

QQQ – Decision 1 – Chapter 8 – Critical Path Analysis (Version 1)

Total Marks: 25

(25 = Platinum, 23 = Gold, 20 = Silver, 17 = Bronze)

1.

- (a)** Draw the activity network described in the precedence table below, using activity on arc and exactly two dummies. **(5)**

Activity	Immediately preceding activities
A	–
B	–
C	–
D	A, B
E	C
F	A, B
G	A, B
H	E, F
I	D
J	D, G
K	H

- (b)** Explain why each of the two dummies is necessary. **(2)**

(Total 7 marks)

2.

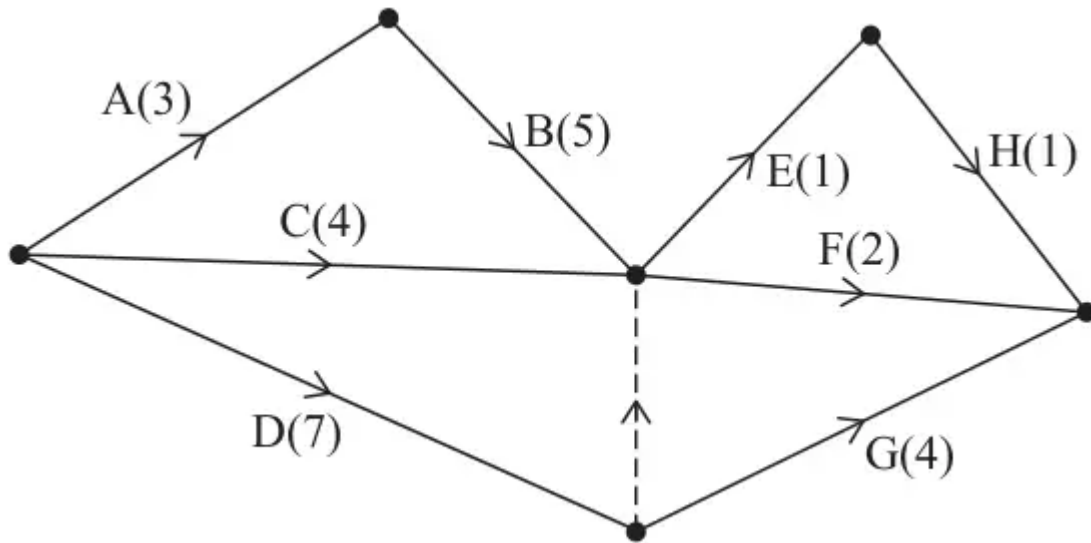


Figure 3

The network in Figure 3 shows the activities that need to be undertaken to complete a project. Each activity is represented by an arc and the duration, in hours, of the corresponding activity is shown in brackets.

- (a) (i) Complete Diagram 1 in the answer book to show the early event times and the late event times.
- (ii) State the minimum completion time of the project. (3)

