SPECIMEN MATERIAL

A-level
ENVIRONMENTAL SCIENCE
PAPER 2

Mark scheme

Series

V1.0

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Examiners are required to assign each of the students' responses to the most appropriate level according to its overall quality, then allocate a single mark within the level. When deciding upon a mark in a level examiners should bear in mind the relative weightings of the assessment objectives (see page 28) and be careful not to over/under credit a particular skill. For example, in question 11.1 more weight should be given to AO1 and AO2 than to AO3. This will be exemplified and reinforced as part of examiner training.

Qu	Part	Marking guidance	Comment	Total marks	AO
01	0	**Description** / **Letter** Layer of straw used to conserve soil water, suppress weeds and keep the crop above soil level — H Lupin plants host nitrogen-fixing bacteria are cultivated to improve soil fertility — B Introduction of *Phytoseiulus persimilis* mites that feeds upon two-spotted spider mites, Tetranychus urticae, which would reduce strawberry crop yields — F Plasmid containing DNA code for antifreeze protein inserted into young strawberry plants — D Sticky scented cones placed near plants attracting the pest Strawberry Blossom Weevil — G		5	AO2

Description	Letter
Layer of straw used to conserve soil water, suppress weeds and keep the crop above soil level	H
Lupin plants host nitrogen-fixing bacteria are cultivated to improve soil fertility	B
Introduction of *Phytoseiulus persimilis* mites that feeds upon two-spotted spider mites, Tetranychus urticae, which would reduce strawberry crop yields	F
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Sticky scented cones placed near plants attracting the pest Strawberry Blossom Weevil	G

Qu	Part	Marking guidance	Comment	Total marks	AO
02	1	at least one point upstream of arable land but after suburban development **and** at least one point downstream before factory/water treatment plant		1	AO2
02	2	Any **four** from: Same timescale [**A stated time** more than one week] Same temperature Same light wavelength [**A** light colour] Same concentration of other nutrients Same water source Same species of algae Same starting mass/population of algae Same volume of water Algae collected at the same time of year 0/1 = 0 mark 2/3 = 1 mark 4 = 2 marks		2	AO2
02	3	Any **one** method from: • counting chamber • microscope and area grid/planimeter • gravimetric method/wet or dry weight when filtered • proximate measure of chlorophyll concentration/fluorometer /spectrophotometer Before and after known time period		1 1	AO1

Qu	Part	Marking guidance	Comment	Total marks	AO
03	1	One mark for result of each part of the calculation: 226100 46020 4.9 ecf Award full marks if correct answer with no working shown Max 2 marks if answer is to more significant figures Partial credit may be gained by a student who makes one or two isolated errors but carries out all other procedures correctly.	Calculation commentary N(N-1) N = 114+111+91+87+73 = 476 N(N-1) = 476x475 = 226100 Each n(n-1) is calculated and added (114x113) + (111x110) + (91x90) + (87x86) + (73x72) = 46020 226100/46020 = 4.9 Students should use the calculated values in the table to recognise that the answer should be given to one dp.	3	AO2
03	2	Any **three** reasons from: • Named abiotic condition has become unsuitable eg light, humidity, temperature, wind velocity • Increased edge effect as area is smaller • Difficult to colonise from other areas • Loss of named species inter-relationship, eg food species		3	AO2 = 2 AO3 = 1
03	3	Any **four** features controlled by the canopy layer: Controlled abiotic factors • Low light levels/shaded beneath canopy	Students gain credit for describing the abiotic factors controlled by the canopy layer to which woodland floor species must be adapted and/or the adaptations of woodland floor	4	AO1 = 2 AO2 = 2

		• More humid beneath canopy • Reduced wind velocity beneath canopy • Canopy protects from rain • Dead organic matter from the canopy provides nutrients Specific adaptations (without which survival would be lower) • Higher chlorophyll concentration • Additional pigments/xanthophyll/ carotenoid/anthocyanin • Growth early in year/before canopy is dense • Storage organ/bulb due to short growing season • Adaptation for insect pollination • Thinner cuticle as humidity is high	plants to these conditions.		

