OCR
RECOGNISING ACHIEVEMENT

GCE

Design & Technology

Advanced GCE **A2 7822-3**

Advanced Subsidiary GCE **AS 3822-3**

Mark Schemes for the Units

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2520/01 Product Design 1

1 (a) Justified design requirements include:

- cut holes cleanly to produce neat finish
- cut easily and efficiently so relatively little force is required
- adjustable to suit different sizes of paper
- justified aesthetic comment
- guide to accurately position holes on a range of sizes of paper.
- other appropriate, justified response.

No marks awarded for statements referring to obvious product function eg must punch holes

For **three** justified design requirements 1 x 3 **[3]**

(b) Examples could be:

- easy to set adjustable arm
- relatively little force required
- correct size for palm, hand to locate and press
- safe to use
- handle designed for ease of carrying
- grip on base to prevent movement.

A clear description related to ergonomic features up to 2 marks

For **three** examples described 2 x 3 **[6]**

(c) Appropriate example giving indication of size 1 mark

Explanation to include notion of allowance, eg tight or running fit
Clear explanation up to 2 marks **[3]**

(d) Issues included in discussion could be:

- new products
- research competitor /products/sales
- improve quality assurance
- better advertising/marketing
- restyle/improve already successful products.

Examples could be:

- mobile phone upgrades
- imac - ipod.

P	relevant points/issues	up to 3 marks
Q	quality of explanation	up to 2 marks
S	specific example/evidence	1 mark **[6]**

Total [18]

2 (a) Benefits could be:

- justified statement regarding accuracy
- justified statement regarding speed of use
- easy communication/sharing
- can alter with ease.
- other appropriate, justified response.

For **three** reasons 1 x 3 **[3]**

(b) Example could be:

- miller
- bread making machine
- sewing machine
- plotter/cutter
- lathe
- laser cutter/engraver.

example 1 mark

Benefit could be:
- accurate repetition of shape
- speed, once set up.

clear explanation up to 2 marks **[3]**

(c) Drawbacks could be:

- computer crash
- training/updating
- costly initial set up
- worker alienation/job losses.

Clear explanation up to 2 marks 2 x 3 **[6]**

(d) Issues included in discussion could be:

- whole product designed and tested on computer system
- cost reductions, reduced testing
- lead time reduced
- faults identified
- heavy reliance on 'untested product H& S concerns.

Examples could be:

- CNC machine simulations, testing validity of design
- walk-through architectural type programmes.

P	relevant points/issues	up to 3 marks
Q	quality of explanation	up to 2 marks
S	specific example/evidence	1 mark

[6]

Total [18]

3 (a) Justified design requirements include:

- easy to hold and manipulate to prevent discomfort
- easy to clean to maintain hygiene
- range of colours to coordinate/identify for family members
- some flexibility so as not to harm sensitive gums
- will accept no sharp corners to prevent damage to inside of mouth
- other appropriate, justified response.

No marks awarded for statements referring to obvious product function eg must clean teeth

For **three** justified design requirements 1 x 3 **[3]**

(b) Reasons could be:

- no need for power source (batteries or recharging)
- more energy needed in production of electric toothbrush
- greater use of materials used
- if battery powered, disposal of batteries
- easier to reuse/recycle.

Clear explanation up to two marks 2 x 3 **[6]**

(c) Any appropriate example 1 mark

Explanation could include:

- making modifications after use
- ensure product viability, avoid sales disaster
- ensuring safe use.

Example 1 mark
Well explained 2 marks [3]

(d) Issues included in discussion could be:

- appropriate advertising of product
- effective target marketing
- ergonomic requirements of group
- fashion, taste, style appropriate to age group.

Examples could be:

- specific magazines
- specific ergonomic/anthropometric feature
- specific example related to fashion or style.

P	relevant points/issues	up to 3 marks
Q	quality of explanation	up to 2 marks
S	specific example/evidence	1 mark **[6]**

Total [18]

4 (a) Justified design requirements include:

- range of sizes to ensure comfortable fit for range of users
- soft fabric to avoid skin irritation
- appropriate fabric for modesty
- qualified aesthetic requirement
- easy to put on and take off when wet
- fabric/colour system appropriate for frequent wet use to last a reasonable length of time.
- other appropriate, justified response.

For **three** justified design requirements 1 x 3 **[3]**

(b) Examples could be:

- seam/stitch quality
- correct assembly of pattern parts
- pattern alignment
- stretch and recover tests.

For three examples 1 x 3 **[3]**

(c) Methods could be:

- celebrities
- TV/Internet
- Sunday magazines
- mail order catalogues
- specialist sport outlets
- outfitters.

For methods identified 1 mark

Quality of evaluation up to 2 marks 2 x 3 **[6]**

(d) Discussion could include:

Issues included in discussion could be:

- training requirements
- possible cost implications
- market reassurance
- coordinated control checks, inspections.

Examples could be:

- Toyota/BMW or other TQM system
- example of brands with consumer loyalty eg Apple.

P	relevant points/issues	up to 3 marks
Q	quality of explanation	up to 2 marks
S	specific example/evidence	1 mark **[6]**

Total [18]

5 (a) Justified design requirements include:

- clear indication of contents of package to inform customer
- will resist damage/leakage if dropped from small height
- has appropriate material inside which will not contaminate or flavour contents to the dissatisfaction of customer
- suitable shape to allow maximum packing for transportation and storing on shelf
- other appropriate, justified response.

No marks awarded for statements referring to obvious product function eg must hold fruit juice

For **three** justified design requirements 1 x 3 **[3]**

(b) Reasons could be:

- attract buyers
- make clear contents of package
- corporate identity
- colour coordinate with similar brand products
- shape affected by functional requirements.

For three examples 1 x 3 **[3]**

(c) Ways could be:

- brand reliability
- recommendation from trusted source
- kite mark/CE
- reviews eg Which reports
- sell by dates.

For three ways well explained 2 x 3 **[6]**

(d) Discussion could include:

Issues included in discussion could be:

- broad market/often televised
- image must be simple (logo), focus usually seconds
- some products not accepted, cigarettes, alcohol
- target market at those attending events
- usually have greater disposable income
- cost implications.

Examples could be:

- alcohol/tobacco restrictions
- major brand sponsorship companies eg Coke Cola

P	relevant points/issues	up to 3 marks
Q	quality of explanation	up to 2 marks
S	specific example/evidence	1 mark **[6]**

Total [18]

2520/02 Product Design 1

Section A

1 (a) (i) Any suitable hardwood such as teak, eg ash, mahogany, oak, beech, sycamore, Do not accept balsa, timber or any softwoods eg pine,
- 1 mark for each. **[2]**

(ii) Strong, often easy to work, hardwearing (durable) good appearance, take a variety of finishes, stable/non warping, resistant to rotting, water resistant (justified)
Do not accept waterproof, cheap, weight

[2]

(b) Detailed description of the process to include:

- cutting to length, use of jig, marking out [2]
- preparation of holes (use of appropriate jig) [2]
- assembly (use of appropriate jig) [2]
- finishing [1]
- correct name of tools – eg Pillar drill, circular saw (CNC) [1]
- correct number of components bought in [1]

only 1 mark if no jig used – up to 8 marks

[8]

(c) Discussion could include:
- material cost and availability + transportation
- processes to be carried out
- machinery, equipment - cost, availability
- thickness of section to be formed
- appearance in terms of grain/finishes etc
- strength of finished product

