Rewarding Learning

ADVANCED
General Certificate of Education
2014

Technology and Design

Assessment Unit A2 1

assessing

Systems and Control

[AV211]

WEDNESDAY 14 MAY, MORNING

MARK SCHEME

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

In all cases, correct alternative responses will be given full credit.

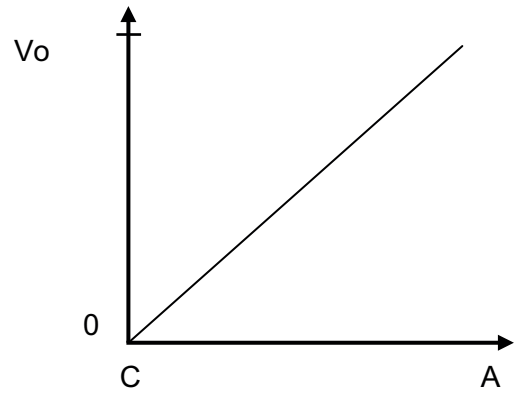
AVAILABLE MARKS

Section A

1 (a) (i) Closed loop because the operation of the gas valve will in turn have an effect on the gas pressure that the sensor detects. This is represented by the feedback loop shown on the diagram. [2]

(ii) For any three blocks
Input – Pressure sensor
Control – amplifier or PIC
Output – solenoid valve or meter display. [3]

(b) (i) Graph with labelled axes

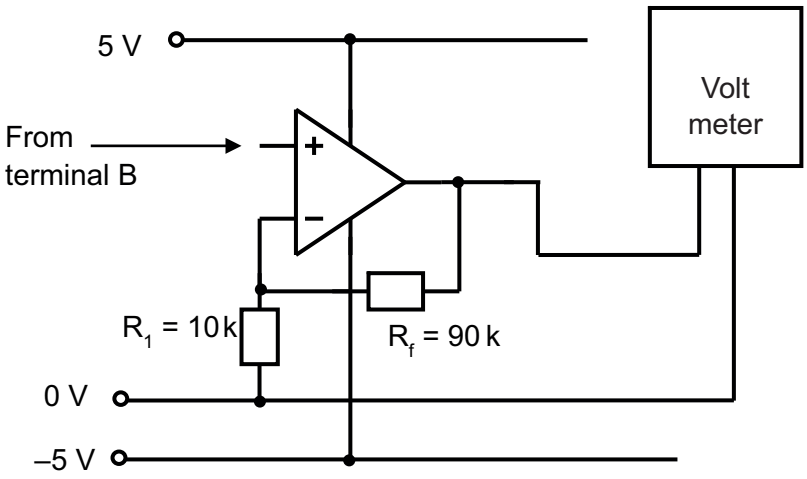


[2]

(ii) 25 mm – 12 mm = 13/25 × 100 k = 52 k [2]

(c) (i) max o/p voltage = 25/0.05 × 0.001 = 0.5 volts.
Gain = 5 volts/0.5 volts = 10 [3]

(ii)



[4]

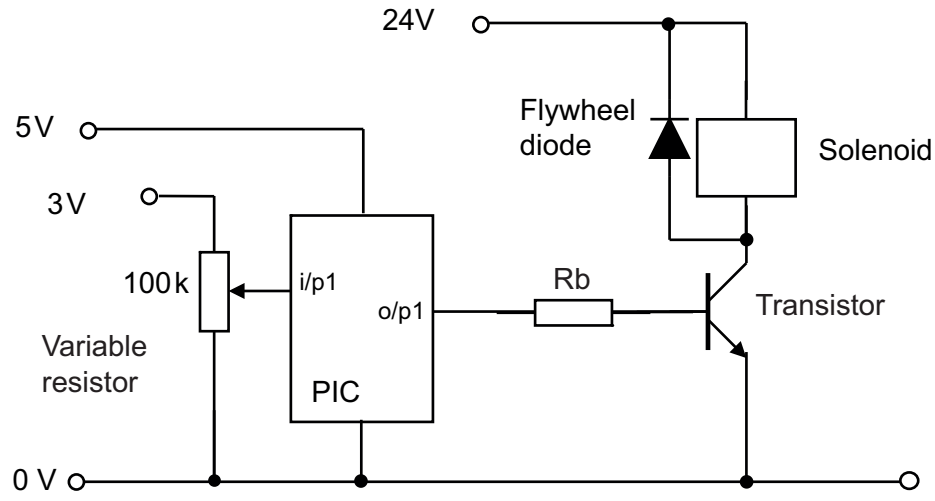
(d) (i) The analogue input on a PIC will convert any voltage within preset limits into an internally readable digital value. [2]

(ii) 1.2/3 × 15 = 6
1.8/3 × 15 = 9

[2]

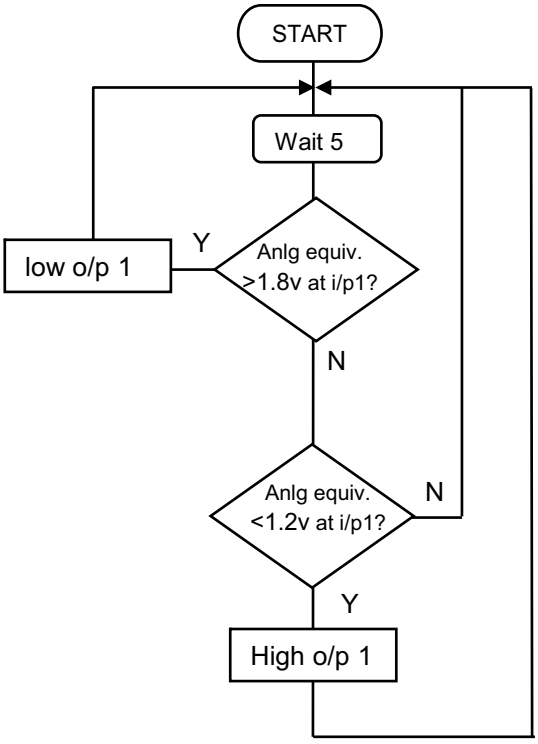
AVAILABLE MARKS

(iii)