Qu	Part	Marking guidance	Comment	Total marks	AO
04	1	**One** mark for **one** cause of the short-term trend: Precipitation fluctuations Weather-related abstraction changes **One** mark for **one** cause of the long-term trend: Climate change Abstraction rate greater than recharge	Students should recognise that there are short-term fluctuations within a longer-term trend and suggest reasons for these.	2	AO1
04	2	One mark for cause of salinisation • Water table will fall below sea level • A saltwater incursion will occur One mark for the consequence of salinisation • salinity outside range of tolerance of crop species • osmotic dehydration	Students should recognise that the problem is caused by the suitability of the salt that is in the water, not by lack of availability of the water.	2	AO2
04	3	Any **two** advantages from: • more reliable/predictable supply • low turbidity therefore less processing required before use/pumping • more consistent mineral content • no/few pathogens		2	AO1
04	4	A taxon that is only found in one area		1	AO1

04	5	**Two** advantages plus **one** disadvantage **OR** **One** advantage plus **two** disadvantages From: Advantages Don't need to capture animals – less risk of harm No disturbance to newts/habitat Gene pool studies possible Disadvantages Delay before results available No population dynamics data More complex equipment		3	AO3

Qu	Part	Marking guidance	Comment	Total marks	AO
05	1	1 mark for correct calculation for both colonies Colony A Area = 0.21 km^2 Abundance = 65 x 10^3 Population density = 309.5 x 10^3 km^{-2} Accept 290 to 330 x 10^3 Colony B Area = 0.42 km^2 Abundance = 120 x 10^3 Population density = 285.7 x 10^3 km^{-2} Accept 280 to 291 x 10^3 1 mark for difference Difference = 23.8 x 10^3 km^{-2} Accept correct value calculated from results first two calculations.	Students need to use the data from the graph to calculate the population densities for the two colonies and calculate the difference between them as a percentage of the density of colony A.	2	AO2
05	2	Overlapping standard deviations so no significant difference	Students must understand the use of standard deviation in assessing statistical significance and how it can be represented on graphs.	1	AO3
05	3	Any four of: eg • Check population density is the same using both methods, to check the accuracy of satellite surveys. • Check species composition is the same using both methods, to check the accuracy of satellite surveys. Activities that are only possible with ground-based surveys: eg • Collection of data on breeding success • Collection of data on survival	Students must consider the information given, and their own knowledge, to suggest why ground-based surveys are still used. This involves an evaluation of the data that can only be collected by ground-based surveys.	4	AO3

		rates • Collection of data on growth rates • Collection of data on food • Collection of data from DNA samples • Collection of data from blood samples • Can allow fitting of tags/tracking devices			

05	4	Reduced ice area linked to (fewer) Adelie Penguins, (more) Gentoo Penguins	Students must show they understand the relationship between pack ice area and population size for the two penguin species(caused by feeding habits).	1	AO1

05	5	Any **two** from: • More krill survives – eaten by the food of King Penguins • Change in predator feeding habits (King to Adelie Penguins) • Less competition for breeding sites • Accept: King Penguins predate on Adelie Penguins	Students are not expected to have knowledge of penguin population dynamics or food webs. They must deduce possible answers from their wider knowledge.	2	AO2

Qu	Part	Marking guidance	Comment	Total marks	AO
06	1	Any **two** from: • Higher productivity/higher yield per unit area • wider market with more than one product/less prone to market variations • reduced risk of loss from species-specific pests/disease • species occupy different niches in lake • some species provide faeces/food for others/common carp • common carp aerate mud • reduction of population of denitrifying bacteria • release/re-suspension of nutrients		2	AO1
06	2	Any **two** from: • to replace nutrients removed by fishing • to increase algal/plant growth for silver/grass carp food • to provide food for common carp • nitrogen/nutrients for fish to produce proteins • cheaper/more easily available than inorganic fertiliser	Students must understand the possible impacts of adding manure and deduce suitable answers from the information given or suggest plausible answers from their wider knowledge. Students are expected to demonstrate their understanding of the properties of manure as a source of inorganic and organic nutrients.	2	AO1

