CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0625 PHYSICS

0625/21 Paper 2 (Core Theory), maximum raw mark 80

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NOTES ABOUT MARK SCHEME SYMBOLS AND OTHER MATTERS

B marks are independent marks, which do not depend on any other marks. For a B mark to be scored, the point to which it refers must actually be seen in the candidate's answer.

M marks are method marks upon which accuracy marks (A marks) later depend. For an M mark to be scored, the point to which it refers **must** be seen in a candidate's answer. If a candidate fails to score a particular M mark, then none of the dependent A marks can be scored.

C marks are compensatory method marks which can be scored even if the points to which they refer are not written down by the candidate, provided subsequent working gives evidence that they must have known it. For example, if an equation carries a C mark and the candidate does not write down the actual equation but does correct working which shows he or she knew the equation, then the C mark is scored.

A marks are accuracy or answer marks which either depend on an M mark, or which are one of the ways which allow a C mark to be scored.

Brackets ( ) around words or units in the mark scheme are intended to indicate wording used to clarify the mark scheme, but the marks do not depend on seeing the words or units in brackets, e.g. 10 (J) means that the mark is scored for 10, regardless of the unit given.

c.a.o. means "correct answer only".

e.c.f. means "error carried forward". This indicates that if a candidate has made an earlier mistake and has carried his incorrect value forward to subsequent stages of working, he or she may be given marks indicated by e.c.f. provided his or her subsequent working is correct, bearing in mind his or her earlier mistake. This prevents a candidate being penalised more than once for a particular mistake, but **only** applies to marks annotated "e.c.f."

e.e.o.o. means "each error or omission".

owtte means “or words to that effect”

Underlining indicates that this must be seen in the answer offered, or something very similar.

OR indicates alternative answers, any one of which is satisfactory for scoring the mark.

AND indicates that both answers are required to score the mark.

Spelling Be generous about spelling and use of English. However, do not allow ambiguities, e.g. spelling which suggests confusion between reflection / refraction / diffraction or thermistor / transistor / transformer.

Significant figures Answers are generally acceptable to any number of significant figures ≥ 2, except where the mark scheme specifies otherwise.

Units On this paper, incorrect units are not penalised, except where specified. More commonly, marks are allocated for specific units.

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Fractions These are only acceptable where specified.

NOT indicates that an incorrect answer is not to be disregarded, but cancels another otherwise correct alternative offered by the candidate. i.e. right plus wrong penalty applies.

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1 (a) (i) measuring OR graduated cylinder B1

(ii) balance B1

(b) Honey has a larger density than water. B1
Kerosene has a smaller density than water. B1

(c) density = mass / volume in any form: words, symbols, numbers C1
10.5 / 13 C1
0.81 A1
g / cm^3 B1

[Total: 8]

2 (a) (i) calculation seen using times from cameras A and B C1
160 (s) A1

(ii) speed = distance / time in any form: words, symbols, numbers C1
5000 / 160 C1
31.3 (m / s) A1

(iii) much slower than between A and B B1

(b) less / lower than suggested speed limit B1
either reference to just over limit between cameras A and B B1
then much slower speed, so average below limit B1
OR average speed over 10 000 m is about 15 m / s (for B2)

[Total: 9]

3 (a) three lines required: B1
- line from solid to bottom pattern
- line from liquid to middle pattern
- line from gas to top pattern

(b) (i) any two from: B2
- energy needed to turn liquid into a gas
- remaining perfume / liquid / particles have lower energy
- energy transfers from arm to perfume (cooling arm)

(ii) particles move / evaporate faster (when hotter) B1
collisions (with stopper) harder / more often B1
pressure greater (inside than outside) OR
force on stopper (from perfume) greater than friction + stopper weight B1

[Total: 6]

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4 **(a)** any two from: B2
- microwave not heard / sound is heard
- sound is slower / longitudinal wave or signal is transverse
- sound needs medium / cannot travel through a vacuum
- signal is electromagnetic wave owtte
- sound has longer wavelength / lower frequency

(b) **(i)** reflected B1

(ii) diffracted B1

[Total: 4]

5 **(a)** 100 (°C) B1
0 (°C) B1

(b) thermometer (bulb) placed in ice C1
melting ice OR ice and water mixture A1

(c) expansion B1

[Total: 5]

6 **(a)** wind B1

(b) electrical B1
light B1

(c) **(i)** dark B1
no wind / calm B1

(ii) (back-up / rechargeable) battery B1

(d) gravitational potential (energy) B1

[Total: 7]

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7 **(a)** A: arrow pointing left / away from N B1
C: arrow pointing left / same as A B1
B and D: arrow pointing right B1

(b) correct field lines carefully drawn through B and D B1

(c) steel B1

[Total: 5]

8 **(a)** **(i)** any two from: B2
- (small current in) relay coil produces magnetic field
- relay coil attracts armature
- starter motor connected across battery p.d.

(ii) lower (electrical) resistance B1
less heating (in cable) B1

(b) **(i)** 1.2 (A) B1

(ii) if a lamp fails other will work OR
each lamp can be controlled by a switch B1

[Total: 6]

9 **(a)** **(i)** thermistor correctly labelled B1

(ii) correct symbol for voltmeter B1
voltmeter in parallel with thermistor OR e.c.f. **(a)(i)** B1

(b) **(i)** $R = V / I$ in any form: words, symbols, numbers C1
6.0 / 0.004 OR 6.0 / 4.0 C1
1500 A1
Ω OR ohm(s) B1

(ii) not a straight line / constant gradient OR not through origin B1

[Total: 8]

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10 (a) resistance of LDR decreases M1
current increases A1

(b) (i) ray from object parallel to axis M1
ray continued correctly through F A1

(ii) second ray correctly drawn through centre of lens OR through F B1
intersection of two or more rays B1

(iii) image at intersection drawn and labelled correctly A1

[Total: 7]

11 (a) Gamma / γ B1

(b) (i) nucleon (accept mass) B1
proton (accept atomic) B1

(ii) $A = 4$ B1
$Z = 2$ B1

(iii) alpha / α (particle) B1

[Total: 6]

12 (a) (i) turbine B1

(ii) any two from: B2
- produces sulfur oxides / nitrous oxides
- produces carbon dioxide
- (fossil fuels / they) are non-renewable / not sustainable (resources)

(b) $V_1 / V_2 = N_1 / N_2$ C1
$115 / 25 \times 500$ C1
2300 A1

(c) smaller current (in transmission cables) B1
smaller heating effect (in transmission cables) B1
less energy wasted (in) / more efficient (transmission) B1

[Total: 9]

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