

**Applied Engineering (Double Award)
Applied Manufacturing (Double Award)**

General Certificate of Secondary Education **GCSE 1492**

General Certificate of Secondary Education **GCSE 1496**

Mark Schemes for the Units

January 2007

1492/1496/MS/R/07J

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

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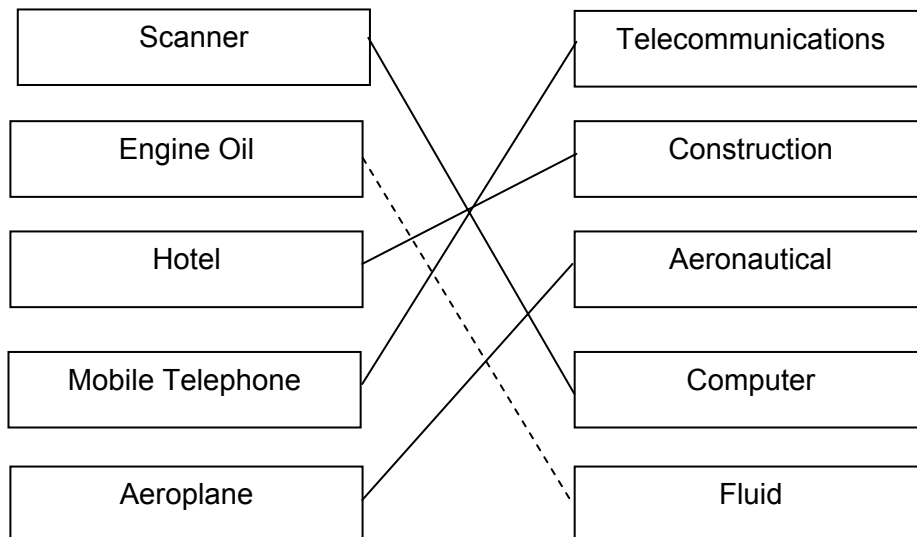
Applied GCSE (Double Award) Engineering (1492)
Applied GCSE (Double Award) Manufacturing (1496)

MARK SCHEMES FOR THE UNITS

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Mark Scheme 4868
January 2007

1 (a)



1 mark per correct link. Do not reward the point which has been given.

[4]

(b) **Technology must be used by the product not used in the manufacture of the product**

Reward old technology if no new technology stated and vice versa.
Reward old technology where it relates to the suggested new technology or to the product itself. Examples below.

Scanner:

New Technology: Digital Technology - copying, high resolution, colour, magnification/reduction capability, light sensor, optical character recognition, 1

Old Dot matrix (if new technology appropriate), typewriter/ribbon, Gestetner, Banda, carbon paper tracing. 1

Hotel:

New Technology: electronic booking/billing/reservations, Internet advertising, popup etc, automatic telephone systems, thermostatic central heating control, electronically controlled lifts, reinforced concrete used in construction, electronic key pads. 1

Old Technologies: Paper based/booking/bookkeeping/billing/reservations, receptionist manually answering every call, localised heating/ventilation systems, manual doors in lifts, electrically controlled lifts, traditional construction methods (not as far back as wooden walls!), yale/mortise keys. 1

Mobile Telephone:

New Technology: (accept changes from a traditional "land line") micro electronic components, display devices, LCD, mobility/cordless, infrared, Bluetooth, blackberry, digital cameras, satellite technology, sim cards, memory chips, voice recognition, video, email, internet, extended colour ranges now available (details required), weight/size related to improved moulding techniques, range of ring tone, polyphonic ring tones, keypads. 1

Old Technology: (accept changes from a traditional "land line") cords/cables,

limited memory, only made phone calls, size/weight/bulk, limited colours, limited tones,
bell alert, circular dial - slower/mechanical. 1

Aeroplane:

New Technologies: Satellite Navigation, radar, modern materials (tungsten, aluminium alloys, specific plastics ie PTFE on nose cones) reference performance of aircraft, automatic pilots, inferred cooking of in flight meals, electronic warning systems for doors/landing gear stowage/air pressure etc. 1

Old Technologies: Materials related to weight/performance, electronically heated food warming, manual operation of..., mechanical warning systems. 1

Maximum of 6 marks **[6]**

- (c)
- Special rules apply for H & S
 - Special quality standards apply to sector
 - Similar materials are used for similar tasks
 - For promotion/advertising/etc.
 - Unions or trade organisations represent common interests
 - Identifies where similar jobs or training needed
- 1

Any two points at one mark per different point 1

Maximum of 2 marks **[2]**

Total maximum mark for this question is: 12

- 2 One mark for each relevant point shown.
Must relate to design or manufacture of product shown.
No marks for points repeated from the digital camera.
Rather than ticks, use T, M or S to identify where marks have been awarded.

