Checking assumptions and interpreting recommendations

6 questions | 16 marks

Equivalent correct methods earn the corresponding marks.

1. The technician minimum is $9. Write a recommendation that includes the pairings and one assumption. [3 marks]

Cost ($) of assigning one technician to each job.

Technician	Job 1	Job 2	Job 3
Ali	9	2	7
Bea	6	4	3
Chen	5	8	1

Identify the chosen entries, not only the total.

State a relevant feasibility/additivity assumption.

Answer: Assign Ali to 2, Bea to 1 and Chen to 3 for $9, assuming all are available and each does exactly one independent job.

2. Ali cannot do job 2. Find and interpret the new technician optimum. [3 marks]

Cost ($) of assigning one technician to each job.

Technician	Job 1	Job 2	Job 3
Ali	9	2	7
Bea	6	4	3
Chen	5	8	1

Exclude the two assignments using Ali→2.

Among the remaining totals 14,20,21,16, choose 14.

Answer: $14: Ali→1, Bea→2, Chen→3.

3. Why is $1,000 a safe substitute for the forbidden entry in the preceding problem when all other costs are nonnegative and a feasible $14 allocation is known? [3 marks]

The bound depends on nonnegative remaining costs.

The large value is justified by an actual feasible alternative.

Answer: Any assignment using the forbidden entry would cost at least $1,000, so it cannot beat the feasible $14 assignment.

4. A manager asks for the 'best assignment' but supplies both times and profits. What must be clarified before optimisation? [2 marks]

Different objectives can select different pairings.

A single optimisation requires an explicit criterion.

Answer: The objective and any constraints: for example minimise total time, maximise profit, or meet a time limit then maximise profit.

5. A project finish moves from 20 to 21 days when an uncertain activity is extended by 3 days. What does this tell you? [3 marks]

The delay in the overall finish is only 1 day.

Not every task-duration change transfers fully to project duration.

Answer: The network absorbed two days of that change before it affected the finish, but the revised critical structure must still be checked.

6. An optimal assignment leaves one job with a dummy worker. Write the limitation that must accompany the recommendation. [2 marks]

Identify the uncompleted job explicitly.

If every job is mandatory, the original capacity model must be revised.

Answer: That real job remains unfilled, with the stated penalty or allowed omission; the model has not created an extra worker.