

Question number	Answer	Notes	Marks
11 (a) (i)	work done = force \times distance (travelled);	allow accepted symbols	1
(ii)	substitution; evaluation; e.g. work done = 0.89×26 work done = 23.1(4 J)		2
(iii)	evidence of recall of formula GPE = mgh; substitution; evaluation; e.g. GPE = mgh GPE = $1.3 \times 10 \times 0.11$ GPE = 1.4(3 J)	allow $g = 9.8(1)$ (N/kg)	3
(iv)	any TWO from: any reference to friction/air resistance; energy transferred to the surroundings (by mechanical work); block not necessarily at constant speed;	-1 for POT error providing use of g seen allow 'heat/thermal energy transferred to air/ramp by friction for 2 marks	2
(b)	any TWO from: lower force required; to prevent block from slipping down required / to move block; any TWO from: longer distance required (with a lower force); more inefficient; greater proportion of energy transferred to the surroundings;	allow 'to overcome friction' allow 'easier to move block' for 2 marks Allow idea of more work required (for same increase in GPE)	4

(Total for Question 11 = 12 marks)