T – maximum 4

One mark for each named example of technology, one for detail on how/why used.
(N.B. Mobile phone may have two cameras. One for pictures the other for video calls.) **[4]**

M – maximum 4

One mark for each named example of a material or component. (not plastic –must be specific)

One mark for how used

[4]

S – maximum 4

One mark for sketch showing overall structure. One for each structural feature identified, one more for explaining how the structural feature meets its purpose/reflects the technology used. **[4]**

For example, the camera shown could gain marks as follows:

Recognisable drawing (S)

Electronic flash (T or M) for night pictures (second T or M)

Lens (S or M)

Lightweight (S or M) pressed Al (M) case(S or M)

Lithium ion battery (M and T) compartment at back (S)

USB port (T) at back (S) for fast transfer of pictures (T)

DC jack in (S M or T) for battery charging (second M or T)

LCD colour screen (T or M) at back to view pictures (second T or M)

Infra-red remote receiver (T or M)

Slot (S) for lens cover (M)... to protect lens from damage (S)

Viewfinder (M or S) to focus (S)

Total maximum mark for this question is: 12

- 3 The question is about modern materials and **not** modern technologies.
One mark for correct product plus one mark for appropriate material.
Accept repeats where relevant. Must be a named, specific material.
- (a) Weight reduction: Tennis racquet = carbon fibre [1]
Surfboards, canoes = GRP, fibre glass [1]
Car wheels = Aluminium alloy
Packaging materials = expanded polystyrene foam (accept polystyrene)
Clothing = Synthilla
- (b) Stronger:
Canoes, boat hulls, caravans, surfboards = GRP, fibre glass [1]
Car bumpers, TV cases, tool boxes = ABS [1]
Crash helmets, riot shields, telephone box/bus shelter windows = polycarbonate
Fishing rods: Carbon fibre
- (c) Easier to use:
Baking trays, frying pans = PTFE coating [1]
Clothing = Rayon/acrylic, SOFT *switch* fabric [1]
CD drawer = motion control gel (smart grease)
Flip top lids on containers = polypropylene (live hinges)
Drinks cans = aluminium (ring pulls)
- (d) Safer
Crash helmets, riot shields, safety machine guards = Polycarbonate [1]
Babies feeding bottle, electric kettles, thermometers = Thermochromic inks. [1]
Safety clothing eg Fireman's soldiers jackets = Nomex or Kevlar
Clothing/footwear = Gortex *if qualified reference properties of Gortex.*
- (e) One mark for a possible effect on the workforce identified one mark for justification/reasoning. Examples below: [2]
Increased pay/more job satisfaction because of specialised training
Reduced pay/job satisfaction/ pride in work because skills no longer needed
loss of workers, increased boredom
0-2 for each effect depending on amount of detail given and understanding shown. [2]

Total maximum mark for this question is: 12

- 4 (a) Research, market research, CAD, (**NOT** CAM), email communication with other companies potential customers, calculations, presentation of ideas to customer, trialling/testing of ideas, modelling, early 3D evaluation (one for each **different** example given). [1]
[1]
- (b) Internet advertising, pop-up's, emails, production of flyers/brochures/adverts/ automatic telephone dialling, data base of customers (**NOT** component/stock/ materials). (One for each **different** example given) [1]
[1]
- (c) Programme **control**, offering different washing/spinning cycles, alarms for certain actions/operations, different models having different functions, voice warnings.
0-2 dependent on detail and understanding evidenced. [2]
- (d) Automated equipment used for Cutting, folding, bending panels, assembly of/soldering/placement of components related to PCBs, screwing, riveting or welding components together, spraying panels, assembly of drum/blocks/ transporting, CIM etc.
Specific operations stated (one mark per operation) plus/or additional mark for explanation/understanding shown. [2]
- (e) Description of a benefit to users. Examples below.
Wider range of products, more functions, more efficient, feeling of well being - having used eco-cycle (one mark, for second need expansion – why or how)
Water usage/less powder needed reference environmental damage, more efficient product through programming/improved action, generally less cost for better quality product, products tend to last longer (have longer warranty) than previously, smaller products than earlier machines through electronics/materials, more aesthetically pleasing due to improved materials and technology. [2]
- (f) Difficulties of disposal. 2 marks for each one described. Award one mark only for a feature e.g. heavy, not biodegradable, for the second, need to show understanding of how/why) Examples below.
Convincing users to correctly dispose, risk of children/animals getting trapped in old machines, physical problems of lifting, moving, storing prior to removal/ transportation due to bulk/weight, fly tipping by irresponsible people, difficulty in separation of materials for recycling, transfer of "disposal cost" to consumer/manufacturing company, disposal of CFCs, scrap value v effort required for such products. [2]
[2]
0-2 for each **different** difficulty depending on detail given and understanding evidenced.