[4]

(iv)

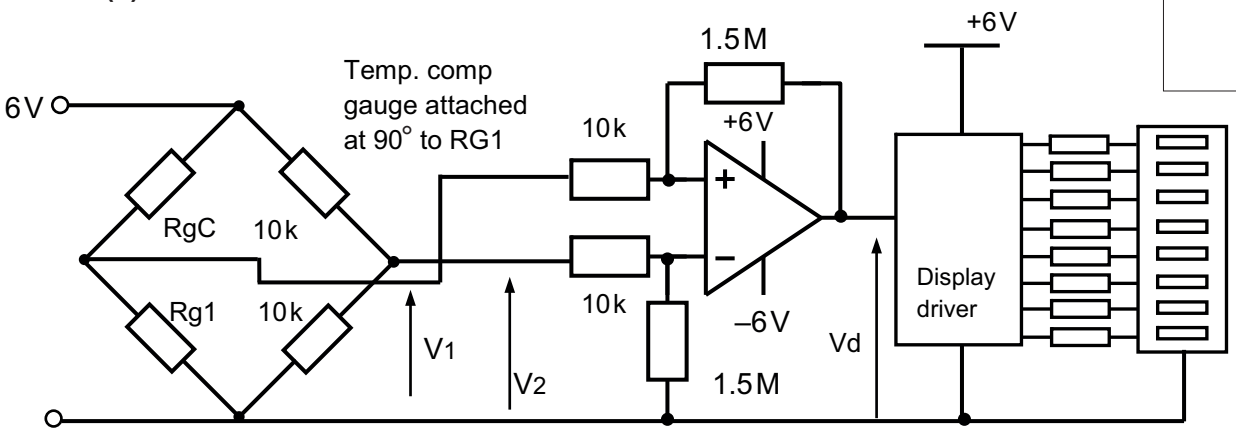


[4]

(e) (i) 120 + (120/100 × 2.5) = 123 ohms [2]

AVAILABLE MARKS

(ii)



When strained Rg1 = 123 Ω

Therefore differential voltage = 0.04 V

$$\text{Gain} = \frac{6}{0.04} = 150$$

Display driver typically requires input voltage range 0–6 V. All bars illuminated when Vd = 6 Volts.

[10]

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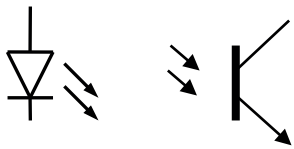
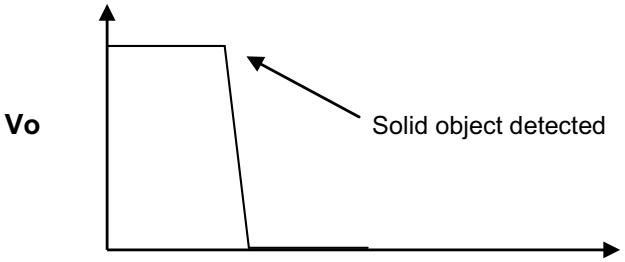
AVAILABLE MARKS

2 **(a)** **(i)**



[2]

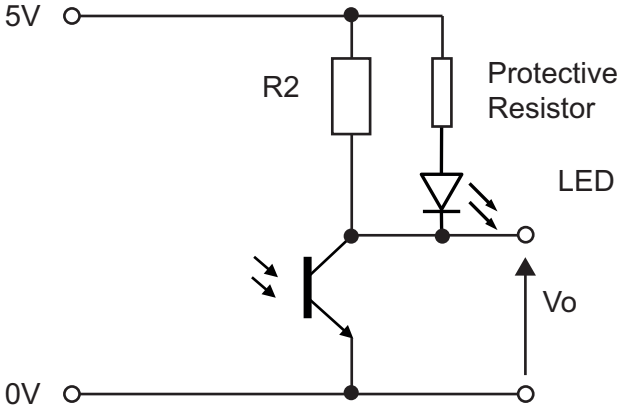
(ii)



[3]

explanation: phototransistor will stop conducting when solid object blocks infrared light
Therefore Vo will be high

(iii)



[2]

AVAILABLE MARKS

(b) (i)

Ta	Tb	Tc	CA	CR
0	0	1	1	0
0	1	1	0	1
1	1	1	1	0

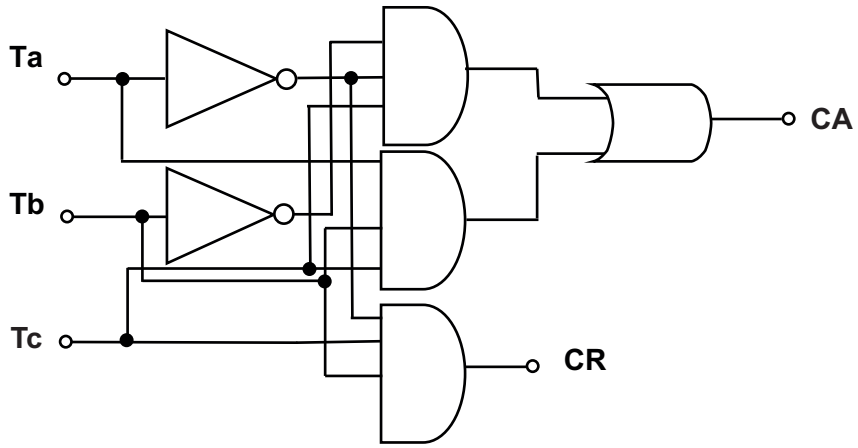
[1] for correct Ta,Tb and Tc. [1] each for CA and CR [3]