06	3	Any **three** from: • Shrimp growth rate higher than mullet • Mullet mass increase greater than shrimp • Shrimp growth rate lower under polyculture than monoculture • Mullet growth rate higher under polyculture than monoculture	Students must identify the trends within each data set and evaluate differences between them in rates of changes and changes in values.	3	AO3

06	4	• Variability increases over time in all data sets • Variability is greater for mullet than shrimps • Variability is greater for polyculture than monoculture	Students must understand that the spread of data around the mean is represented by the standard deviation. They should compare the SDs and means to evaluate the differences in data variability in the original data.	3	AO3

Qu	Part	Marking guidance	Comment	Total marks	AO
07	1	EITHER • shaken up in distilled water and left to settle • calibrated pH meter OR • add distilled water and barium sulfate addition • pH papers/solution/universal indicator for colour comparison/reference to range of colours [Reject litmus papers/red-blue]		2	AO1
07	2	There is no relationship between soil pH and crop yield		1	AO3
07	3	0.1%	Students need to understand how a correlation coefficient can be used to determine the level of statistical significance of the coefficient.	1	AO3
07	4	0.7 Accept 0.7 – 0.71	Students must show their understanding of probability in interpreting and using the graph.	1	AO3

07	5	Any **five** reasons from: • less aerobic activity • decreased decomposition/cycling of nutrients/organic matter in soil • slower release of organic phosphate (during decay) • eg by decomposers/detritivores • decreased phosphorous mineralisation • decreased uptake of inorganic phosphate by plants • fewer mycorrhizal fungi • decreased nitrogen fixation • by eg *Azotobacter/Nostoc* • decreased nitrification • by eg *Nitrobacter/Nitrosomonas* • decreased nitrate uptake by plants • nitrates less available for synthesis of eg amino acids/protein/DNA • less soil mixing/aeration by worms	Students gain credit for describing the edaphic factors controlled by waterlogging and low pH and for specific named soil taxa. Credit is also gained for linked descriptions of how these affect crop growth and therefore yields.	5	AO2

Qu	Part	Marking guidance	Comment	Total marks	AO
08	1	Any **five** reasons from: • Disproportionate effect on the community relative to their abundance/low functional redundancy • Seed dispersal • Seeds not destroyed by rumination/chewing • Undigested seeds in dung • Greater dispersal distance of seeds • Paths for other species • Create water holes • Creation of clearing • Increased water availability • Increased mineral nutrient availability • Dung is food for other species • Other species that rely on trees • Control of named abiotic factors	Students must understand the concept of keystone species and apply this to an unfamiliar species. They must analyse and interpret the passage to select information that demonstrates this role for the African Forest Elephant.	5	AO2 = 2 AO3 = 3

Qu	Part	Marking guidance	Comment	Total marks	AO
09	1	Any **two** factors with data from: • Orange Roughy has a later age of first breeding: 2 vs 20 yrs • Orange Roughy has a lower fecundity: 30 000 vs 80 000 • Orange Roughy can be caught before breeding: Mackerel: breeding age: 2; age caught: 2 Orange Roughy: breeding age: 20; age caught 10	Students must analyse and interpret the data in the table to select the significant values and explain the difference in overfishing risk.	2	AO3
09	2	Any two of: • Mackerel are caught in single species shoals • Named more selective fishing method used for Mackerel: /purse seining/hand lines • Mackerel are pelagic/there is no demersal/seabed catch		2	AO3
09	3	Any **two** from: • Earlier age at first breeding • Smaller mean mass • Younger mean age • Lower genetic diversity	Students must show they understand the data that must be collected to estimate Maximum Sustainable yield and therefore detect overfishing.	2	AO1
09	4	Mackerel mean growth rate = 0.125 kg yr^{-1} Orange Roughy mean growth rate = 0.0467 2.68 times as fast Accept 2.677/2.679	Calculation commentary Max mass/max age = 2.5 kg/20yrs Max mass/max age = 7.0 kg/150 yrs 0.125/0.0466 = 2.68	2	AO2
09	5	First mark 0.2 kg mass at first breeding Second mark 0.2 x 80 000 = 16 000	Calculation commentary From Table 6, the age of first breeding is 2 years. From Figure 8, the mass at age 2	1	AO2

			is 200g. From Table 6, fish produce 80 000 eggs per kg.		