Total maximum mark for this question is: 14

5 (a)

Mechanical	Electrical/electronic	Pneumatic/hydraulic
Springs	LEDs	Reservoirs
Gear trains	Thermistors	Flow control valves

One mark for each correctly identified classification [4]

(b) One mark for appropriate application or function in product. **plus** up to two marks for reasons for use:

Spring:

Return mechanism on gate - simple component, inexpensive component. 1

Easy to fit/replace, differing types/strengths available. Can be adjusted. 2

Gear trains:

Gear box inside metal working lathe - efficient transfer of rotary motion, allows for reverse movement, easily maintained, replaced, efficient 1

engagement of teeth, gear wheels can be changed to get different ratios. 2

Other examples below

LEDs:

Stereo indicators - small components, energy efficient, withstands physical "shock" up to a point - compared to a bulb, different colours available, easy to fit/solder in place, flashing LEDs available. [3]

Thermistors:

Frost Alarms - small component, cost effective, easy to install/replace in some instances, available in a range of values, robust component. [3]

Reservoirs:

Motor car braking system - container for extra/surplus fluid, safety amount of fluid to avoid air ingress to system, backup container for fluids, reserve to maintain functionality of system. [3]

Flow control valves:

Radiator thermostat - adjust liquid flow in a system, adjustable valves, adjustable flows, simple to operate, hand operation. [3]

Maximum of 6 marks

(c) Specific point identified for one mark. Justification/reasoning required to support award of second mark

Speed of locating components, ordering, stock control, calculations of value of stock, automatic ordering of replacement stock. Tracking customer orders. Less paperwork, fewer errors, less manpower required, smaller work space, cost effective method, 100% accurate, minimal human error (input and interpretation only). Data easily transferred to other departments/companies via email/internet. [2]

Maximum of 4 marks

Total maximum mark for this question is: 14

- 6 (a) Award across the response.
 One mark for giving a correctly-named example of a process with up to a further two for describing it, or
 Three marks for clear description of an example of one of the process types but without the correct name for it. Examples below:

Process examples

Material removal processes: Filing, shaping machine, milling, sawing, mechanical sawing, lathe, CNC lathe, router, CNC router, guillotine, snips, etching.

Shaping and manipulation processes:

Shaping machine, spinning, bending, rolling, folding beating, hollowing, casting, moulding, planishing, raising.

Joining and assembly processes:

Brazing, soldering, welding, gluing, screwing, riveting, bolting.

Heat and chemical treatment:

Bluing, etching, pickling, coating - galvanizing - chrome plating etc, annealing, hardening.

Surface finishing:

Bluing, painting, enamelling, stove enamelling, coating, waxing, polishing.

Process description points

Should include positive points to reward, e.g. Preparation

Correct tool or machine/selection of tool or machine identified, why chosen, alternative tools or machines/methods of holding of work piece/securing of work piece, quality indicators/control points, possible problems, next steps **2 x [3]**

- (b) Test must relate to one of the two chosen processes answered in part a. **NO** marks if a disassociated test.
 One mark for test identified plus one mark for description = (0-2)

Appropriate test suggested: use of reference points, templates, optical templates, weighing, visual test, roughness test, hardness test, jigs. **[2]**

- (c) Award marks for:
 Showing understanding of tolerance **e.g.** limit of acceptable discrepancy of size, weight, etc of a component or dimension. Referred to as \pm (plus or minus) unit. (1)
 Clear description of what course of action is taken/what consequences are when something is out of tolerance (one mark only for 'it is scrapped' type response) **[2]**