(ii) CA = $\overline{Ta}.\overline{Tb}.Tc + Ta.Tb.Tc$

CR = $\overline{Ta}.Tb.Tc$

[2]

(iii)



[3]

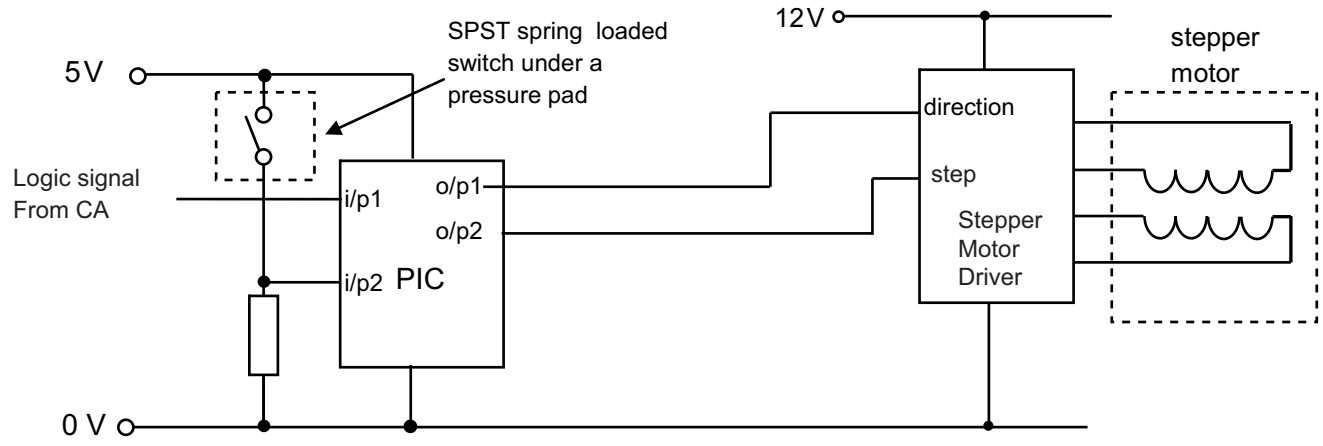
(c) (i) To increment the coil sequence in order to move the motor to the next step angle. [1]

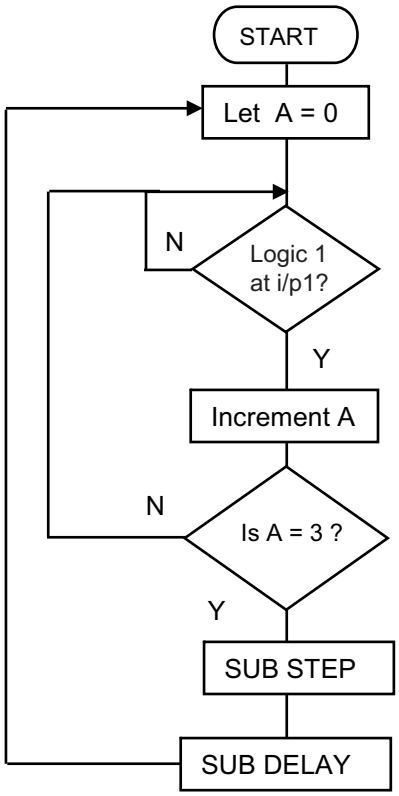
(ii) Any **two** from the following:

- Unlike DC motors stepper motors can be easily stopped at an angular position.
- DC motors produce high torque at high RPM while stepper motors can produce high torque at low RPM.
- Stepper motors can be electrically 'held' in a stationary position where DC motors require a mechanical brake. [2]

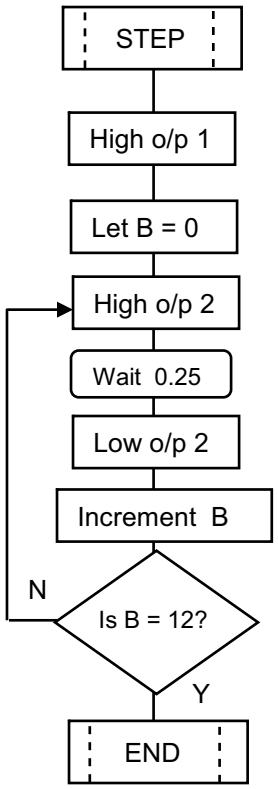
(iii) 90/7.5 = 12 steps in 3 seconds
Frequency = 4 Hz [3]

(d)

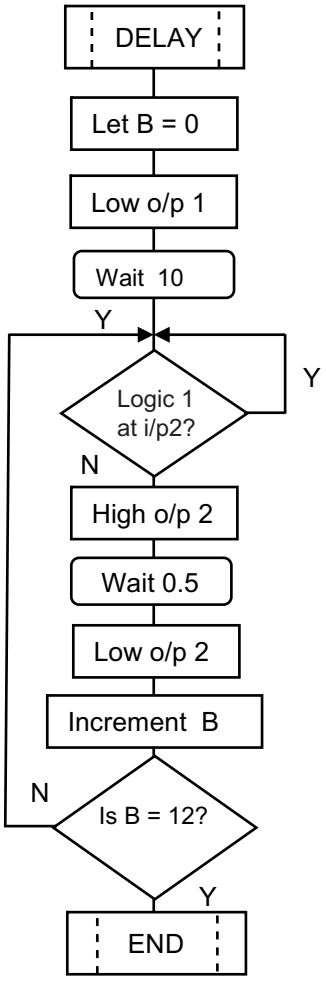




The main program will count the number of logic 1s from the CA light and run two subroutines before returning to the start again.