09	6	Named improvement Detail eg Net maximum size limit Dolphins/porpoises not disoriented/can escape Escape hatches eg of named bycatch taxon/turtles Dolphin pingers/reflective discs Warn of presence of net		2	AO1

09	7	NTZ • Protected breeding population • Breeding surplus re-populates fished areas Minimum catchable size regulations • Uncaught individuals survive to grow • Larger mass when caught	Students must show understanding of how the two techniques work to protect breeding populations and increase future catches.	4	AO1

Qu	Part	Marking guidance	Comment	Total marks	AO
10	1	Any **three** from: • More suitable conditions for decomposers/bacteria • Suitable temperature: rate of decomposer activity, kinetic energy for chemical reactions • No light for photodegradation • Less water • Lower mobility/dispersal	Students must apply their knowledge of pollutant properties and aquifers to the behaviour of neonicotinoids	3	AO2 = 2 AO3 = 1
10	2	Any **three** from: • Changed farming practice • Other pesticide • Weather/climate change • Change in inter-dependent species	Students must apply their knowledge of wildlife conservation and agriculture to suggest other causes of the decline in bee populations.	3	AO2 = 2 AO3 = 1
10	3	Any **three** features that reduce the amount used, from: • Accurate positioning (on seed) (because seed coating rather than aerial) • Translocation throughout plant (because systemic rather than contact) • Longer presence (because persistent) • Reduced need for re-application (because persistent/systemic) • No spray drift (because seed coating rather than aerial)	Students must apply their understanding of pollutant and pesticide properties to compare the behaviour of the two pesticides and therefore the amount used.	3	AO2

10	4	Essential plan features Neonicotinoid and fungicide – ranges of concentrations Measured separately and in combination Any **four** details from: • Stated method(s) of application/exposure • Stated duration of tests • Stated measure of impact eg lifespan, LD_{50}, LC_{50}, MDAF, MDNF, other % mortality measure • Replicates of each test • Standardisation of other named variable	Students must apply their understanding how the independent variables must be controlled and changed. They must also apply their understanding of the need to standardise the method and control other variables.	6	AO2 = 3 AO3 = 3

11.1 Agriculture

AO1 = 10, AO2 = 10 and AO3 = 5

Marking guidance			
Topic areas	**Possible topics**	**Impact on sustainability**	**Spec ref**
Conservation of biodiversity	Habitat conservation Ref to agri-environment schemes eg Countryside Stewardship Uncultivated field margins/corners Beetle banks Hedgerow infill/management for wildlife Ditch management In-field trees Skylark scrapes Conservation of specific Habitats, eg grazing marsh, chalk grassland.	Provision of habitat/suitable conditions for wildlife. Examples of specific taxa and why they benefit	3.5.1 3.1.2
	Cultural pest control rather than use of pesticides	Pesticide impacts (that are reduced) Loss of non-target species Loss of inter-species relationships Food Pollination Seed dispersal Contamination of water supplies	
	Management of pesticide use Choice of pesticides Low volume spray systems Pest monitoring systems, eg use of UAVs/satellite imagery	Ref to impacts of specific groups eg Organochlorines Organophosphates Pyrethroids Neonicotinoids Reduced amount used. To reduce unnecessary use.	
Atmosphere	Low tillage methods. Alternatives to artificial nitrogen fertilisers.	Reduced CO_2 emissions from fuel use by machinery. Reduced CO_2 emissions during manufacture, reduced NOx emissions following application.	3.5.1 3.2.1
Hydrosphere	Low nitrate use over aquifers/near rivers	Reduced contamination of water supplies Reduced eutrophication	3.5.1 3.2.2
	Drought–resistant crops	Reduce over-exploitation of irrigation water supplies	
	Mulching	Reduce evaporation of soil moisture	
Mineral resources/ biogeochemical cycles	Use of organic fertilisers/compost Growth of legumes/green manures	Reduced use of artificial fertilisers - reduced energy use, eg Haber process - reduced use of non-renewable	3.5.1 3.2.3 3.2.4