- (d) Description of effect on product outcome related to good/poor/no production planning.
 Reference needs to be made to **two** of the following:
 Materials/parts to be used; Processes to be used;
 Tools, equipment and/or machinery; Sequence of activities;
 Scheduling; Quality checks; and H&S factors
 For example:
 People, components processes can be organised clearly so that production is smooth and efficient as possible (2 Marks)

[2]

Total maximum mark for this question is: 12

- 7 (a) Material consisting of long chains of linked monomers or accept plastic materials produced from carbon based materials such as oil or coal. (1)
Any polymer as an example for second mark.
Do not reward second mark unless there is an example. [2]
- (b) To obtain improved properties/characteristics which are new or transferred from one mother metal to the alloy.
Any alloy as an example for second mark. (Include stainless steel).
Do not reward second mark unless there is an example. [2]
- (c) Memory activated when alloy reaches a specific temperature, e.g. by removal of electric current which when initially applied causes the wire (material) to shrink.
One for description plus second mark for reference to temperature producing reversion to shape. [2]
- (d) No mark for example but example used as vehicle for candidate explanation
Babies drinks mug, thermometers etc.
Thermochromic inks/films/paints:
Changes colour with exposure to heat and/or cold = 1 mark.
A flexible decorative practical product easy to apply = 1 mark.
0-2 for details and understanding evidenced, [2]
- (e) One mark for device and one for appropriate use which could relate to phones cameras, video recorders, etc.
Examples (appropriate for ..., see below)
Hard disk (A), memory card (A, I, RW, phones, cameras),
Floppy disk (P,E, RW) memory stick (A RW, phones, cameras) pen drive (E, RW,)
CD-R (E,R, P) CD-RW (E,RW, P), DVD (E,R, P), [1]
SIMMs (A ,I,T), RAM chips (A ,I,T),
External hard disk/USB hard disk [1]
- Look for detailed understanding for second mark. Guidance:
P portable storage
T temporary/volatile
R read only
RW read/write
I internal, E – external
A additional memory for computer/phone [1]
- NOT just storing data! [1]

Total maximum mark for this question is: 12

8

- Identify **three** relevant issues/points raised by the question;
- Explain why you consider **two** of these issues/points to be relevant, and
- Use **one** specific example or piece of evidence to support your answer.

If a candidate has clear and detailed understanding but does not adhere to the structure award positively but do not give marks away for “guesses” or similar points repeated without showing understanding.

There is some overlap because both are essentially about control, for full marks candidates should show understanding of the differences.

(a)

Issues/points	Relevance	examples
Programmed control	Offering different functions different models having different functions, alarms for certain actions operations	e.g. washing machines made with different functions
Can be reprogrammed or replaced easily	Capability of upgrades made easier. Wider variety of products more sales more money choice	Car engine management system can be reprogrammed to improve performance
Increased range of product options	Naturally then attract a wider market one production line can offer many alternative products	
	Company image enhanced	

[6]

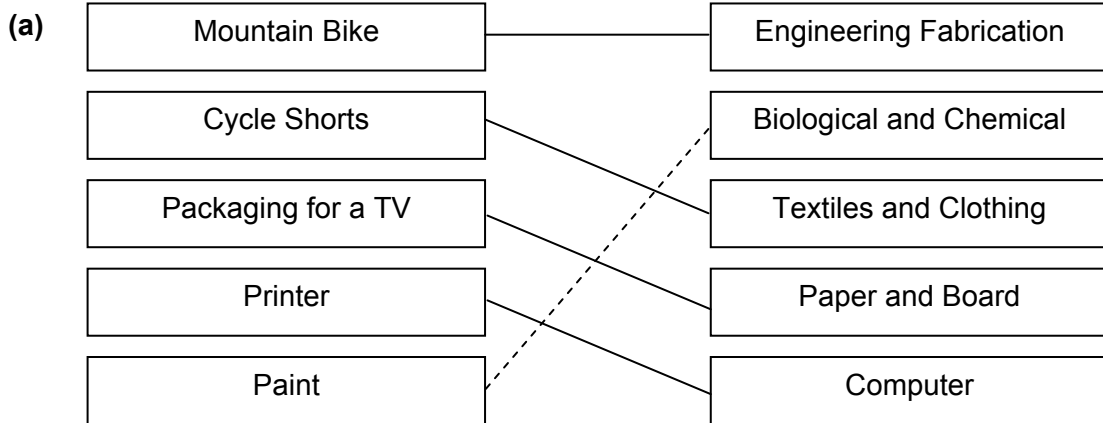
(b)

