

Additional Applied Science A

General Certificate of Secondary Education

Unit **A325/01**: Scientific Detection (Foundation Tier)

Mark Scheme for January 2011

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Abbreviations, annotations and conventions used in the detailed mark scheme:

| | | |
|---------------------|---|---|
| / | = | alternative and acceptable answers for the same marking point |
| (1) | = | separates marking points |
| not/reject | = | answers which are not worthy of credit |
| ignore | = | statements which are irrelevant – applies to neutral answers |
| allow/accept | = | answers that can be accepted |
| (words) | = | words which are not essential to gain credit |
| <u>words</u> | = | underlined words must be present in answer to score a mark |
| ecf | = | error carried forward |
| AW/owtte | = | alternative wording |
| ORA | = | or reverse argument |

| Question | | Expected Answers | Marks | Additional Guidance | |
|----------|-----|------------------|-------|--|--|
| 1 | (a) | | [2] | 3 correct on LHS = 1 mark 3 correct on RHS = 1 mark | |
| | (b) | (i) | [1] | <p>ensures reliability <input checked="" type="checkbox"/></p> <p>increases sales <input type="checkbox"/></p> <p>monitors ordering <input type="checkbox"/></p> <p>reduces waste <input type="checkbox"/></p> | <p>accept any indication of correct response</p> <p>lose 1 mark for each additional incorrect response</p> <p>candidate cannot score less than zero</p> |
| | | (ii) | [1] | <p>profit <input type="checkbox"/></p> <p>speed of production <input type="checkbox"/></p> <p>staff promotion <input type="checkbox"/></p> <p>reliability <input checked="" type="checkbox"/></p> | <p>accept any indication of correct response</p> <p>lose 1 mark for each additional incorrect response</p> <p>candidate cannot score less than zero</p> |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-------|---|------------|---|
| | (iii) | to act as an incentive to work harder <input type="checkbox"/> to check the quality of their work <input checked="" type="checkbox"/> to get extra qualifications <input type="checkbox"/> to check the equipment is working properly <input type="checkbox"/> | [1] | accept any indication of correct response lose 1 mark for each additional incorrect response candidate cannot score less than zero |
| Total | | | [5] | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|--|-------|---|
| 2 | (a) | number of policemen <input type="checkbox"/> tyre skid marks <input checked="" type="checkbox"/> time of day <input type="checkbox"/> that an ambulance has not yet arrived <input type="checkbox"/> position of the cars <input checked="" type="checkbox"/> the house on the corner <input type="checkbox"/> the condition of the road <input checked="" type="checkbox"/> | [3] | accept any indication of correct response lose 1 mark for each additional incorrect response candidate cannot score less than zero |
| | (b) | (i) | [2] | accept 9.9 to 10.1 60 = 2 marks accept 59.4 or 60.6 allow ecf from measurement for 2 nd marking point eg 15 X 6 = 90 for 1 mark allow correct use of mm or m |
| | | (ii) | [2] | 1800 alone = 2 marks |
| Total | | | [7] | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|--|-------|---|
| 3 | (a) | <p>blood / sample on slide; add stain or reagent (to slide / blood / sample); add / use cover / slip; all steps in correct order;</p> | [3] | <p>context must be correct eg “put staining agent onto cover slip” does not score either of the two marks</p> <p>3 steps correct = 2 marks 2 steps correct = 1 mark correct order if all three steps present = 1 mark</p> <p>allow multiple responses in a single step</p> <p>ignore alternative uses for cover slip eg to drag across slide</p> <p>do not allow just listing the words that have been given</p> <p>ignore any reference to microscope</p> |
| | (b) | <p>multiply / times; (1) idea of (magnification) of two lenses; (1)</p> | [2] | <p>allow correct example of calculation for multiplication mark e.g. $10 \times 20 = 200$ is 1 mark not more than 2 lenses</p> |