[P] Critical examination of issues [3]
[Q] Quality of explanation [2]
[S] Supporting examples/evidence [1] **[6]**

2 (a) (i) Eg toughness, strength, hardwearing, durable, malleability, low cost, readily available, easy to work/manufacture
Do not accept cheap or cheaper (must be justified) **[2]**

(ii) In order to reduce wear or deformation of the spanner, make it stronger/more durable **[2]**

(b) Case hardening (4), Stamping/blanking (4)

Case hardening: clean steel	[1]
Place in carbon rich box (CASENIT)	[1]
Heat until red hot	[1]
Allow time for carbon to be absorbed	[1]
Cleaning/polishing	[1]
Stamping/blanking	
Material in strip form	[1]
Male and female punches	[2]
Force applied	[1]
Tessalated/multi-puching	[1]

[8]

(c) Discussion could include:

- cost comparisons
- availability of material and equipment
- different hardness at the ring end
- environmental issues
- obsolescence
- freebies/eg IKEA Allen keys

[P] Critical examination of issues	[3]	
[Q] Quality of explanation	[2]	
[S] Supporting examples/evidence	[1]	**[6]**

3 (a) (i) tough, low cost, impact resistance, easily coloured, flexible, rigid, durable/hard wearing, readily available, easily manufactured
strong if justified, lightweight **[2]**

(ii) Lower cost, reduces the amount of components, visually more appealing, no assembly required. **[2]**

(b) Detailed description of injection moulding
6 Marks available for process – 2 marks for mould details
eg:

- Hopper/pellets [1]
- heating/molten [1]
- forced into mould under pressure [1]
- cooling (water) [1]
- ejection of moulding [1]
- removal of sprue/waste [1]
- mould details: draft angles, rounded corners, split mould, runner/sprue – for full 2 marks, details of hinge must be shown/labelled [2]

[8]

(c) Fashion drivers such as colour, style, form, discussion about obsolescence including technological, products such as aga cookers that resist fashion.

[P] Critical examination of issues [3]
[Q] Quality of explanation [2]
[S] Supporting examples/evidence [1] **[6]**

4 (a) (i) Lightweight, stiff, easily printed on to (can be coloured), readily available, strong/durable if justfied
Do not accept cheap **[2]**

(ii) Protects the card – increases life, provides waterproof/wipe clean surface, stiffens the card, relatively low cost solution, easy to add design,
1 mark for each. **[2]**

(b)

Film laminate on roll placed on machine	[1]
File card (on sheets) placed in machine (could mention sheet feeder)	[1]
Adhesive applied to laminate	[1]
Laminate stretched over card	[1]
Card passes through rollers	[1]
Laminate 'pressed' excess adhesive removed	[1]
Excess laminate trimmed	[1]
Files cut to size	[1]
If encapsulation described – maximum 4 marks available	
Film laminate on roll placed on machine	[1]
Heat applied	[1]
Pressure applied	[1]
Trimming	[1]

[8]

(c) Discussion could include:

- lower cost materials may require design changes – thicker section etc
- finishes – spot varnishing, foil blocking, lamination, embossing + specialist finishes eg UV
- die cutting, laser cutting,
- intricate/multiple folds
- hand finishing

do not accept generic ICT/ CAD/CAM answers

[P] Critical examination of issues	[3]	
[Q] Quality of explanation	[2]	
[S] Supporting examples/evidence	[1]	**[6]**

5 (a) (i) Eg age advice, recycling symbols, bar codes, this way up, umbrella symbol, keep Britain tidy, FSC symbol (tree), dolby, (content symbols eg gun), common food symbols Not DVD **[2]**

(ii) Lower cost, allows standard case to be used, interchangeable, re-useable or recyclable **[2]**

(b) Any suitable high volume batch process.

Flexography

- artwork/origination [1]
- image setter - colour separation, film images produced for each colour [2]
- flexography rollers exposed to UV light [1]
- plate cylinder rollers chemically etched (Photo Mechanical Transfer) [1]
- relief/rasied plates (additional mark) [1]
- separate plate cylinder rollers each colour (4+) eg CMYK [1]
- inking roller apples ink from reservoir [1]
- ink transferred to substrate/paper [1]
- Paper fed through rollers at high speed (web fed) – quick drying ink [1]
- Continuous process [1]
- quality checks [1]

Generic

- artwork/origination [1]
- image setter - colour separation, film images produced for each colour [2]
- plate/screen.flexo sheet [1]
- attach to press [1]
- inks applied [1]
- drying [1]
- quality checks [1]

[8]

(c) Discussion could include:

- restrictions on the design from process such as offset litho that requires flat sheets,
- examples such as gravure highest quality (eg magazines, [1]) – demand high print runs, postage stamps
- end use of product – eg newspapers thrown away/recycled
- flexography – difficult to mix colours
- discussions around quantity vs quality (and cost) examples such as wedding stationery, estate agent particulars

[P] Critical examination of issues [3]
[Q] Quality of explanation [2]
[S] Supporting examples/evidence [1]

[6]

6 (a) (i) Easy to wash, stretchy, easy to assemble, absorbent, durable, retains shape. Comfortable, non – allergic, hot washable. **[4]**

(b)

- Logo designed on computer/scanned [1]
- Computer linked to embroidery machine (image digitised) [1]
- Logo adjusted (checked for size/accuracy [1]
- Embroidery machine loaded with appropriate yarns [1]
- Add backing material [1]
- Shirt aligned accurately [1]
- Logo machined [1]
- Shirt removed – final finishing [1]
- Shirt checked for accuracy/quality [1]
- Need to explain the need to use a frame to support and hold the fabric taught [1]

[8]

(c) Discussion could include:

- speed
- accuracy
- quality
- repeatability
- may require non skilled labour/less labour
- cost of training
- replacement costs of machinery
- investment in new machinery may require higher scales of production to justify expenditure

[P] Critical examination of issues [3]
[Q] Quality of explanation [2]
[S] Supporting examples/evidence [1] **[6]**

7 (a) (i) Cotton, wool, polyester, nylon, acrylic weaves, viscose, chintz. **[2]**

(ii) Easy-care, flame-resist (proban pyrovotech), moth-proofing, permanent pleating, stain – resist (scotch-guard/teflon), water-repellent, anti-static, anti-pilling.
Do not accept waterproof **[2]**

(b) Calendering:
- fabric on a roll [1]
- glaze/coating can be applied [1]
- fabric fed into **series** of rollers - highly polished [2]
- heated rollers + pressure [2]
- rollers may be textured [1]
- improved lustre and shine [1]
- labelled diagram [2]

[8]

(c) Discussion could include:
- pollution from dyes/chemical finishes
- issues around land fill/disposal of textile products
- many fibres produced from synthetic polymers – issues around non-renewable sources such as oil, energy used in extraction and refining

[P] Critical examination of issues [3]
[Q] Quality of explanation [2]
[S] Supporting examples/evidence [1] **[6]**

2521/02 Systems and Control Technology 1

1 (a) (i) 3 input and gate – output to A (1) allow it from top switch output. **[1]**

(ii) Pin2- no connection to any other line. **[1]**

(iii) Formula correctly used (1) 200K (1). Allow answer only if correct. **[2]**

(iv) Voltage in pin 7 will rise (1) till threshold returns it to 0v. **[1]**

(b) Pin 3 (1) connected to darlington driver, op-amp (1), to 24v relay (1) with flywheel diode (1) if all connections are made. **[4]**

(c) PIC processor (1) code written to PIC with big combination possibilities (1) can be reprogrammed easily (1). **[3]**

(d) Points could be: **[3]**

- closed areas
- access restricted- monitoring difficult
- industrial waste hidden
- HSE
- gates/barriers
- lighting
- cctv.

