*This means that if the A, B route with 13 weeks duration, probability 0.2, occurs at the same time as the C route duration of 12 weeks, probability 0.6, the critical path would be 13 weeks i.e. the longer duration, with the probability of 0.12 (0.6 × 0.2).

Summary of possible durations

12 weeks probability (0.12 + 0.18)	=	0.30
13 weeks probability (0.12)	=	0.12
14 weeks probability (0.06 + 0.09 + 0.06)	=	0.21
15 weeks probability (0.18 + 0.09)	=	0.27
17 weeks probability (0.2 + 0.3 + 0.2 + 0.3)	=	0.10
		1.00

Thus the probability of achieving 14 weeks or less is **0.63** (0.30 + 0.12 + 0.21) and the probability of exceeding the scheduled date is **0.37**.

Summary

10. a) Basic time analysis of a network involves calculating the critical path i.e. the shortest time in which the project can be completed.

    b) The critical path is established by calculating the EST (Earliest Start Times) and LST (Latest Start Time) for each event and comparing them. The critical path is the chain of activities where the EST's and LST's are the same.

    c) Float is the spare time available on non-critical activities. There are three types of float; total float, free float and independent float.

    d) To calculate the probability of achieving scheduled dates it is necessary to establish what variability is likely to exist for each activity.

    e) Given activity time estimates the expected value of the project duration is calculated and an estimate made of the activity standard deviations.

    f) The activity standard deviations are combined to form the standard deviation of the overall project so that probability estimates can be made for various project duration possibilities.

Points to note

11. a) The problems of dealing with uncertainty occur again and again in quantitative techniques. Increasingly examination questions are likely to contain variable activity times and associated probabilities.

    b) When variable time estimates are used, near critical paths may have more variability than the critical path so the near critical paths may influence probability estimates.

    c) The basis of the Standard Deviation estimate given in para 8 is the Normal Distribution. It is known that virtually all of the distribution lies within the mean ± 3s hence the formula given

$$\text{i.e. } \frac{\text{max} - \text{min}}{6} = \sigma$$