		phosphate reserves	
	Crop rotation Maintain soil biota – aeration and organic matter	Even nutrient demands, reduced need for additional nutrient inputs	
Soil	Soil conservation measures: Long-term crops Contour ploughing/terracing Tied ridges Windbreaks Multi-cropping/strip cropping Mulching Increased organic matter	Details of how methods work. Reference to soil texture, structure, humus, water content	3.5.1 3.2.5
Energy	Low/no tillage methods	Reduced non-renewable fossil fuel use	3.5.1 3.3

Issues that may be developed

- Clear understanding of sustainability.
- Decision-making for long-term optimal production rather than short-term maximum production.
- Max output/unit input rather than max output/unit area.
- Comparison of extensive and intensive systems.
- Efficiency rather than productivity.
- Organic agriculture/permaculture: the use of natural systems rather than artificial systems.
- Food chain control, eg low-meat diets.

11.2 Circular economy

AO1 = 10, AO2 = 10 and AO3 = 5

Marking guidance			
Topic areas	**Detail**		**Spec ref**
Principles of the circular economy	**Examples in natural systems**	**Application to human systems**	
• Cycling of materials	• Biogeochemical cycles • Hydrological cycle • Reliance on simple monomers, (eg CH_2) to build complex molecules • Biodegradable molecules	• No planned obsolescence • Maintain • Refurbish • Reuse • Recycle • EU landfill directive	3.2.4 3.2.2 3.4 3.6.3 3.6.4
• Energy derived from renewable resources	Low energy density solar power Photosynthesis produces high-energy density molecules	• Reduced use of non-renewable energy • Increased use of renewable energy • Development of associated technologies eg energy storage • Increased use of low temperature processes	3.3 3.6.2
		New technologies to optimise use: energy conservation	3.3
	Low temperature processes	Bioleaching, phytomining, polymer adsorption	3.2.3
• Human activities should support ecosystems	Living organisms exploit ecosystems but do not destroy them. Surplus production supports ecosystems, eg flowers, seeds, breeding surplus	Exploitation below the Maximum Sustainable Yield • Fisheries • Forests Integration of natural and human landscapes • Urban areas • Agriculture	3.5.2 3.5.3
• Separation of technical and biological material	Simple monomers can be broken down and rebuilt in different forms	Separation of materials Recycling of technical materials eg metals Biodegradation/alternative use of organic wastes eg sewage, food processing waste Increased use of organic materials, eg polymers from plant oils	3.4 3.6.3 3.6.4
• Diversity increases resilience	Natural stability of diverse ecosystems, eg tropical rainforests.	Polyculture rather than monoculture Natural nutrient systems rather than chemical fertilisers Ecological pest control The hydrogen economy	3.5.1 3.3
	Adaptation to new ecological	Biomimicry:	3.1.2

	niches increases diversity and resilience	Vehicle designs Architecture Materials	
• Connected systems use wastes as resources	Role of living organisms in biogeochemical cycles. Living systems rarely produce toxic wastes	Industrial symbiosis – co-location of industries to use wastes eg Kalundborg: integration of energy supply, fertilisers, cement, biotechnology, agriculture, aquaculture, metallurgy, water management.	3.2.4 3.6.3
• Design for end of life	Biodegradation and reuse Cradle to cradle design (C2C)	EU Vehicle design for end of life directive WEEE – EU directive on waste electric and electronic equipment EU directive on packaging and packaging waste Active disassembly Lease/purchase-buy back systems	3.6.3

Examiners are reminded that AO1, AO2 and AO3 are regarded as interdependent. When deciding on a mark all should be considered together using the best fit approach. In doing so, examiners should bear in mind the relative weightings of the assessment objectives. More weight should therefore be given to AO1 and AO2 than AO3.