Any three correct points.
Two qualified correctly (2).
Specific example (1).

Total 18 marks

2 (a) (i) DPDT. **[1]**

(ii) Risk of double touch of contacts, spikes. **[1]**

(iii) Debouncing circuit. **[1]**

(b) (i) I=P/V I= 45/24= 1.875 or 1.9 Amps or Ohms law. **[1]**

(ii) Connection from one o/p line to relay to 0v (1) 24v through contacts to bulb (1) flywheel diode (1) if connections made. If connections not made maximum (2). **[3]**

(c) (i) Two AND gates across Red (1) and Green (1) connections (1). **[3]**

(ii) One package gives economic circuit tracking. **[2]**

(iii) Pic timing circuit – changing timer easily. **[1]**

(d) Points could be: **[3]**

- long life
- expensive at make
- less replacement
- employment in spares industry
- brightness
- style
- vibration problem eliminated
- stronger in accidents.

Any three correct points.
Two qualified correctly (2).
Specific example (1).

Total 18 marks

3 (a) (i) Camera track speeds vary with event (1) fast return needed (1). **[2]**

(ii) Toothed belt system (1) quiet, maintenance free (1), indexing capability, safer (1). If wrong choice but correct reasons allow max (2) **[3]**

(b) Buffers, angle plate, microswitch, sensor(1) quality of drawing (1) **[2]**

(c) (i) Ball race, needle roller. **[1]**

(ii) Drawing should show: **[4]**

- rubber mounts (1)
- springs (1)
- dampers on springs (1)
- quality of drawing (1)

or other suitable features .

(d) Points could be: **[3]**

- market forces
- cost to manufacturer
- consumer
- designer
- energy
- employment
- specialists.

Any three correct points.
Two qualified correctly (2).
Specific example (1).

Total 18 marks

4 (a) (i) Belt can slip if machine jammed. **[1]**

(ii) Velocity ratio 1:4. **[1]**

(iii) Velocity of cutters 612.5rpm. **[1]**

(b) (i) Steel type for cutters - carbon steel, stainless. **[1]**

(ii) 8mm machine screws make blade replacement easier (1), more reliable fixing for quality control (1) uniform tightness on head. Standard size. **[2]**

(iii) Balance is important (1) quick fit on production line, holes line up (1). **[2]**

(c) Notes and sketches should show method of overcoming imbalance of machine when moving it - wheels added with locks, stand has front resting in a channel with wheels, long lever in handle to ease tilt, counterbalance (3) for features (1) for quality of drawing. **[4]**

(d) Points could be: **[3]**

- instruction manual
- labelling
- guards
- PPA
- access by children
- size of trimmings
- safety cut off if jamming occurs.

Any three correct points.
Two qualified correctly (2).
Specific example (1).

Total 18 marks

5 (a) (i) Unidirectional restrictor (1) reservoir (1). **[2]**

(ii) Size of reservoir (1) flow rate of restrictor, air pressure (1). **[2]**

(b) (i) Both connections from DAC to FCR correct (1)
both connections to 5PV correct (1). **[2]**

(ii) Disadvantage could be speed of operation only one way (1)
spring return (1). **[2]**

(c) (i) No speed control (1) operator must count packages (1)
system can get out of sync (1). **[3]**

(ii) Add solenoid valves(1) sensors on track, counter system (1). **[2]**

(d) Points could be: **[3]**

- employment
- setting up costs
- software crashes
- hardware replacement
- safety
- accuracy
- ro-ro handling
- auto racking and collection.

Any three correct points.
Two qualified correctly (2).
Specific example (1).

Total 18 marks

6 (a) (i) Port 1 connects to port 2 (1). **[1]**
Port 2 connects to port 4 (1). **[1]**

(ii) Add FCR in each line to DAC 2x (1). Correct orientation (1). **[4]**
If all connections made correctly (1)

(b) (i) Calculation- F=PxA **[3]**
100=0.6A (1)
A=166 (1)
14.52mm or 15 (1).

(ii) C-16mm. **[1]**

(iii) Strength (1) air consumption ratio (1). **[2]**

(c) Points could be: **[3]**

- employee training
- setting up costs
- hardware replacement
- safety
- forces required
- air supply system
- lubrication.

Any three correct points.
Two qualified correctly (2).
Specific example (1).

Total 18 marks

2524/01 Product Design 2

1 Fig 1 shows a chair made from solid hardwood.

(a) (i) Answers could include:
- Good tensile properties
- Good compressive properties
- Can be bent/formed
- Grain pattern can be used for aesthetic reasons.

2 x 1 mark [2]

(ii) Answers could include:
- Looks more attractive than softwood
- Has an 'expensive' look compared to softwood
- More durable than softwood
- Traditional values.

2 x 1 mark [2]

(iii) Answers could include:
- Width of seat in relation to buttocks
- Length of back in relation to torso
- Height of seat in relation to calves
- Length of seat in relation to thighs
- Weight
- Shape
- Visual impact.

2 x 1 mark for ergonomic feature
2 x 1 mark for clear description of feature [4]

(b) (i) Answers could include:
- Water reservoir
- Connection hose
- Steam chamber
- Time lapse
- Bending former
- Curing time.

4 x 1 mark [4]

The chairs are to be produced in a batch of 500.

(ii) Answers could include:
CNC or Hand turning acceptable:
- Blank put onto machine
- Head stock
- Tail stock
- Blank centred to ensure balance
- Tooling method
- Checking gauge to ensure all legs are uniform
- Copy turning
- Some form of QA mentioned.

Generic 'CNC answer' maximum 2 marks

4 x 1 mark [4]

(c) Discussions could include:

- Cost of energy in transportation of raw materials from felling to saw mill
- Cost of energy in transportation from mill to consumer
- Conversion costs of kiln drying compared to air drying
- Waste produced from mill
- Use of waste as fuel in conversion
- Noise pollution issues from mill.

Discussion to focus on processing of raw timber – do not accept deforestation and similar issues.

P	relevant points/issues	up to 3 marks	
Q	quality of explanation	up to 3 marks	
S	specific examples/evidence	up to 2 marks	**[8]**

Total: [24]

2 Fig 2 shows details of a rotary blade trimmer made mainly from steel.

(a) (i) Answers could include:
- Good strength to weight ratio
- Easy to form
- Readily available in sheet form
- Steel can be hardened to form blade.

2 x 1 mark [2]

(ii) Answers could include:
- Powder coat
- Dip/Plastic coat
- Spray painted.

2 x 1 mark [2]

(iii) Answers could include:
- Blade enclosed in plastic cover
- Extensions to blade cover to prevent finger traps
- Plastic covert over paper edge to prevent finger tip being sliced
- **Rounded** edges to avoid sharp corners/edges. (Do not accept generic 'no sharp edges').

