

## Mark schemes

**1** D [1]

**2** B [1]

**3** D [1]

**4** D [1]

**5** D [1]

**6** B [1]

**7** D [1]

**8** C [1]

**9** C [1]

**10** B [1]

**11** 1 mark each correct row

B3

[3]

12

vector      metre

B1

scalar      joule

B1

scalar      watt

allow capital letters, misspellings and plural units  
*accept v, s for vector and scalar*

B1

[3]

## Examiner reports

- 2** Occasionally students are presented with multiple choice questions which require them to work out the “incorrect” answer. This will be highlighted by a bold “not” in the question. The fact that only 40% of students managed to find the correct answer may indicate that this could have caused difficulties, although this is contradicted by the small number (2%) of students choosing the watt. The most popular distractor, D, may have been chosen because of its apparent complexity.
- 3** It is surprising that only 49% of the candidates arrived at the correct answer in this question. Identifying the rate of change of momentum with force, and the unit of force with (mass  $\times$  acceleration), ought to be relatively straightforward piece of physics for candidates at the end of an A level course. Distractors A and C (where in each case the answer is a unit of momentum) were both chosen by about 20% of the candidates.
- 4** The unit of gravitational potential was known correctly by 71% of the candidates in this question. However, one in five selected distractor C –  $\text{N kg}^{-1}$  – which is the unit of gravitational field strength.
- 5** This question was the most demanding question on the paper, with only 39% of the students giving the correct answer. In order to identify the correct combinations of units to give  $\text{V m}^{-1}$ , it was necessary to remember that  $1 \text{ V} = 1 \text{ J C}^{-1}$  and that  $1 \text{ C} = 1 \text{ A s}$ . Distractor C was the choice of over a quarter of the students.
- 6** This question tested familiarity with the units of impulse. The relationship between impulse and change of momentum pointed directly to  $\text{kg m s}^{-1}$ , which was chosen by two-thirds of the candidates. The common incorrect answers were distractors A ( $\text{N s}^{-1}$ : obviously confused with N s) and C ( $\text{kg m s}^{-2}$ , a unit of force rather than force  $\times$  time).
- 11** Not the easy “starter for three” one might have expected. The most common error: weight given as a scalar quantity and/or measured in kilograms. Also a disappointing number of candidates did not know the unit for energy.
- 12** Surprisingly, many candidates did not gain full marks here. The difference between vectors and scalars was not always well known and a significant number of candidates were unable to state the full name of each unit, even though poor spelling of these names was condoned.