used correct mathematical statements, or communicated mathematical insight.

Examples of possible student responses:

The students has:

Identified the critical path, critical events and minimum completion time for the project.

Tabulated the EST, LST, EFT, LFT and total float time for each activity in the project and drawn up an appropriate Gantt chart and time schedule and correctly identified the number of workers required as well as commenting on the number of hours each would have to work.

Correctly discussed in depth the effect of a delay in one critical and one non-critical activity and included information on float times etc.

Identified a suitable period when a person could visit the project and see the maximum number of tasks (activities) being undertaken during that period.

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.