1 mark for correct method
1 mark for description

2 x 2 marks [4]

(b) (i) Description could include:
- Bending die
- Goose-neck die
- Normally off-set dies used on long runs
- Pressure on punch
- Punch descending into metal
- Die forming bend.

1 mark for correct process
1 mark for description

2 x 2 marks [4]

(ii)
- Steel hardened
- Steel normalized
- Description of colour changes.

1 mark for correct process
1 mark for description

2 x 2 marks [4]

(c) Discussions could include:

- Aesthetics verses cost
- Form to consider issues such as RSI
- Taking into account machinery that might be found in an office such as accommodating computers
- Range of potential users/shapes/sizes/comfort
- Use of materials to blend into office environment.

P	relevant points/issues	up to 3 marks	
Q	quality of explanation	up to 3 marks	
S	specific examples/evidence	up to 2 marks	**[8]**

Total: [24]

3 Fig 3 shows a car with a side moulding made from PVC.

(a) (i) Answers could include:
- Does not corrode
- Self coloured
- Flexible
- Easy to mould. **2 x 1 mark [2]**

(ii) Answers could include:
- HDPE
- Acrylic
- Polycarbonate
- ABS
- Nylon
- Polypropylene. **2 x 1 mark [2]**

(iii) Description could include:
- Snap clips
- Channel slides
- Machine screws
- Self tapping screws
- Use of suitable adhesives for materials components being described in candidates answer.

1 mark for method
1 mark for description **2 x 2 marks [4]**

(b) Description could include:
- Hopper
- Feed throat
- Screw drive motor
- Heater
- Screw drive
- Barrel
- Breaker plate
- Feed-pipe
- Die
- Water/air cooled
- Support/out-feed. **8 x 1 mark [8]**

(c) Discussion could include:
- Lighter cars to conserve fuel
- Hybrid cars
- Electric cars
- Lean-burn engines
- Use of bio-fuels
- Use of recycled plastics
- Increased cost
- Alternative materials used.

P	relevant points/issues	up to 3 marks
Q	quality of explanation	up to 3 marks
S	specific examples/evidence	up to 2 marks **[8]**

Total: [24]

4 Fig 4 shows a concept drawing of a digital radio that has been hand-drawn and rendered by airbrushing.

(a) (i) Answers could include:
- To develop new ideas
- Part of design process to see what ideas could be carried forward
- To produce an outline of a new design
- To show others as a focus/inspirational point.

2 x 1 mark [2]

(ii) Answers could include:
- Pen work
- Water colours
- Markers
- Pencil.

2 x 1 mark [2]

(iii) Descriptions could include:
- Preparation of mask
- Use of film/card
- Area protection.

1 mark for method
1 mark for preparation

2 x 2 marks [4]

(b) The concept drawing is to be printed in a glossy magazine.

(i) Description could include:
- Image loaded into computer by scanning
- Image loaded into package such as 'photo-shop'
- Image manipulated
- Further computer 'airbrushing' can be used to enhance artwork
- Image saved as a suitable print file
- Image sent direct to printers.

4 x 1 mark [4]

The magazines will be printed by the gravure printing process.

(ii) Descriptions could include:
- High speed rotary press
- Print surface is lower than non printing surface
- Ink fills gaps in printing surface
- Paper pressed against plate by impression roller
- Printing plate made of copper not aluminium
- Four colour rollers (cymk)

4 x 1 mark [4]

(c) Discussions could include:

- Suggestive selling techniques
- Possibility of offensive images to some groups
- Junk mail
- Need to promote goods to ensure fiscal growth/sound economy.

P	relevant points/issues	up to 3 marks	
Q	quality of explanation	up to 3 marks	
S	specific examples/evidence	up to 2 marks	**[8]**

Total: [24]

5 Fig 5 shows details of a children's book made from board.
The book includes a battery operated sound generator.

(a) (i) Answers could include:
- Cotton/rag/fabric
- Paper
- Vinyl.

2 x 1 mark [2]

(ii) Answers could include:
- Moisture resistant surface
- Wipe clean surface
- Aesthetic qualities of a glossy surface.

2 x 1 mark [2]

(iii) Descriptions could include:
- Binding (bias binding)
- Stitching
- Gluing
- Taping
- Welding (plastic).

1 mark for method
1 mark for description

2 x 2 marks [4]

(b) Answers could include:
- Offset lithographic printing or similar
- Colour rollers
- Blanket
- Printing glued to board
- Cut-out for sound generator using press form
- Recess for sound generator flange
- Sound generator inserted
- Final layer of board glued to hold generator in
- Book bound
- Outside shape cut by press form.

8 x 1 mark [8]

(c) Discussion could include:
- Simple language
- Educational
- Size – not too big to hold
- Non gender specific
- Need to consider cultural issues
- Use of colour
- Big images.

P	relevant points/issues	up to 3 marks	
Q	quality of explanation	up to 3 marks	
S	specific examples/evidence	up to 2 marks	**[8]**

Total: [24]

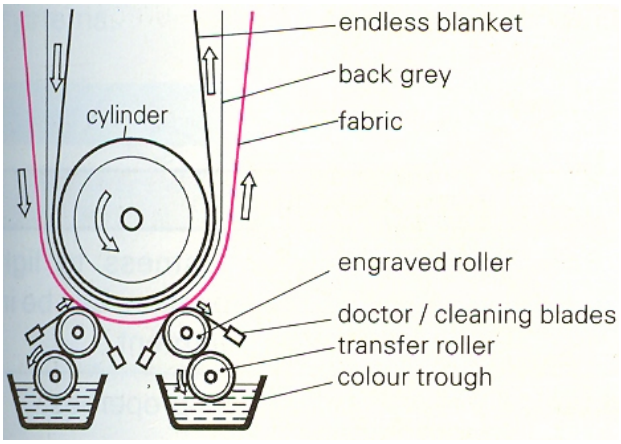
6 (a) (i) Any four, one mark each:

- Absorbent so comfortable to wear
- Absorbent so will take up the dye
- Natural fibre so non-irritating
- No static
- Hardwearing
- Firm. Stable fabric. **[4]**

(ii) Any four, one mark each:

- Country of manufacture
- Size
- Manufacturer's name
- Colour/batch number
- Cost
- Washing instructions
- Eco labels
- Details of special finishes. **[4]**

(b) Any eight points in logical order, information from diagrams or notes:



- Design is engraved onto copper rollers (Produces very sharp outlines to the printed shapes, so good for small figures)
- A separate roller for each colour, so two needed for this design
- The maximum repeat is the circumference of the roller
- Rollers mounted against the large main cylinder around which the fabric travels
- A resilient blanket and a protective back grey used to help with the printing
- Printing paste located in a trough
- Transfer roller runs partly immersed in the paste and in contact with the engraved roller
- A blade scrapes away the paste except for that contained in the engraving, and another scrapes away lint picked up from the fabric
- The engraved roller presses against the fabric and transfers the design
- Any excess paste squeezed through the fabric is picked up by the back grey, protecting the blanket and preventing the design from being smeared
- Fabric will go through process twice, once for each colour.

