Resource histograms and scheduling

Answers

Further Maths topic practice

This topic online

Q	Answer	Marks
1	**a)** 3 **b)** 2 × 23 = 46 < 61, so two workers cannot do all the work in 23 hours	3
2	**a)** A 0, B 3, C 0, D 1, E 0, F 1, G 3, H 0; critical A, C, E, H **b)** Cascade chart: A 0 to 4, C 4 to 7, E 7 to 11, H 11 to 16, B 0 to 4 (float to 7), D 4 to 9 (float to 10), F 9 to 10 (float to 11), G 9 to 13 (float to 16)	5
3	**a)** Histogram: 0 to 2: 3, 2 to 3: 3, 3 to 4: 4, 4 to 8: 4, 8 to 9: 2, 9 to 11: 2, 11 to 12: 1 **b)** 4 workers, from 3 to 8 days	4
4	**a)** 1: (0, 0); 2: (5, 5); 3: (7, 7); 4: (11, 14); 5: (14, 14); 6: (18, 18); 7: (22, 22) **b)** 22 days; A, D, E, G, I **c)** 3	6
5	**a)** Must: C, E, F; could: D **b)** F, G, H, I **c)** 3 **d)** Four activities, F, G, H and I, must all be happening at 10.5 days, so at least 4 workers are needed to finish in 16 days	7
6	**a)** Histogram: 0 to 2: 5, 2 to 3: 6, 3 to 4: 7, 4 to 5: 8, 5 to 8: 4, 8 to 11: 2 **b)** F starts at 5 (F at 6 or E at 5 also work): 0 to 2: 5, 2 to 3: 6, 3 to 4: 5, 4 to 5: 6, 5 to 7: 6, 7 to 8: 4, 8 to 11: 2	7
7	**a)** 3 **b)** Worker 1: B 0-5, F 5-12, I 12-16; Worker 2: A 0-3, D 3-9, H 9-13; Worker 3: C 0-4, G 4-7, E 7-9	7
8	**a)** 1: (0, 0); 2: (5, 5); 3: (3, 3); 4: (4, 5); 5: (9, 9); 6: (8, 8); 7: (13, 13) **b)** Histogram: 0 to 3: 3, 3 to 4: 4, 4 to 5: 4, 5 to 7: 4, 7 to 8: 3, 8 to 9: 3, 9 to 13: 2 **c)** 39 ÷ 13 = 3; A, E and F are critical and C must run from 1 to 4 at the latest, so 4 activities are in progress from 3 to 4	8
9	**a)** 1: (0, 0); 2: (4, 4); 3: (3, 4); 4: (9, 9); 5: (9, 10); 6: (13, 13); 13 hours **b)** 3 **c)** Worker 1: A 0-4, E 4-10, F 10-14, G 14-17; Worker 2: B 0-3, D 3-5, C 5-10, H 10-17; 17 hours **d)** 34 hours of work shared by 2 workers takes at least 17 hours	9
10	**a)** A: 0, 4; B: 0, 7; C: 0, 4; D: 4, 9; E: 6, 11; F: 3, 11; G: 9, 16; H: 11, 16; I: 9, 11 **b)** 16 days; A, D, H, I **c)** Worker 3: B 0 to 6, E 6 to 10; worker 2: G 10 to 16	9
11	**a)** 1: (0, 0); 2: (4, 4); 3: (3, 4); 4: (9, 9); 5: (5, 6); 6: (12, 12); 12 hours **b)** Histogram: 0 to 3: 5, 3 to 4: 7, 4 to 5: 7, 5 to 7: 8, 7 to 9: 5, 9 to 10: 5, 10 to 11: 4, 11 to 12: 2 **c)** Start times A 0, B 0, C 5, D 4, E 3, F 10, G 8, H 8; histogram 0 to 3: 5, 3 to 4: 4, 4 to 5: 4, 5 to 8: 5, 8 to 10: 5, 10 to 13: 5, 13 to 14: 3 (other valid plans are possible)	10

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12	**a)** 1: (0, 0); 2: (4, 5); 3: (7, 7); 4: (3, 7); 5: (11, 11); 6: (10, 12); 7: (16, 16); 8: (20, 20) **b)** Cascade chart: B 0 to 7, E 7 to 11, H 11 to 16, L 16 to 20, A 0 to 4 (float to 5), C 0 to 3 (float to 7), G 3 to 8 (float to 12), D 4 to 10 (float to 11), F 7 to 10 (float to 12), I 10 to 14 (float to 16), K 10 to 15 (float to 20), J 11 to 18 (float to 20) **c)** 3 **d)** Worker 1: A 0-4, D 4-10, H 11-16, L 16-20; Worker 2: B 0-7, E 7-11, I 11-15, K 15-20; Worker 3: C 0-3, G 3-8, F 8-11, J 11-18	12

Full worked solutions, written out by hand, are on the solutions sheet for this topic.

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