This subroutine will set the direction of the stepper and raise the barrier in 3 seconds (12 steps).



This subroutine will delay for 10 seconds before reversing the direction of the stepper and lowering the barrier in 6 seconds. An extra check has been inserted in the event of the pressure pad being activated.

[10]

AVAILABLE MARKS

	AVAILABLE MARKS

(e) Any **two** main factors from the following:

1. Cost – single LEDs could indicate the number of coins relatively economically whereas a seven segment display may be more expensive.
2. Simplicity of driving circuitry – Bar graph type displays and seven segment displays require driving circuits where single LED clusters can easily be switched.
3. Visual display requirements. Where decimal numbers are required a seven segment display may be more appropriate. The numbers 1, 2 and 3 could be displayed to represent the coins. However a bar graph type display can be calibrated to represent numbers.
4. Ease of service replacement – While all LED type displays offer durability if one bar or segment in display fails the entire display will need replacing. Single LEDs or LED clusters could be replaced in the event of vandalism or failure in car park system.

Any **three** main factors from the following:

1. Common anode or common cathode which refers to the internal connection of more than one LED will influence driving circuits.
2. A wide range of colour variations is available in LED types.
3. The physical size of an LED display can vary with implications for power consumption and current demand.
4. Package shape will vary depending on size and type of display.
5. Luminescence or brightness of displays can be specified depending on requirements along with viewing angle which may influence choice. [5]

Quality of written communication

For a response not worthy of credit.	[0]
Poor selection and use of a writing form and style appropriate to the content. The content is poorly organised and little use is made of appropriate technological vocabulary. The writing is barely legible and the spelling, grammar and punctuation is inaccurate.	[1]–[2]
Good selection and use of a writing form and style appropriate to the content. The content is organised and use is made of appropriate technological vocabulary. The writing is legible and the spelling, grammar and punctuation is accurate.	[3]
Very good selection and use of a writing form and style appropriate to the content. The content is well organised and good use is made of appropriate technological vocabulary. The writing is clearly legible and the spelling, grammar and punctuation is very accurate.	[4]

[4] 40

Section A **80**

Section B

AVAILABLE MARKS

3 **(a)** Sketch of four pulleys, correct rope and hook position [2]
Annotation [1] [3]

(b) **(i)** P = work/time
P = 18 000 N × 20 m/120 sec
P = 3000 W
P = 3000 × 100/80
P = 3750 W [2]

(ii) Kinetic energy = $\frac{1}{2}$ × mass × v^2 Velocity = 0.22 × 2800/60 = 10.26 m/s

KE = 0.5 × 0.5 × 10.26^2

KE = 26.31 J [3]

(iii) Any **two** from the following:
- They prevent leakage from or into the joined objects while under compression.
- Often the two mating surfaces are not completely matched, requiring the need for a gasket to seal the different levels at the join.
- Gaskets save money by allowing “less-than-perfect” mating surfaces on machine parts which can use a gasket to fill irregularities.
- They allow for assembly and disassembly of components or parts for maintenance. [2]

(iv) Static Friction – before something slides the friction force is at maximum limited friction. Before sliding, the force trying to cause sliding and the friction force remain equal to each other.

Dynamic Friction – the friction force required to maintain movement is less than the static friction.

For a response not worthy of credit.	[0]
A vague description of the difference between static and dynamic friction.	[1]
A clear description of the difference between static and dynamic friction.	[2]

[2]

AVAILABLE MARKS

(c) Factors when selecting lubricant

Oils have to operate under different working conditions of load, speed, force and temperature and therefore present different properties. It is necessary to select the correct type of oil for specific jobs. Thin oils have a low viscosity and flow easily through small holes and clearances. Thick oils have a high viscosity and offer more resistance to flow. Thick oils are capable of avoiding being squeezed out of bearing surfaces at high pressure.
Oil is affected by temperature – the hotter an oils gets, the lower the viscosity. [3]

Example with justification:

SAE number	Oil thickness	Application
10	Extra-light	Low pressure.
20	Light	Sewing machines, printers, etc.
30	Medium	General purpose, e.g. engines.
40	Medium-heavy	Bearings.
50	Heavy	
60, 75, 140, 250	Extra heavy	High pressure, e.g. transmission and parts

[2] [5]

Quality of written communication

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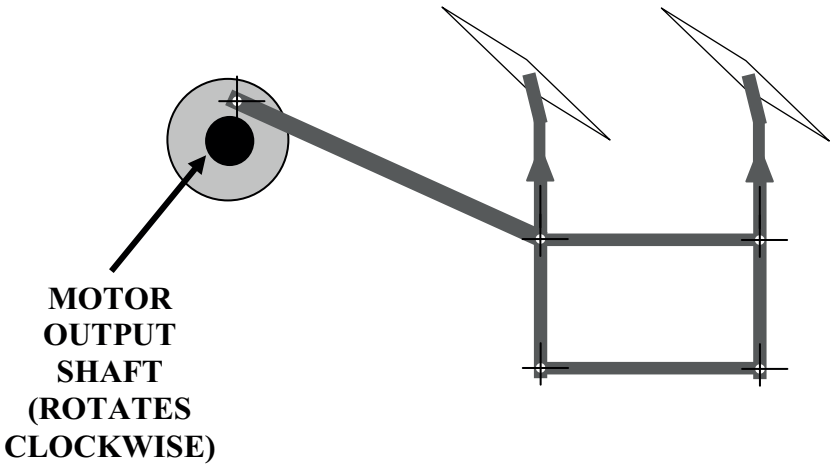
[4]

(d) (i) See sample answer. [4]

(ii) See sample answer. [5]