(c) Discussion could include reference to:

- Designs can be generated using computer – scanners, graphics tablets, digital photographs, etc.
- Ideas manipulated quickly and accurately
- Can look at 3D images of designs
- Cost of CAD/CAM equipment
- Cost of maintenance
- Cost of training
- Accuracy of results improved
- Less space needed for storage of patterns for garments
- Ease of communication – can be e-mailed
- Increased risk of designs being copied – hackers
- Speed of manufacture of patterns – can also be adapted easily for new style
- Grading can be done quickly and accurately
- Can be downloaded directly to cutter – increased speed and accuracy
- Lay plan can be generated by computer – speed, accuracy and saving fabric
- Many automated machines, eg buttonholes, embroidery etc
- Reduced workforce, saving money
- CIM manufacture – includes design and development, production planning and control, manufacture and administration
- Jobs lost
- Helps company remain competitive
- If system crashes, all work lost, delays in production.

Range and relevance of issues relating to the question **[3]**
Quality of the reasoning and explanation **[3]**
Suitable use of examples and evidence to support the discussion **[2]**

7 (a) (i) Any two points, one mark each:

- Can be washed at lower temperature
- Less agitation needed in washing – prolongs life of product
- Does not crease too much so little ironing needed
- Quick to dry so speeds up washing process
- Good for the environment – less energy used. **[2]**

(ii) Any two reasons, one mark each:

- Secure seam – many threads interlocked
- Cuts loose threads at same time so quick
- Stitches seam and neatens all in one go
- Flat seam so comfortable to lie on
- Discrete from the outside. **[2]**

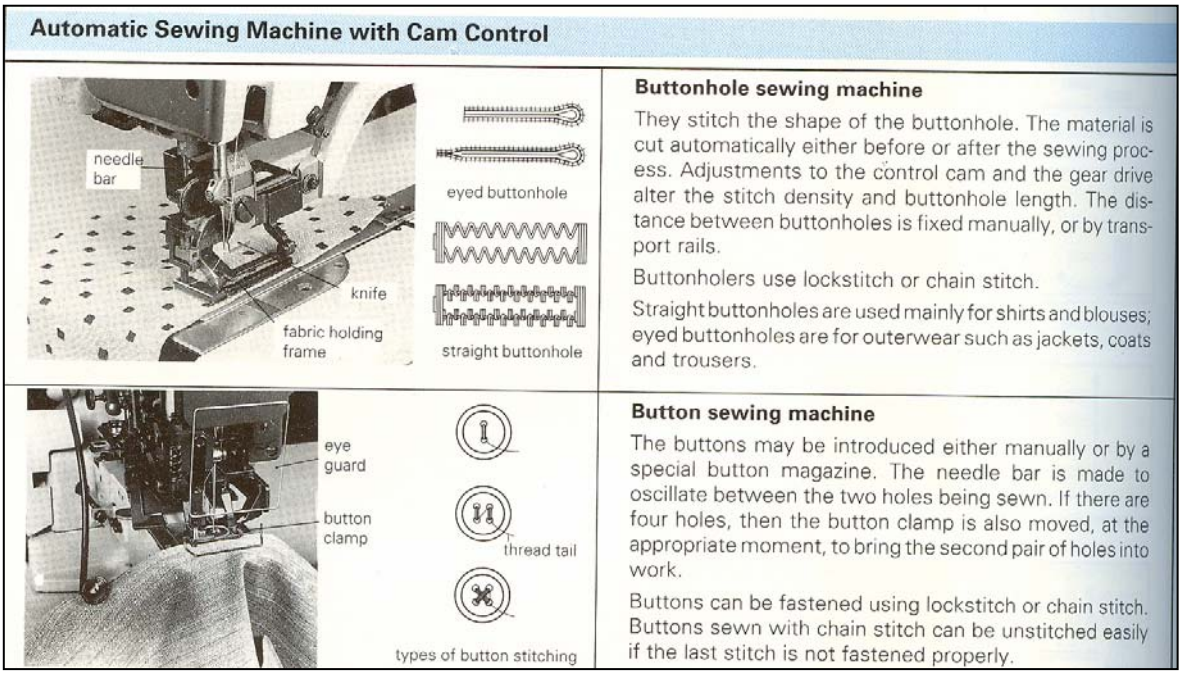
(b) (i) Any two advantages, one mark each:

- Decorative feature – may increase sales
- Different styles of button could be used – increase sales
- Secure fastening – fewer customer complaints
- Can charge more as more desirable
- May be cheaper than 'popper tape'
- Can use CAM machines to speed up process and improve quality.

(ii) Any two disadvantages, one mark each:

- Additional cost in manufacture, labour, components, so more expensive to buy
- Buttons may be uncomfortable to lie on
- May get caught in hair etc
- Buttons may fall off and be lost, spoiling the set
- Difficult to fasten/line up. **[4]**

(c) (i) Any six points in a logical order. Information can come from notes or diagrams and there may be some variation depending on the type of machine used to stitch the buttonhole:



- The buttons are needed before the buttonholes are worked to determine the size of the buttonhole
- The length of the buttonhole is the diameter of the button plus 2mm
- The buttonhole needs to be the radius of the button from the edge of the fabric
- Some machines will work an automatic buttonhole, or a semi-automatic buttonhole
- A different presser foot will be needed
- Computer controlled machines will 'remember' the size and make all subsequent holes the same size
- Position of the holes should be marked on the fabric using tailor tacks or tailor's pencil
- They should be spaced evenly along the area to be fastened
- The stitching should be worked before the fabric is cut.
- If the hole is too big, the button will not stay fastened
- If it is too small, it will not be possible to fasten the button
- Test holes should be worked and cut before going on to the product
- The button should be stitched under the buttonhole, after it has been worked
- It can be attached by hand stitching or a specialised machine
- The button may have a 'shank' attached to it to allow for the thickness of the fabric, or one will need to be worked when the button is attached. **[6]**

(ii) Any two checks, one mark each:

- Check size of buttonholes correct – big enough to push button through, but small enough to stay fastened
- Distance between buttonholes all the same/evenly spaced so looks good
- Buttons correctly placed under the buttonhole so when fastened they lie flat
- The lines of stitching match in the button hole, no gaps or overshoots
- When fabric cut, the stitching has not been cut as well as this will cause the stitching will come undone
- Buttons are secure, with shank of the button correct length to accommodate the fabric
- Buttons not damaged, no chips of flaws. **[2]**

(d) Discussion could include reference to:

- Peer pressure
- Appropriateness of advertising, content
- Place – TV, magazines, bill boards, radio
- Time if TV or radio
- Planned obsolescence
- Where the product will be sold
- Target market
- Role models
- Gender issues
- Politics/religion/race
- Cost of advertising
- Encouraging debt

Range and relevance of issues relating to the question **[3]**
Quality of the reasoning and explanation **[3]**
Suitable use of examples and evidence to support the discussion **[2]**