Issues/points	Relevance	Examples
Programmed control Flexible control	Switch outputs depending on inputs	Conveyor belt speed control in continuous freezer
Easy to set up compared with specialised control systems . Contain everything needed to handle high power loads.	Less down time when setting up or switching products No extra electronics	
Use logic notation so very little electrical design is required/can change program relatively easily	Highly skilled programmers not needed	Keeps production set up costs down
They can operate in adverse conditions/hazardous environments Mechanically/electrically rugged. Can carry out repetitive operations to consistent high quality	Can be used for wide range of production tasks	Paint spraying controlling robots Consistently high product quality
Low cost to buy and run compared with other control systems	Reduce production costs Reduce product costs	
May have unemployment	Automation of processes reduces size of workforce	

[6]**Total maximum mark for this question is: 12****Total 100 marks**

**Mark Scheme 4880
January 2007**

1



1 mark per correct link. Do not reward the point which has been given.

[4]

(b)

Product	Modern Technology	Technology Replaced
Paint	Synthetic binding agents.	Lead as a pigment.
Mountain Bike	Carbon fibre frames, multi speed gearing systems, hydraulic disc brakes, hydraulic/pneumatic suspension systems. (1)	Low carbon steel or aluminium frames, hard rubber brake blocks (side pull), little or no suspension damping, limited gearing systems, etc. (1)
Printer	Bubble jet, ink jet, laser, dot matrix, accept colour printing/photo printing, memory card printing, memory devices, USB transfer of data. (1)	Dot matrix (if new technology appropriate), typewriter/ribbon, Gestetner, Banda, carbon paper. (1)
Cycle Shorts	Lycra, breathable fabrics. (1)	Cotton. (1)
Packaging for a TV	Expanded polystyrene moulding. (1)	Cardboard, brown paper wrapping. (1)

- (c)
- Special rules apply for H & S
 - Special quality standards apply to sector
 - Similar materials are used for similar tasks
 - For promotion/advertising/etc.
 - Unions or trade organisations represent common interests
 - Identifies where similar jobs or training needed

1

Any two points at one mark per different point

1

Maximum of 2 marks

[2]

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Clothing = Synthilla

(b) Stronger: [1]

Canoes, boat hulls, caravans, surfboards = GRP, fibre glass [1]

Car bumpers, TV cases, tool boxes = ABS [1]

Crash helmets, riot shields, telephone box/bus shelter windows = polycarbonate

Fishing rods: Carbon fibre

(c) Easier to use: [1]

Baking trays, frying pans = PTFE coating [1]

Clothing = Rayon/acrylic, SOFT *switch* fabric [1]

CD drawer = motion control gel (smart grease)

Flip top lids on containers = polypropylene (live hinges)

Drinks cans = aluminium (ring pulls)

(d) Safer [1]

Crash helmets, riot shields, safety machine guards = Polycarbonate [1]

Babies feeding bottle, electric kettles, thermometers = Thermochromic inks. [1]

Safety clothing eg Fireman's soldiers jackets = Nomex or Kevlar

Clothing/footwear = Gortex *if qualified reference properties of Gortex.*

(e) One mark for a possible effect on the workforce identified one mark for justification/reasoning. Examples below: [2]

Increased pay/more job satisfaction because of specialised training

Reduced pay/job satisfaction/ pride in work because skills no longer needed

loss of workers, increased boredom

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Convincing users to correctly dispose, risk of children/animals getting trapped in old machines, physical problems of lifting, moving, storing prior to removal/ transportation due to bulk/weight, fly tipping by irresponsible people, difficulty in separation of materials for recycling, transfer of “disposal cost” to consumer/manufacturing company, disposal of CFCs, scrap value v effort required for such products. [2]
[2]
0-2 for each **different** difficulty depending on detail given and understanding evidenced.

Total maximum mark for this question is: 14

- 5 (a) For each part, up to 3 marks for a clear explanation using an example. Award up to 2 marks for points such as given below, with a suitable example for the third mark.