			AVAILABLE MARKS
(e) (i)	**Sample Answer** – A sketch of a suitable mechanism such as a treadle linkage. Attachments must be clearly outlined. [4]		
	Sample:		



(ii)	**Sample Answer** – A sketch of a roller bearing showing it fixed to the main housing using suitable attachment and lubrication points.			
	Drawing of housing	[3]		
	Secure method	[1]		
	Removal method	[1]		
	Lubrication points (i.e. grease nipples)	[1]	[6]	40

		AVAILABLE MARKS
4	**(a)** Any **one** from the following: • Maintenance of moving parts • Checking of pipes and components • Regulated air pressure • The need for safety valves Or other suitable answer [1]	
	(b) **(i)** The circuit operates as follows: The air bleed activates and sends a signal to Valve A (lever operated). These work together in AND logic and send a signal to the 1:2 side of the 5PV which sends the DAC negative. As the cylinder goes negative exhaust air goes through the time delay and activates the 1:2 side of Valve B. Valve B (NOT Valve) operates on a pressure differential between the main air signal and the amplified exhaust air signal. Valve B activates the 1:4 side of the 5PV putting the DAC positive. The Air Bleed is activated and the lever 3/2 activated (AND logic) and puts the DAC negative. The sequence continues with Valve B putting the DAC positive and the sequence continues. [5]	
	(ii) W = F × L 1098.3N × 0. 6 = 658.98J [2]	
	(iii) Volume = $\frac{S \times D^2 \pi}{4} + \frac{S \times (D^2 - d^2)\pi}{4}$ Volume = $140 \times 12^2 \times 3.14/4 + 140 \times (12^2 - 3^2) \times 3.14/4$ Volume = 15825.6 + 14836.5 Volume = 30662.1 mm^3 [2] Volume = cylinder volume × gauge pressure + atmospheric pressure × number of cycles (no/min) 337.283 × 1000000 = 30662.1 × (5.5) × (no/min) No/min = $\frac{337.283 \times 10^6}{30662.1 \times 5.5}$ Answer number of cycles per min = 2000 [2] [4]	
	(c) Ans = Connection of Control Panel [1] Method of activating cylinder W – X – [2] Method of activating cylinder X + W + Y – [3] Method of activating cylinder Y + Z – [2] Method of activating cylinder Z+ [1] Time Delay [1] Speed Control [1] Group changeover valves [3] Connection of Emergency Stops [4] See sample answer [18]	
	(d) **(i)** See sample answer [5]	
	(ii) See sample answer [5]	40
	Section B	**80**

AVAILABLE MARKS

Section C

Product Design

5 **(a)** Companies should provide proposals which consider the type of materials needed, the amount of materials required, sourcing of materials, and the processes required to manufacture the product in order to reflect on the impact this will have on the environment. [1]

(b) **(i)** Probability sampling could be used in market research by –

ensuring that everyone in a given population has an equal chance of being surveyed for their views and opinions on whatever particular information the company is trying to find out about trampolines. Essentially, probability sampling means that respondents are chosen at random and everyone has an equal opportunity to participate in the research. [2]

(ii) Non-probability sampling could be used in market research by –

only sampling people they think might buy the product or have a large enough space to accommodate the product in their garden. Non-probability sampling creates a biased sample wherein not everyone has an equal chance of being sampled. [2]

(c) Any **two** appropriate tests that could be used to test the trampoline from the following:

- Max weight – A series of tests with different weights up to a maximum of 150 kg to record the performance of the bed of the trampoline over time and in various weather conditions.
- Assembly – Recruit a number of people with no previous experience of assembly and provide them with the instructions, and record the time taken to assemble the product from the time they remove the components from the packaging to the product is fully assembled.
- Warranty – Under controlled lab tests the frame could be subjected to accelerated environmental conditions in order to determine if the frame would not rust within the specified time and to determine if the bed, padding and enclosure would not degrade in the time span. [4]

(d) Any of the **three** promotional methods from the following:

- Sales promotions – Introductory offers based on numbers ordered or accessories offered in introductory price.
- Advertising processes – Internet coverage, brochures, leaflets and catalogues or adverts in papers.
- Personal selling – Sales personnel are used to sell door to door or to sell to large retail outlet or shops by visitation.
- Trade fairs – Present their products at the trade fair by leasing a stand to display and promote their product to potential customers.

[6]

(e) Any **five** discussions on the variations which exist between the life cycles for different products.

AVAILABLE MARKS

1. In a typical example we see the five stages, starting with introduction, through growth, maturity, saturation and finally decline. This is a typical structure of a product life cycle, but there are many products that do not fit into this model.

2. In a second example, the product quickly moves through all the stages. Introduction is short, market saturation may be reached in a matter of months, sales can become incredibly high, and products with Straw on Fire life cycles can dominate the market for a short period, but decline sets in shortly after. Some of the best examples of this type of life cycle can be found in the children's toy market, hula hoops, yo-yos, ninja turtles, etc.

3. A third example demonstrates that some products remain in the market place for a long time, and often much longer than competitor products. Consider the shape of the life cycle of Coca Cola, or Rice Krispies or Mars Bars. Are these products in decline, or are sales being maintained?

4. These 3 are not the only possible shapes or structure of product life cycles. Other products may 'sleep'. Sales may be restricted to early adopters (consumers who are willing to pay a premium for new technology) or those 'in the know'. It may take a large advertising campaign or reductions in price to win a mass market for the product. Other products make comebacks, re-released albums, platform shoes and skateboards coming back into fashion.

5. Style, fashion and fad each display a different life cycle curve.

   Style – a basic and distinctive mode of expression. Once invented, styles can last for generations, going in and out of vogue.