2524/02 Product Design 2

QUESTION 1,2,3,4,5 1,2,3	GENERIC MARK SCHEME FOR SECTION B UNIT 2524/02 UNIT 2525/02		MARKS AVAILABLE
SPECIFICATION POINTS (SP) A3 Sheet 1 of 4			
SP	**8 Specification Points which are qualified and justified 2 marks each.** **8** clear statements which are specifically related to the focussed topic **8** clear and relevant justification points A clear relevant statement **1 mark** A clear relevant justification **1 mark** Any generic statements that are not explicitly related to the focus = **0 marks** A point repeated or a simple repetition of information already stated in the question is awarded a circled lower case 'r' **A circled lower case 'r' = 0 marks**	**8 x 1** **8 x 1**	**16**
INITIAL IDEAS (ID) A3 Sheet 2 of 4 and A3 Sheet 3 of 4			
R	**Range of ideas.** **0-2** No-weak range of initial ideas (superficial change of shape lacking any depth or detail) **3-4** Limited-some evidence of variation and range of ideas logically laid out **5-6** Good range of different ideas clearly laid out and understood by a third party **7-8** Good range of appropriate innovative significantly different ideas **9-10** A wide range of appropriate innovative significantly different ideas		**10**
S	**Design ideas relating to the <u>functional aspects of the specification</u>.** **0-1** No-little functional aspects of the specification identified or considered **2-3** Limited-some functional aspects of the specification identified or considered **4-5** Clear-detailed evidence of the majority of the functional aspects have been considered in some depth		**5**
V	**Quality of design thinking relating to volume production and wider market issues.** **0-1** No-little consideration given to market issues or volume production in the design thinking **2-3** Limited-some superficial consideration given to market issues or volume production in the design thinking **4-5** Clear-detailed evidence that consideration has been given to market issues or volume production in the design thinking		**5**

C	**Detail Consideration of construction. Methods/construction/component/assembly detail, appropriate to the product and the chosen materials. Knock down fittings and relevant fixings will be given credit.** **0-1** No-little consideration given to suggested appropriate (alternative) methods of construction or assembly **2-3** Limited-some consideration given to suggested appropriate (alternative) methods of construction or assembly **4-5** Clear-detailed evidence has been considered in relation to appropriate (alternative) methods of construction or assembly		**5**
M	**Consideration of specific materials and components (may include calculations or specific values for components).** **Generic terms not acceptable:** • **Plastics-thermoplastics, thermosetting** • **Wood-hardwood, softwood** • **Cloth-natural fibre, synthetic fibre** • **Metal-ferrous, non-ferrous** • **Paper, card and board** **0-1** No-little mention of relevant and appropriate specific materials and components **2-3** Some consideration given to relevant and appropriate specific materials **4-5** Clear evidence of relevant and appropriate specific materials and components		**5**
D	**Consideration of dimensional detail (may include calculations).** **Overall dimensions plus some detailed dimensions required (circuit diagrams/layouts, systems diagrams, flow diagrams).** **0** No indication of scale, dimensions or calculations **1** Limited indication of scale, dimensions or calculations **2** Evidence of general sizes of scale, dimensions and calculations **3** Detailed sizes given in component parts or sub parts of the design		**3**
E	**Evaluation of the suitability of the ideas with reference to the specification.** **0-1** No-little evidence of evaluation commentary **2-3** Limited-some evidence of subjective evaluation commentary **4-5** Clear-detailed evidence of evaluation commentary (may-must include some objective content). Look for intellectual depth of design analysis and formative thinking		**5**

FEATURES SUITABLE FOR DEVELOPMENT (FD) A3 Sheet 4 of 4.			
F	**Appropriate features identified and clearly described. All major aspects of the design should be evident; this may be in the form of annotation of a final drawing or part drawings, or may be in the form of expanded text eg bullet point-listing. Candidates could refer to the design features in terms of strengths and weaknesses. Ideally there should be at least three different features identified.** **0** No-little features identified-concept drawing only, superficial commentary **1-2** Limited-some internal and or external appropriate features identified. Lacks realistic proposals and detail **3-4** Clear-detailed evidence of internal and or external appropriate features identified. Contains constructive and realistic proposals and detail		**4**
J	**Appropriate justification of the choices made with reference to the specification.** **0** No-evidence of justification made, (descriptive, superficial and subjective) **1-2** Limited-some evidence of justification (superficial descriptive statements with elements of objectivity) **3-4** Clear-detailed intellectual constructive justification is evident. Justification is fluent objective and appropriate		**4**

EFFICIENT COMMUNICATION (CS) A3 Sheets 1-4			
CS	**Communication skills and techniques.** **0** No-weak level of graphical skill/annotation evidenced by poor use of communication methods no apparent quality **1-2** Low level of graphical skill/annotation **3-4** Limited-some graphical skill/annotation evidenced by one form of communication method (eg 2D only) lacking appropriate techniques of detail **5-6** Reasonable evidence of variation and range of graphical techniques/annotation appropriately used **7-8** Fluent range of a variety of graphical presentation techniques in evidence with some annotation **9-10** Fluent design thinking that is evident and expressed coherently and cohesively and easily followed and understood by a third party. (Circuit diagrams, systems diagram, exploded views, sectional views 2D and 3D views enlarged detail views and fluent annotation are appropriately used)		**10**

[Total : 72]

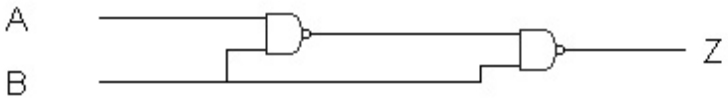
2525/01 Systems and Control Technology 2

1 (a) (i) Easy to use, sturdy, well built, keep valuables secure, or similar.
One mark per answer x 2 **[2]**

(ii) Keypad wired in rows and columns in a grid system (1). So a 3 x 4 keyboard would be 3 columns of 4 rows, each row wired in series and each column wired in series giving 7 main output points. Each button is therefore connected to two output positions (1). Thus, digit 5 is column 2, row 2.
Or a similar suitable response.
[2]

(b) (i) One mark for correct grid, one mark for correct column Z. **[2]**

B	A	Z
0	0	1
0	1	1
1	0	0
1	1	1



(ii)
(1) for each correct NAND gate (1), for connection first output to second input (1), for common B connection.
[4]

(c) (i) Darlington Pair/Driver. **[1]**

(ii) Higher gain, more sensitivity, or similar. **[1]**

(iii) If input is 8 volts than volt drop across R1 = 8 – (2 x V_{BE}) (1) = 8 - 1.4 = 6.6v (1)
I_B = 6.6v/1,000 = 6.6mA (1)
$I_C = h_{FE}$ x 6.6mA = 1.98A (1) **[4]**

(d) P = Identify a range of relevant issues/points. **[3]**
Q = Quality of explanation as to why these issues are relevant. **[3]**
S = Use of specific examples or supporting evidence. **[2]**

Issues could include:
Reduce circuit size, less ICs, less complex, easier to alter / update / revise, greater flexibility for designer or other relevant points.

[Total: 24]

2 (a) (i) Line of sight, limited range. Any one. **[1]**

(ii) Optical/light, wireless, radar, etc. Any one. **[1]**

(b) (i) Correct labels on axes (1).
Correct square wave (1). **[2]**

(ii) $f = 1/(2RC) = 1/(2 \times 1800 \times 0.00000047)$ (1) = 591 Hz (1) **[2]**

(iii) Joining inputs A and B changed gate to NOT gate (1). Two for correct truth table.

B	A	Q
0	0	1
1	1	0
1	1	0
1	1	0

[3]

(iv) The rising trigger threshold or UTP (Upper trip point), is the point at which the voltage across the capacitor, and therefore the input to the gate, has risen sufficiently to cause the output of the Schmitt trigger to rapidly go low (1). The falling trigger threshold is the point at which the voltage across the capacitor has discharged (1) sufficiently to cause the Schmitt trigger output to rapidly go high (1). **[4]**

(c) Flow soldering:
Components are attached to the pcb with adhesive, usually robotically (1).
Board placed on conveyor system that takes board into an oven that heats up the board initially (1).
Pcb passes into solder bath where molten soldering flows over the board in a wave (1).
The board is then cleaned and dried. **[3]**

(d) P = Identify a range of relevant issues/points. **[3]**
Q = Quality of explanation as to why these issues are relevant. **[3]**
S = Use of specific examples or supporting evidence. **[2]**

Issues could include:
Packing density, smaller size of product, use of robots / automation, flow soldering, pick and place or other relevant points.