Continuous operation

Robots are mechanical/electronic. Once they are set up they do not need to stop for breaks like humans (one example only), sickness or holidays. Robots can have their maintenance planned in advance, when not needed for production. [3]

Improved reproducibility

Once programmed, robots repeat the same actions. Human performance tends to vary through tiredness/distractions. Robots can monitor and adjust themselves (as wear occurs for example), or monitor process and adjust their settings to maintain quality. [3]

Increased speed

Robots can be programmed to continue non-stop, minimising lost time. They require less time between operations than a human and can move instantly with accuracy whereas humans would need to use hand-eye coordination, for example in positioning components. Consecutive operations can take place more quickly because wet paint/temperature need not interfere with next process. Heavy work pieces can be manoeuvred safely (humans may need lifting equipment/help which takes time), all saving time. [3]

Hazardous environments

Because they are machines, robots can work in areas that would be unhealthy to humans, e.g. extreme heat or cold, dust, radioactivity, toxic fumes, etc. Human frame is also sensitive to noise, vibration. [3]

- (b) Two marks for a clear description, giving disadvantage and expanded to include why/how for the second mark. Examples below:
High initial costs of installation: capital costs, training or retraining staff, possible loss of income during changeover.
Could have a bored/disaffected workforce due to loss of jobs/redundancies.
Robots are expensive to repair, and may need to wait for parts/expertise. [2]

Total maximum mark for this question is: 14

6 (a)

Stage	Factors to be considered	
Designing	<p>Factor 1/2 The user, location in use, when to be used, sizes, costs (must be a specific and appropriate cost), weight, materials properties/availability, intended markets, competition, existing products, built in obsolescence, maintenance, waste materials, production techniques, machines/technology available (appropriate to scale of manufacture), ergonomics, storage, transportation, tolerances. Designer suitability.</p> <p>The list is not exhaustive. 1 mark per factor clearly identified. (1 + 1)</p>	<p>[1] [1]</p>
Production planning	<p>Factor 1/2 Time restraints, machinery/staffing available, order of manufacture/assembly, loss of materials/ time, sequencing, need to let components cool/heat up/dry etc, consecutive activities possible, materials supply/storage and control issues, H&S, storage after manufacture, effects and restrictions of JIT. Tolerances.</p> <p>The list is not exhaustive. 1 mark per factor clearly identified. (1 + 1)</p>	<p>[1] [1]</p>
Material supply and control	<p>Factor 1/2 JIT, cost of storage, transportation, disposal of waste, waste, recycling/reusing, tolerances and effects, use of ICT, stock shapes and sizes, atmospheric considerations, use by dates, costing factors related to different suppliers/materials/alternatives. Speeds of delivery.</p> <p>The list is not exhaustive. 1 mark per factor clearly identified. (1 + 1)</p>	<p>[1] [1]</p>
Processing – production	<p>Factor 1/2 H&S, equipment/machines/staffing, throughputs, wastes, tolerances, consecutive and concurrent activities, Quality control, Quality assurance, tracking of products, deadlines following plant failure, restrictions of plant, economic use of plant.</p> <p>The list is not exhaustive. 1 mark per factor clearly identified. Should be specific, (i.e. not ‘costs’) (1 + 1)</p>	<p>[1] [1]</p>
Packaging	Answer given to candidate	
Dispatch	<p>Factor 1/2 Tracking, security of load, methods/speed of transportation, time schedules, informing customers, cool/ freezing containers, identification of cargo, time taken/needed related to products (especially food products).</p> <p>The list is not exhaustive. 1 mark per factor clearly identified. (1 + 1)</p>	<p>[1] [1]</p>

- (b)** No mark for product, but test should relate to it.
One mark for a specific test for example weighing, visual test, flame test, functional testing (with detail), scratch with a pin, standard choking test, (BS) finger test, scuff abrasion test, water resistance test, ultrasound test.
One mark for information the stated test will yield about the stated product. (not repetition from test, either test or outcome must be specifically stated)

[2]