   Fashion – a currently accepted or popular style in a given field. Fashions pretty much follow the typical bell-shaped product life cycle curve.

   Fad – are fashions that come quickly into the public eye, are adopted with great zeal, peak early, and the decline very fast. Fad acceptance cycle is short and they tend to attract only a limited following.

6. Product life cycle on an international scale

   Life cycle of the same product can be in different stages in different countries because product adoption occurs throughout the world at different rates.

   For example, Chinese manufacturers often copy US products and sometimes even become exporters to the US and start competing with the original US manufacturers. [5]

AVAILABLE MARKS

Quality of written communication

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[4]

(f) **(i)** Any suitable example of **one** product and an explanation of how it incorporates negative moral factors from the following:

- E.g. Computer/Internet/software. It incorporates negative moral factors in its design as it provides the opportunity for the user to access inappropriate material. The use of some software games is considered to be inappropriate given their content.
- E.g. Use of warning when gambling. [2]

(ii) Any **two** different suitable products and an explanation of how they incorporate environmental factors from the following:

- Car – catalytic convertor, start stop technology, hybrid technology and battery powered cars and other energy saving technologies developed in design and components.
- Light bulbs – Light Emitting Diode (LED) has revolutionised energy-efficient lighting. They last much longer they are more durable, are mercury free, more efficient, inside the home save electricity, remain cool and save money on replacement costs.
- iMac – includes a highly efficient power supply that reduces the amount of power wasted, lower power consumption and the use of power management software. It has eliminated the use of toxic substances in its circuit boards.
  Apple has minimised the waste when iMac reaches end of life through its very efficient design and the use of aluminium and glass, which recyclers can reuse for other products. [4]

AVAILABLE MARKS

(g) (i) Graphical information to convey the following:

Level of response not worthy of credit.	[0]
Poor sketches with little or no annotation. Difficulties in deciding if the design conveys information about the person or space.	[1]
Annotated sketches are limited. The graphics convey information about only one person on the trampoline at any one time and that the space below the trampoline should be clear.	[2]–[3]
Detailed annotated sketches. The graphics convey information about only one person on the trampoline at any one time and that the space below the trampoline should be clear.	[4]–[5]

[5]

(ii) Redesign the peg and bracket.

A solution could be based on a corkscrew peg which will provide a better fastening to the ground. The bracket could be modified with a slot arrangement to accommodate the much wider peg. A small bracket could be welded onto the tubular supports to house the peg when not in use.

Level of response not worthy of credit.	[0]
Poor sketches with little or no annotation. Difficulties in deciding if the design is appropriate for the trampoline.	[1]
Annotated sketches are limited. The design allows the user to fasten the trampoline to the ground. A design is included to ensure that the peg does not get lost when not in use.	[2]–[3]
Detailed annotated sketches. The design allows the user to securely fastened the trampoline to the ground. An appropriate design is included to ensure that the peg does not get lost when not in use.	[4]–[5]

[5] 40

AVAILABLE MARKS

6 **(a)** The inception stage of the product life cycle is

the first stage, long before the product is to be introduced to the market. This stage really focuses on ensuring that the project is both worth doing and possible to do. [2]

(b) **(i)** An environment audit

is a systematic, documented, periodic and objective process carried out by an independent third party to assess the current status of an organisation's compliance with local environmental laws and regulations. [2]

(ii) A life cycle assessment

is a technique to assess environmental impacts associated with all the stages of a product's life from-cradle-to-grave (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling). [2]

(c) The type of information gained by researching each of the following and how this might influence outdoor garden products:

- Family roles – who would mainly carry out the gardening work within the family (male or female) age range. Are the family carrying out all the gardening work or is it contracted out to local firms?
  This might influence the size and type of gardening equipment or might help influence the company to produce more robust commercial gardening equipment. [2]

- Economic trends – may influence the amount of money we earn and the amount of money we can invest in our interests, and lifestyles. This will give valuable information on possible disposable income and if there is an interest in DIY gardening and, if so, which type. This will help the company to focus more on the type of products that people may be able to purchase and help shape the direction of the products for outdoor gardening. [2] [4]

(d) **(i)** Any **two** main characteristics associated with Hall tests from the following:

- Hall Tests are frequently used to test reactions to concepts, designs and products in a neutral but controlled environment.
- Interviewees are recruited prior to the Hall Tests, either in the street or via a postal or telephone campaign, before being brought into the venue to participate in a test and complete a short interview.
- Face to face feedback can be gathered in a controlled environment where people will not influence each other's opinions.
- There is the opportunity for a percentage of the interviewees to be invited to participate in a more in-depth interview, providing qualitative market research feedback in addition to the quantitative market research. [2]

AVAILABLE MARKS

Any **two** main characteristics associated with Retail audits from the following:

- Retail audits monitors the distribution of consumer goods. It is based on in-store observation during which the presence and prominence of certain products being checked.
- It provides an assessment of the presence and availability of a brand to the consumer. It seeks to measure if the shelf presence of one brand is better than the position of competing brands, and the impact of additional product displays, promotional materials and prices on the level of sales.
- Retail audit yields a wealth of information that gives the client basis for tactical decisions to strengthen their market position. [2]

Any **two** main characteristics associated with Omnibus surveys from the following:

- Omnibus surveys provide those seeking information about markets and opinions with a means to get quick, relatively low cost answers to their questions without financing and organising a full market or opinion research survey themselves.
- The research company conducts a number of interviews with the target group on a regular basis: these interviews combine a number of standard questions with questions effectively sponsored by clients.
- Omnibus surveys can also be used to reach more specific audiences such as men or women, certain age, education, or income groups, or even individuals who engage in a specific behaviour. [2] [6]

(ii) Any **three** main advantages associated with the use of postal questionnaires from the following:

- They have the potential to cover a lot of people hence increasing the sample size.
- They are highly targeted to a specific group.
- They are very affordable as the only cost is that of printing and distributing.
- The person completing the questionnaire has more time to think and would be able to give more honest reply due to absence of the interviewer bias. [3]

Any **three** main disadvantages associated with the use of postal questionnaires from the following:

- Firstly only a very few people would be interested in filling out the questionnaire mailed to them; in fact only those people would be willing to answer and mail back the questionnaire who are interested in the topic or subject which that particular questionnaire is about.
- The body language of the respondent cannot be observed as the respondent cannot be seen.
- Those people who do mail back the questionnaire might not have all of the questions answered in it.
- It can be time consuming and the questions can be misunderstood. [3] [6]

AVAILABLE MARKS

(e) **(i)** Explain what is meant by the cost-plus pricing method.