[Total: 24]

3 (a) (i) Light, cost effective, easy to clean, weather resistant. Any two, one mark each. **[2]**

(ii) Complex shapes, lower unit cost for large quantities, quick process, machining costs from solid would be high, or similar suitable responses. Two points well explained (2+1). **[3]**

(iii) Electro-chemical process (1) that alters the surface of the metal (1) to produce a tough aluminium oxide layer (1). **[2]**

(b) (i) 1/400 = 2.5mm per tooth (1). 225/2.5 = 90 teeth (1). 90/15 = 6 revolutions (1). **[3]**

(ii) Cheap to produce, quieter in use, smoother operation, self lubricating etc. Any one. **[2]**

(c) (i) One mark for each suitable method. Glue, rivet, crimped, aluminium, or similar. **[2]**

(ii) One mark for each suitable method. Nut and bolt, pinned, or similar. **[2]**

(d) P = Identify a range of relevant issues/points. **[3]**
Q = Quality of explanation as to why these issues are relevant. **[3]**
S = Use of specific examples or supporting evidence. **[2]**

Issues could include:
Cost, protection, display, environment, product, transport, or other relevant points.

[Total: 24]

4 (a) (i) Improves durability, maintain sharp edge, greater strength, etc. Any one. **[1]**

(ii) Hardening involves the heating of steel to a high temperature (1). Steel is then quenched (1). For tempering the steel is heated again, not to such a high temperature, (colours), the temperature is held for a time (1) and then the steel is quenched (1). **[4]**

(b) PTFE coating a blade helps to give a smooth action, ensure less wear, better corrosion resistance and better cutting action. Any one. **[1]**

(c) (i) Holds the adjustment, (1) will not shake free (1). **[2]**

(ii) Device used in damp/wet conditions , device needs to be tough due to being used in demanding environment, keeps looks and condition. Any two. **[2]**

(d) (i) Max. = (100 x 1125)/450 (1) = 250N (1).
Min. = (100 x 1125)/750 (1) = 150N (1). **[4]**

(ii) Longer handle length gives greater distance between handles so:(1)
person may not be able to span the widest gap or; (1)
person cannot apply sufficient effort if handles too far apart or;(1)
handles may bend when force applied if they are too long. (1)
Or extra weight of longer handle (1) may make them unstable / unusable (1) **[2]**

(e) P = Identify a range of relevant issues/points. **[3]**
Q = Quality of explanation as to why these issues are relevant. **[3]**
S = Use of specific examples or supporting evidence. **[2]**

Issues could include:
Less staff (manufacturing), less control over product (needs goodwill of supplier), just-in-time implications, new factory layout, better quality control or other relevant points.

[Total: 24]

5 (a) (i) Valve B is a unidirectional restrictor or flow restrictor that restricts the flow of exhaust air (1) from cylinder A and so slows the action of cylinder A and the barrier closing (1). **[2]**

(ii) D and F form a delay (1). Main air from cylinder A in-stroke is piped to valve D which restricts air to reservoir F. This delays air reaching valve E 1 2 and closing the barrier (1). **[2]**

(iii) Cylinder A needs to pivot due to action of barrier arm about its pivot point (1). The movement of the barrier arm requires the end of cylinder A piston to move in an arc (1). **[2]**

(b) (i) the position of the device within the system; **[1]**

(ii) how your device is operated by the system; **[1]**

(iii) the link between operator and counter; **[2]**

(iv) how the link attaches to the counter. **[2]**

(c) $F = p \times A$. 882N/0.6N/mm² = A. So, A = 1470mm²
Area of piston rod = 25π = 78.54mm². Total Area = 1470 + 78.54 = 1548.54mm² (1)
1548.54mm²/π = r² (1) So, r² = 492.92mm². r = 22.2mm (1)
Therefore, d = 44.4mm (1).
[4]

(d) P = Identify a range of relevant issues/points. **[3]**
Q = Quality of explanation as to why these issues are relevant. **[3]**
S = Use of specific examples or supporting evidence. **[2]**

Issues could include:
Easy to update / change, can be seen in 3D without need for model, information can be shared around factory / world by internet, link with CAM, qualified staff or other relevant points.

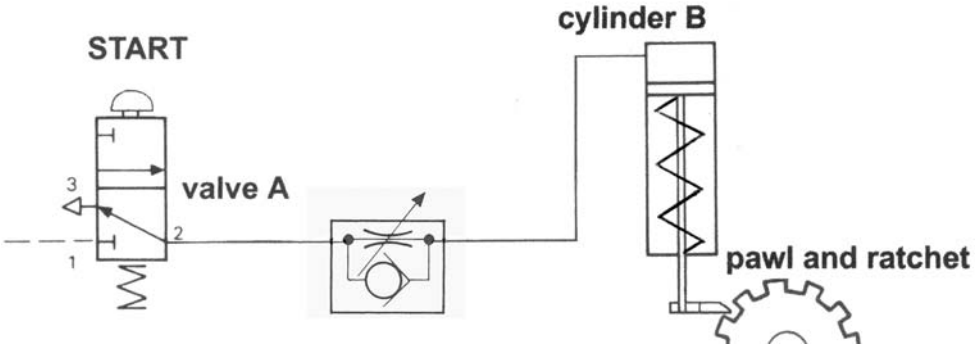
[Total: 24]

6 (a) (i) Push button. **[1]**

(ii) A 3-port roller-trip valve. **[1]**

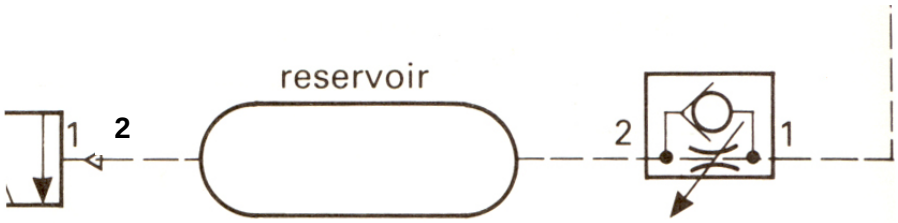
(iii) B+, B-, G+, G- or B+, G+, B-, G-. **[1]**

(b) Use a unidirectional flow valve or flow restrictor between valve A and cylinder B, as shown. Correct position (1), correct symbol (1), notes (1).



[3]

(c) Time delay between valve C and valve F 1 2, as shown below:
Correct position (1), correct symbols, one for each (2), notes (1).



[4]

(d) (i) Lubrication of air required where moving parts are in evidence. Achieved by using oil fog lubricator/microfog lubricator (1) or similar. Air passing through lubricator sucks oil up a tube and a valve atomises the air (1). **[2]**

(ii) $A = \pi r^2$. So, $A = 400p$ mm² (1) $F = p \times A$. So, $p \times A = 754$N (1)
$p = 754/400\pi$ (1) So, $p = 0.6$N/mm² (1) **[4]**

(e) P = Identify a range of relevant issues/points. **[3]**
Q = Quality of explanation as to why these issues are relevant. **[3]**
S = Use of specific examples or supporting evidence. **[2]**

Issues could include:
Legislation, accuracy of information, legal obligations, in-house or external supply, positioning or other relevant points.