| | (c) | <p>increase the size of the specimen <input type="checkbox"/></p> <p>stop air movements between.....specimen <input type="checkbox"/></p> <p>increase the resolution of the image <input checked="" type="checkbox"/></p> <p>move the image closer to the eye <input type="checkbox"/></p> | [1] | <p>accept any indication of correct response</p> <p>lose 1 mark for each additional incorrect response</p> <p>candidate cannot score less than zero</p> |
| Total | | | [6] | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|---|-------|---|
| 4 | (a) | A; | [1] | |
| | (b) | viewing very thin material <input type="checkbox"/> viewing material from plants <input type="checkbox"/> viewing living material <input checked="" type="checkbox"/> viewing materials from animals <input type="checkbox"/> viewing at very high magnification <input type="checkbox"/> | [1] | accept any indication of correct response lose 1 mark for each additional incorrect response candidate cannot score less than zero |
| | (c) | greater magnification <input checked="" type="checkbox"/> more powerful light source <input type="checkbox"/> larger screen on which to view the image <input type="checkbox"/> examine the specimen for longer <input type="checkbox"/> are a more modern invention <input type="checkbox"/> | [1] | accept any indication of correct response lose 1 mark for each additional incorrect response candidate cannot score less than zero |
| Total | | | [3] | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|--|-------|---|
| 5 | (a) | A and B; | [1] | both needed for 1 mark allow either way round |
| | (b) | stationary phase <input type="checkbox"/> reference material <input type="checkbox"/> retention factor <input type="checkbox"/> mobile phase <input checked="" type="checkbox"/> | [1] | accept any indication of correct response lose 1 mark for each additional incorrect response candidate cannot score less than zero |
| | (c) | stationary phase <input checked="" type="checkbox"/> reference material <input type="checkbox"/> retention factor <input type="checkbox"/> mobile phase <input type="checkbox"/> | [1] | accept any indication of correct response lose 1 mark for each additional incorrect response candidate cannot score less than zero |
| | (d) | The dye soaks up the paper. <input type="checkbox"/> The dye goes up the paper by capillary action. <input type="checkbox"/> Evaporation from the top of the paper pulls the dye up. <input type="checkbox"/> The dye moves between the two phases. <input checked="" type="checkbox"/> | [1] | accept any indication of correct response lose 1 mark for each additional incorrect response candidate cannot score less than zero |
| | (e) | idea of compare / match; (1) idea to identify / to find; (1) | [2] | |
| Total | | | [6] | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------------|---------|--|-------|---|
| 6 | (a) | <pre> graph LR A[litmus test] --- B[qualitative] C[universal indicator test] --- D[semi quantitative] E[colorimeter] --- F[quantitative] </pre> | [2] | 3 or 2 lines correct = 2 marks 1 line correct = 1 mark |
| | (b) | 7.30; (1) | [1] | |
| | (c) | diabetes / glucose (testing kit) / clinistix; pregnancy (testing kit); cystitis (testing kit); kidney / protein (testing kit) / uristix; steroids (testing kit); cholesterol (testing kit); nicotine (testing kit); alcohol / breathalyser; prostate (testing kit); HIV / AIDS (testing kit); allergy (testing kit); | [2] | any 2 from reject clinic stick and clinical stick ignore urine testing kit ignore blood testing kit ignore drug testing |
| | (d) (i) | plots correct; (1) | [1] | plots must be within a tolerance of less than 1 small square. allow any clear indication of plot eg X or • |
| | (ii) | through <u>origin</u> and <u>correct coordinates for last point</u> ; (1) | [1] | do not accept points joined dot-to-dot tolerance of origin must be less than 1 small square |
| | (iii) | ring around last-but-one point; (1) | [1] | if no response on graph, check table to see if ring is around 0.68 – 0.80 no ecf reject if two points ringed |
| | (iv) | 0.32; (1) | [1] | allow 0.31 – 0.33 error carried forward from d(ii) within error of ± 0.01 reject 0.3 (must be 2 decimal places) |
| Total | | | [9] | |
| Paper Total | | | [36] | |

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