This takes the cost of producing your product and adds an amount that you need to make a profit. This is usually expressed as a percentage of the cost. [2]

(ii) The importance to consider the elasticity of demand for the product.

Since the elasticity of demand is really how sensitive the demand is for a product to a change in the product's own price it could result in greater profit margins for the company or it could result in a reduction in sales and the consequences of that. [2]

(f) Two other ICT systems which could be used in the design and manufacture of the garden kneeler from the following:

- ICT systems to communicate with customers (both nationally and internationally) Webcams, video conferencing, MS messenger and I meetings.
- ICT systems used to order parts, ensure stock levels and schedule manufacture.
- ICT systems to monitor manufacturing processes or to carry out quality control checks. [4]

(g) **(i)** A suitable design that will enable the user to quickly extend the length of each of the supports.

A solution could be based on a ball and spring mechanism used in crutches. A plastic sleeve or insert could be used to prevent damage to the paintwork.

Level of response not worthy of credit.	[0]
Poor sketches with little or no annotation. Difficulties in deciding if the design is appropriate for the kneeler.	[1]
Annotated sketches are limited. The design allows the user to extend the length of each of the supports of the garden kneeler. A design is included to prevent damage to the paintwork.	[2]–[3]
Detailed annotated sketches. The design allows the user to quickly extend the length of each of the supports of the garden kneeler. An appropriate design is included to prevent damage to the paintwork.	[4]

[4]

(ii) A design to fulfil the following:

A solution which folds over the top of the side rail and two clips are used to secure the board to the two uprights of the side rail. A top bracket with a profile to receive the two garden tools with the handles facing upwards for easy access (press fit). A bottom bracket is used for the tools to rest on. Small board with two protruding brackets all injection moulded in one piece. Clips are injection moulded and secured to board with adhesives or double sided tape.

1. Allow the user to quickly attach/remove the board from the side of the garden kneeler.

Level of response not worthy of credit	[0]
Annotated sketches are limited. The design allows the user to attach/remove the board from the side of the garden kneeler but not quickly.	[1]
Detailed annotated sketches. The design allows the user to quickly attach/remove the board from the side of the garden kneeler.	[2]

[2]

2. Displays the two garden tools to facilitate easy access.

Level of response not worthy of credit.	[0]
Annotated sketches are limited. The design displays the two garden tools but does not facilitate easy access.	[1]
Detailed annotated sketches. The design displays the two garden tools to facilitate easy access.	[2]

[2]

3. Uses the minimum amount of material and requires the minimum number of manufacturing processes in order to provide a commercially viable product.

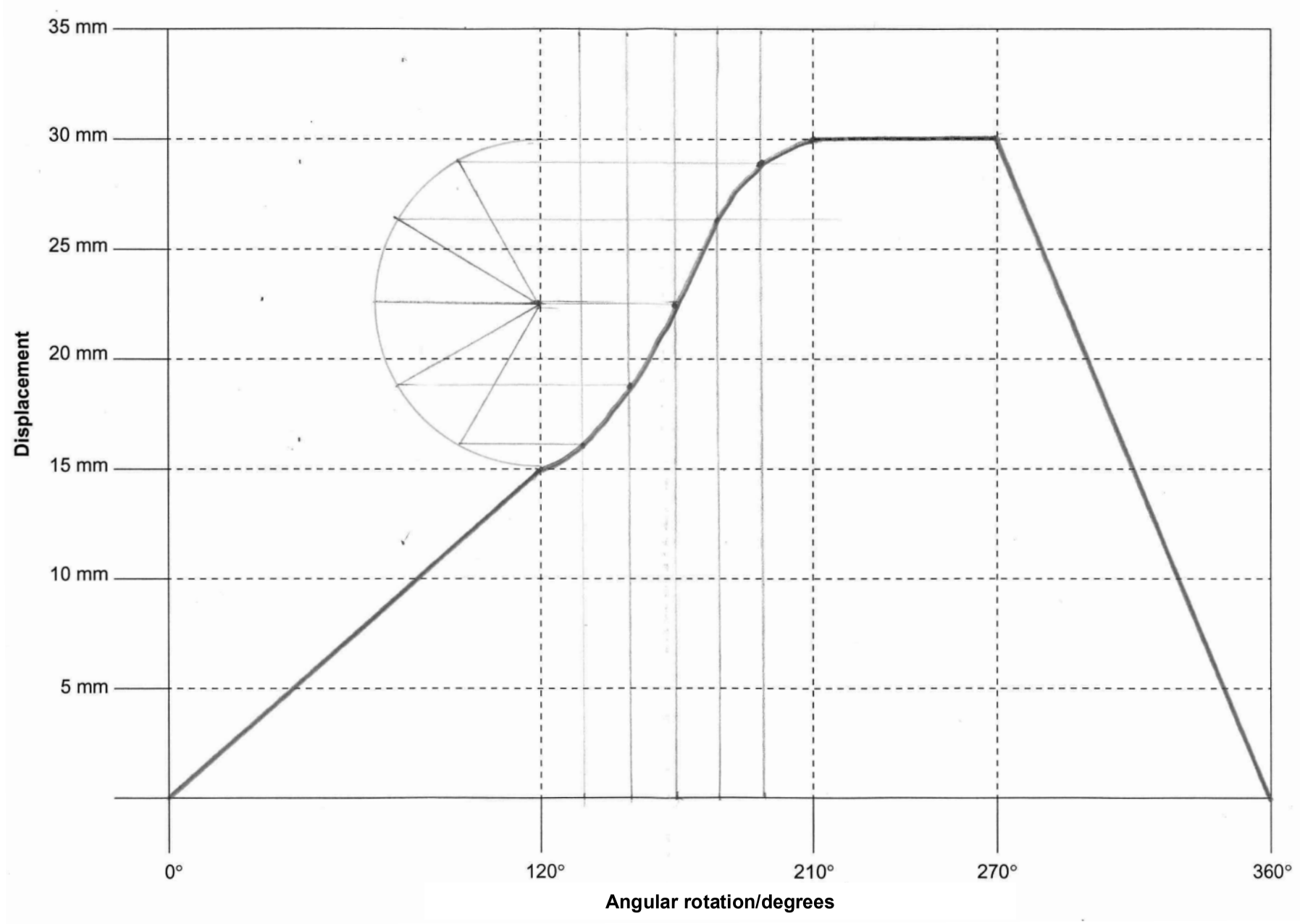
Level of response not worthy of credit.	[0]
The design does not fully minimise the use of materials and the number of manufacturing processes required.	[1]
The design minimises the use of materials and provides a minimal number of manufacturing processes to produce the product.	[2]