[Total: 24]

2525/02 Systems and Control Technology 2

QUESTION 1,2,3,4,5 1,2,3	GENERIC MARK SCHEME FOR SECTION B UNIT 2524/02 UNIT 2525/02		MARKS AVAILABLE

SPECIFICATION POINTS (SP) A3 Sheet 1 of 4			
SP	**8 Specification Points which are qualified and justified 2 marks each.** **8** clear statements which are specifically related to the focussed topic **8** clear and relevant justification points A clear relevant statement **1 mark** A clear relevant justification **1 mark** Any generic statements that are not explicitly related to the focus = **0 marks** A point repeated or a simple repetition of information already stated in the question is awarded a circled lower case 'r' **A circled lower case 'r' = 0 marks**	**8 x 1** **8 x 1**	**16**

INITIAL IDEAS (ID) A3 Sheet 2 of 4 and A3 Sheet 3 of 4			
R	**Range of ideas.** **0-2** No-weak range of initial ideas (superficial change of shape lacking any depth or detail) **3-4** Limited-some evidence of variation and range of ideas logically laid out **5-6** Good range of different ideas clearly laid out and understood by a third party **7-8** Good range of appropriate innovative significantly different ideas **9-10** A wide range of appropriate innovative significantly different ideas		**10**
S	**Design ideas relating to the <u>functional aspects of the specification</u>.** **0-1** No-little functional aspects of the specification identified or considered **2-3** Limited-some functional aspects of the specification identified or considered **4-5** Clear-detailed evidence of the majority of the functional aspects have been considered in some depth		**5**
V	**Quality of design thinking relating to volume production and wider market issues.** **0-1** No-little consideration given to market issues or volume production in the design thinking **2-3** Limited-some superficial consideration given to market issues or volume production in the design thinking **4-5** Clear-detailed evidence that consideration has been given to market issues or volume production in the design thinking		**5**

C	**Detail Consideration of construction. Methods/construction/component/assembly detail, appropriate to the product and the chosen materials. Knock down fittings and relevant fixings will be given credit.** **0-1** No-little consideration given to suggested appropriate (alternative) methods of construction or assembly **2-3** Limited-some consideration given to suggested appropriate (alternative) methods of construction or assembly **4-5** Clear-detailed evidence has been considered in relation to appropriate (alternative) methods of construction or assembly		**5**
M	**Consideration of specific materials and components (may include calculations or specific values for components).** **Generic terms not acceptable:** • **Plastics-thermoplastics, thermosetting** • **Wood-hardwood, softwood** • **Cloth-natural fibre, synthetic fibre** • **Metal-ferrous, non-ferrous** • **Paper, card and board** **0-1** No-little mention of relevant and appropriate specific materials and components **2-3** Some consideration given to relevant and appropriate specific materials **4-5** Clear evidence of relevant and appropriate specific materials and components		**5**
D	**Consideration of dimensional detail (may include calculations).** **Overall dimensions plus some detailed dimensions required (circuit diagrams/layouts, systems diagrams, flow diagrams).** **0** No indication of scale, dimensions or calculations **1** Limited indication of scale, dimensions or calculations **2** Evidence of general sizes of scale, dimensions and calculations **3** Detailed sizes given in component parts or sub parts of the design		**3**
E	**Evaluation of the suitability of the ideas with reference to the specification.** **0-1** No-little evidence of evaluation commentary **2-3** Limited-some evidence of subjective evaluation commentary **4-5** Clear-detailed evidence of evaluation commentary (may-must include some objective content). Look for intellectual depth of design analysis and formative thinking		**5**

FEATURES SUITABLE FOR DEVELOPMENT (FD) A3 Sheet 4 of 4.			
F	**Appropriate features identified and clearly described. All major aspects of the design should be evident; this may be in the form of annotation of a final drawing or part drawings, or may be in the form of expanded text eg bullet point-listing. Candidates could refer to the design features in terms of strengths and weaknesses. Ideally there should be at least three different features identified.** **0** No-little features identified-concept drawing only, superficial commentary **1-2** Limited-some internal and or external appropriate features identified. Lacks realistic proposals and detail **3-4** Clear-detailed evidence of internal and or external appropriate features identified. Contains constructive and realistic proposals and detail		**4**
J	**Appropriate justification of the choices made with reference to the specification.** **0** No-evidence of justification made, (descriptive, superficial and subjective) **1-2** Limited-some evidence of justification (superficial descriptive statements with elements of objectivity) **3-4** Clear-detailed intellectual constructive justification is evident. Justification is fluent objective and appropriate		**4**

EFFICIENT COMMUNICATION (CS) A3 Sheets 1-4			
CS	**Communication skills and techniques.** **0** No-weak level of graphical skill/annotation evidenced by poor use of communication methods no apparent quality **1-2** Low level of graphical skill/annotation **3-4** Limited-some graphical skill/annotation evidenced by one form of communication method (eg 2D only) lacking appropriate techniques of detail **5-6** Reasonable evidence of variation and range of graphical techniques/annotation appropriately used **7-8** Fluent range of a variety of graphical presentation techniques in evidence with some annotation **9-10** Fluent design thinking that is evident and expressed coherently and cohesively and easily followed and understood by a third party. (Circuit diagrams, systems diagram, exploded views, sectional views 2D and 3D views enlarged detail views and fluent annotation are appropriately used)		**10**

[Total : 72]

Grade Threshold

Advanced GCE GCE Design and Technology (7822, 7823)
Advanced Subsidiary GCE Design and Technology (3822, 3823)
January 2008 Assessment Series

Unit Threshold Marks

Unit		Maximum Mark	a	b	c	d	e	u
2519	Raw	120	96	84	72	60	48	0
	UMS	120	96	84	72	60	48	0
2520	Raw	90	54	48	43	38	33	0
	UMS	90	72	63	54	45	36	0
2521	Raw	90	60	54	48	42	37	0
	UMS	90	72	63	54	45	36	0
2522	Raw	90	72	63	54	45	36	0
	UMS	90	72	63	54	45	36	0
2523	Raw	90	72	63	54	45	36	0
	UMS	90	72	63	54	45	36	0
2524	Raw	120	77	69	61	53	45	0
	UMS	120	96	84	72	60	48	0
2525	Raw	120	81	73	65	57	49	0
	UMS	120	96	84	72	60	48	0

Specification Aggregation Results

Overall threshold marks in UMS (i.e. after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
3822, 3823	300	240	210	180	150	120	0
7822, 7823	600	480	420	360	300	240	0

The cumulative percentage of candidates awarded each grade was as follows:

	A	B	C	D	E	U	Total Number of Candidates
3822	9.6	26.6	50.00	78.7	100	100	100
3823	0.0	11.1	44.4	88.9	100	100	10

3822: 3389 candidates aggregated this series

3823: 167 candidates aggregated this series

	A	B	C	D	E	U	Total Number of Candidates
7822	16.7	25.00	83.3	91.7	91.7	100	13
7823	0	0	0	0	0	100	0

7822: 2969 candidates aggregated this series

7823: 0 candidates aggregated this series

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

Statistics are correct at the time of publication

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