Total maximum mark for this question is: 12

- 7 (a) Material consisting of long chains of linked monomers or accept plastic materials produced from carbon based materials such as oil or coal. (1)
Any polymer as an example for second mark.
Do not reward second mark unless there is an example. [2]
- (b) To obtain improved properties/characteristics which are new or transferred from one mother metal to the alloy.
Any alloy as an example for second mark. (Include stainless steel).
Do not reward second mark unless there is an example. [2]
- (c) Memory activated when alloy reaches a specific temperature, e.g. by removal of electric current which when initially applied causes the wire (material) to shrink.
One for description plus second mark for reference to temperature producing reversion to shape. [2]
- (d) No mark for example but example used as vehicle for candidate explanation
Babies drinks mug, thermometers etc.
Thermochromic inks/films/paints:
Changes colour with exposure to heat and/or cold = 1 mark.
A flexible decorative practical product easy to apply = 1 mark.
0-2 for details and understanding evidenced, [2]
- (e) One mark for device and one for appropriate use which could relate to phones cameras, video recorders, etc.
Examples (appropriate for ..., see below)
Hard disk (A), memory card (A, I, RW, phones, cameras),
Floppy disk (P,E, RW) memory stick (A RW, phones, cameras) pen drive (E, RW,)
CD-R (E,R, P) CD-RW (E,RW, P), DVD (E,R, P), [1]
SIMMs (A ,I,T), RAM chips (A ,I,T),
External hard disk/USB hard disk [1]
- Look for detailed understanding for second mark. Guidance:
P portable storage
T temporary/volatile
R read only
RW read/write
I internal, E – external
A additional memory for computer/phone [1]
- NOT just storing data! [1]

Total maximum mark for this question is: 12

8

- Identify **three** relevant issues/points raised by the question;
- Explain why you consider **two** of these issues/points to be relevant, and
- Use **one** specific example or piece of evidence to support your answer.

If a candidate has clear and detailed understanding but does not adhere to the structure award positively but do not give marks away for “guesses” or similar points repeated without showing understanding.

There is some overlap because both are essentially about control, for full marks candidates should show understanding of the differences.

Issues/points	Relevance	examples
Programmed control	Offering different functions different models having different functions, alarms for certain actions operations	e.g. washing machines made with different functions
Can be reprogrammed or replaced easily	Capability of upgrades made easier. Wider variety of products more sales more money choice	Car engine management system can be reprogrammed to improve performance
Increased range of product options	Naturally then attract a wider market one production line can offer many alternative products	
	Company image enhanced	

[6]

Issues/points	Relevance	examples
Programmed control Flexible control	Switch outputs depending on inputs	Conveyor belt speed control in continuous freezer
Easy to set up compared with specialised control systems . Contain everything needed to handle high power loads.	Less down time when setting up or switching products No extra electronics	
Use logic notation so very little electrical design is required/can change program relatively easily	Highly skilled programmers not needed	Keeps production set up costs down
They can operate in adverse conditions/hazardous environments Mechanically/electrically rugged. Can carry out repetitive operations to consistent high quality	Can be used for wide range of production tasks	Paint spraying controlling robots Consistently high product quality
Low cost to buy and run compared with other control systems	Reduce production costs Reduce product costs	
May have unemployment	Automation of processes reduces size of workforce	

[6]

Total maximum mark for this question is: 12

Total 100 marks

**General Certificate of Secondary Education
Engineering (Double Award) 1492
January 2007 Assessment Series**

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
4866	Raw	50	46	40	34	29	23	18	13	8	0
	UMS	100	90	80	70	60	50	40	30	20	0
4867	Raw	50	45	40	35	30	24	18	13	8	0
	UMS	100	90	80	70	60	50	40	30	20	0
4868	Raw	100	69	61	53	45	39	34	29	24	0
	UMS	100	90	80	70	60	50	40	30	20	0

Entry Information

Unit	Total Entry
4866	126
4867	76
4868	665

Specification Aggregation Results

GRADE	A*A*	AA	BB	CC	DD	EE	FF	GG	UU
UMS	270	240	210	180	150	120	90	60	0
Cum %	0	0	0	100	100	100	100	100	100

3 candidates were entered for aggregation this series

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.html

Statistics are correct at the time of publication

**General Certificate of Secondary Education
Manufacturing (Double Award) 1496
January 2007 Assessment Series**

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
4878	Raw	50	45	40	35	30	24	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4879	Raw	50	45	40	35	30	24	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4880	Raw	100	69	60	51	43	37	32	27	22	0
	UMS	100	90	80	70	60	50	40	30	20	0

Entry Information

Unit	Total Entry
4878	108
4879	35
4880	440

Specification Aggregation Results

GRADE	A*A*	AA	BB	CC	DD	EE	FF	GG	UU
UMS	270	240	210	180	150	120	90	60	0
Cum %	0	0	50	50	50	100	100	100	100

2 candidates were entered for aggregation this series

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.html

Statistics are correct at the time of publication

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