Level	Marks	Descriptors
5	21-25	A comprehensive response with a clear and sustained focus. Content is accurate and detailed. Relationships are identified, reflecting the holistic nature of environmental science and the answer as a whole is coherent. A wide range of relevant natural processes/systems and environmental issues are described and articulated clearly. These are applied systematically to the question, with clear relevance to the context. Where conclusions are made, these are fully supported by judgements and presented in a logical and coherent way. Relevant environmental terminology is used consistently and accurately throughout. If there are errors, these are very minor indeed and not sufficient to detract from the answer.
4	16-20	A response in which the focus is largely sustained, with content that is mainly accurate and detailed. Relationships are identified and the answer is largely coherent. A range of natural processes/systems and environmental issues are described and articulated clearly. In most cases, these are applied appropriately to the question but, in some, it is less clear why they are relevant. Where conclusions are made, these are supported by judgements which are mostly coherent and relevant. Relevant environmental terminology is used consistently and throughout, with no more than minor errors.
3	11-15	A partial response which is focused in parts. The content is mostly accurate but not always detailed. There is an attempt at identifying relationships, but the answer as a whole is not fully coherent. A range of natural processes/systems and environmental issues are described, most are articulated clearly. In some cases, these are applied appropriately to the context but, in most, it is less clear why they are relevant. Where conclusions are made, it is not always clear how they relate to the judgments given and are likely to contain errors. Relevant environmental terminology is used, but not consistently and there may be errors.
2	6-10	An unbalanced response, lacking in focus. The content may be inaccurate and lacking detail. There is some attempt at identifying relationships, but the answer is not coherent. A limited range of natural processes/systems and environmental issues are described but not articulated clearly and likely to contain errors and/or omissions. There is a limited attempt to apply them to the context. Any conclusions are likely to be asserted, with no supporting judgements and fundamental errors. Environmental terminology is used, but not always appropriately and sometimes

		with clear errors.
1	1-5	Fragmented points, whose relevance to the question and relationships to each other are unclear. A few natural processes/systems and environmental issues are listed, but unlikely to be described and many may be irrelevant. There is no clear attempt to apply them to the context. It is unlikely that a conclusion will be present. There is an attempt to use environmental terminology, but seldom appropriately.
	0	Nothing written worthy of credit.

Assessment Objective Grid

	AO1	**AO2**	**AO3**	**Total**
01.0		5		**5**
02.1		1 (practical)		**1**
02.2		2 (practical)		**2**
02.3	2 (knowledge/practical)			**2**
03.1		3 (practical/maths)		**3**
03.2		2 (practical)	1 (practical)	**3**
03.3	2	2		**4**
04.1	2			**2**
04.2		2		**2**
04.3	2			**2**
04.4	1 (knowledge)			**1**
04.5			3 (practical)	**3**
05.1		2 (maths)		**2**
05.2			1 (maths)	**1**
05.3			4 (practical)	**4**
05.4	1			**1**
05.5		2		**2**
06.1	2			**2**
06.2	2			**2**
06.3			3 (maths)	**3**
06.4			3 (1 maths)	**3**
07.1	2 (knowledge)			**2**
07.2			1	**1**
07.3			1 (maths)	**1**
07.4			1 (maths)	**1**
07.5		5		**5**
08.1		2	3	**5**
09.1			2 (1 maths)	**2**
09.2			2	**2**
09.3	2			**2**
09.4		2 (maths)		**2**
09.5		1 (maths)		**1**
09.6	2 (knowledge)			**2**
09.7	4			**4**
10.1		2	1	**3**
10.2		2	1	**3**
10.3		3		**3**
10.4		3 (practical)	3 (practical)	**6**
11.1	10	10	5	**25**
Or				
11.2	10	10	5	**25**

Paper Total	**34**	**51**	**35**	**120**

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