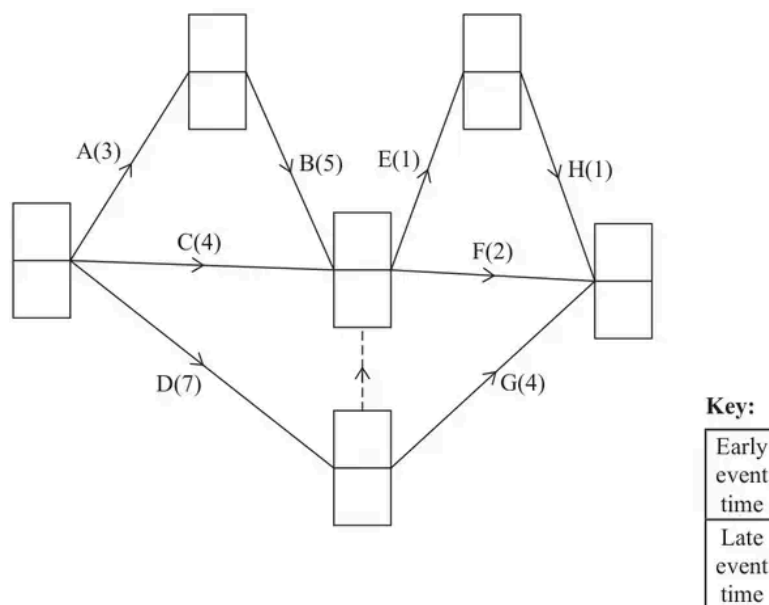


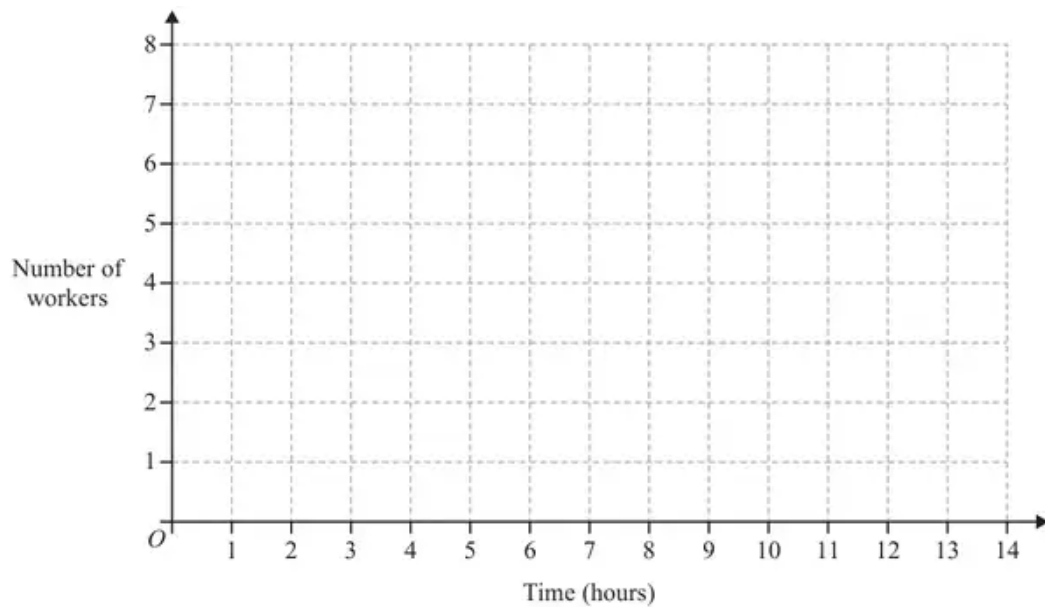
Diagram 1

The table below lists the number of workers required for each activity in the project.

Activity	Number of workers
A	2
B	1
C	2
D	2
E	3
F	2
G	1
H	3

Each worker is able to do any of the activities. Once an activity is started it must be completed without interruption. It is given that each activity begins at its earliest possible start time.

- (b) (i) On Grid 1 in the answer book, draw a resource histogram to show the number of workers required at each time.
- (ii) Hence state the time interval(s) when six workers are required. (4)



Grid 1

(Total 7 marks)

3.

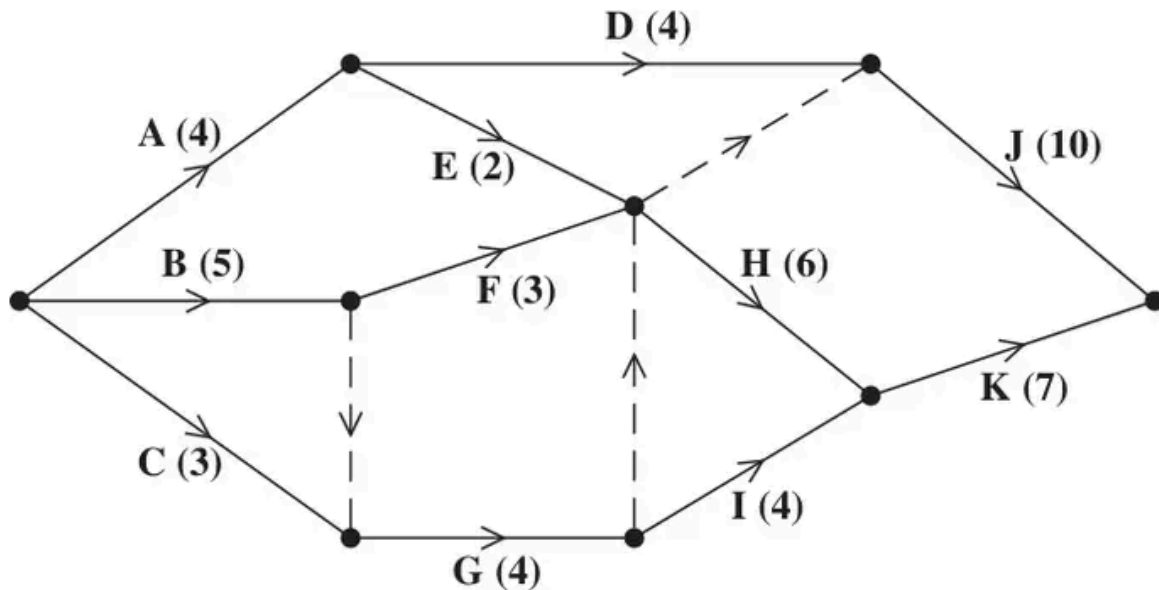


Figure 5

A project is modelled by the activity network shown in Figure 5. The activities are represented by the arcs. The number in brackets on each arc gives the time, in days, to complete the activity. Each activity requires one worker. The project is to be completed in the shortest possible time.

- (a) Complete Diagram 1 in the answer book to show the early event times and late event times. (4)
- (b) Calculate the total float for activity D. You must make the numbers you use in your calculation clear. (2)
- (c) Calculate a lower bound for the number of workers needed to complete the project in the minimum time. You must show your working. (2)

The project is to be completed in the minimum time using as few workers as possible.

- (d) Schedule the activities using Grid 1 in the answer book. (3)

(Total 11 marks)