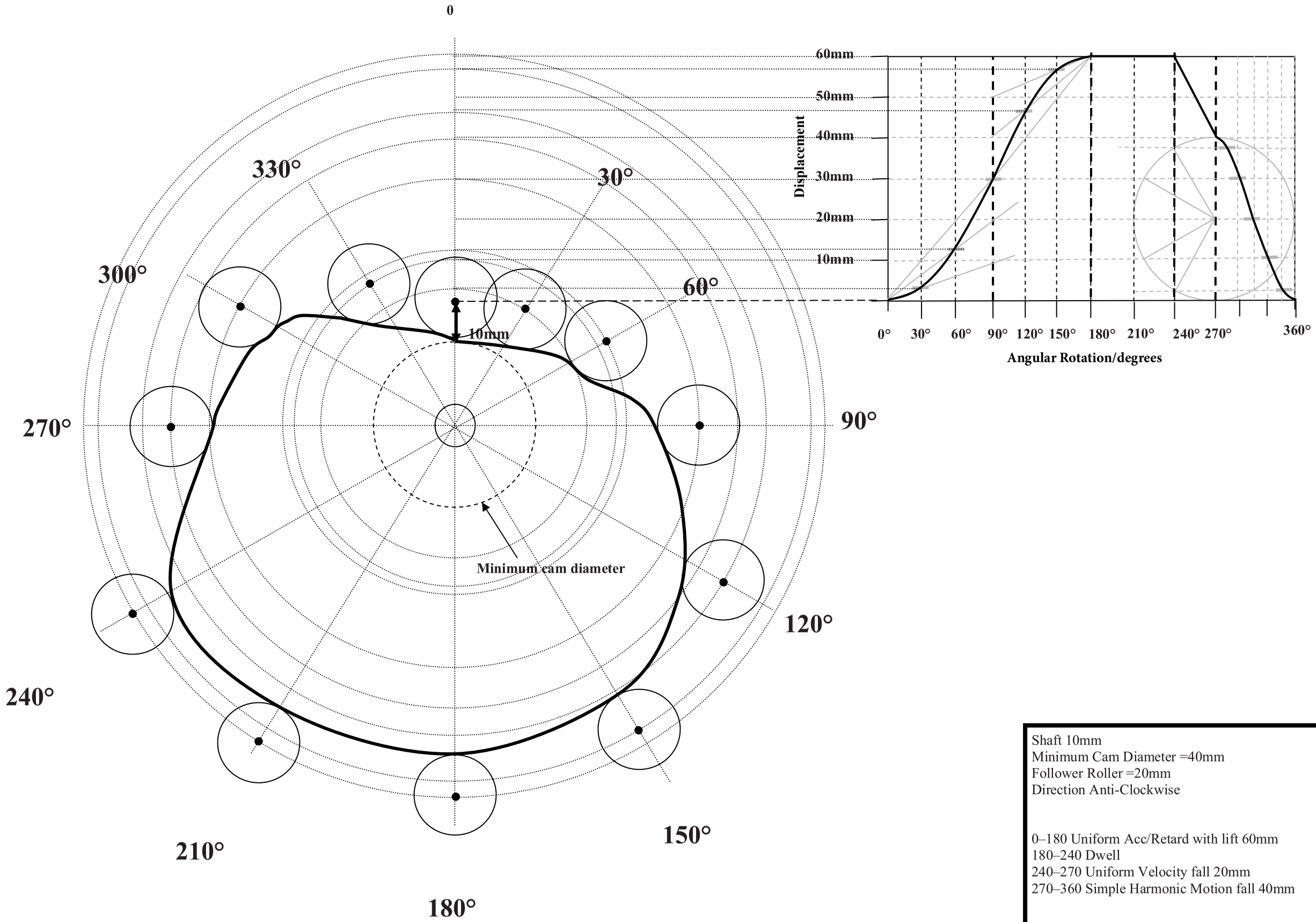
[2]

Section C

Total

AVAILABLE MARKS
40
80
80

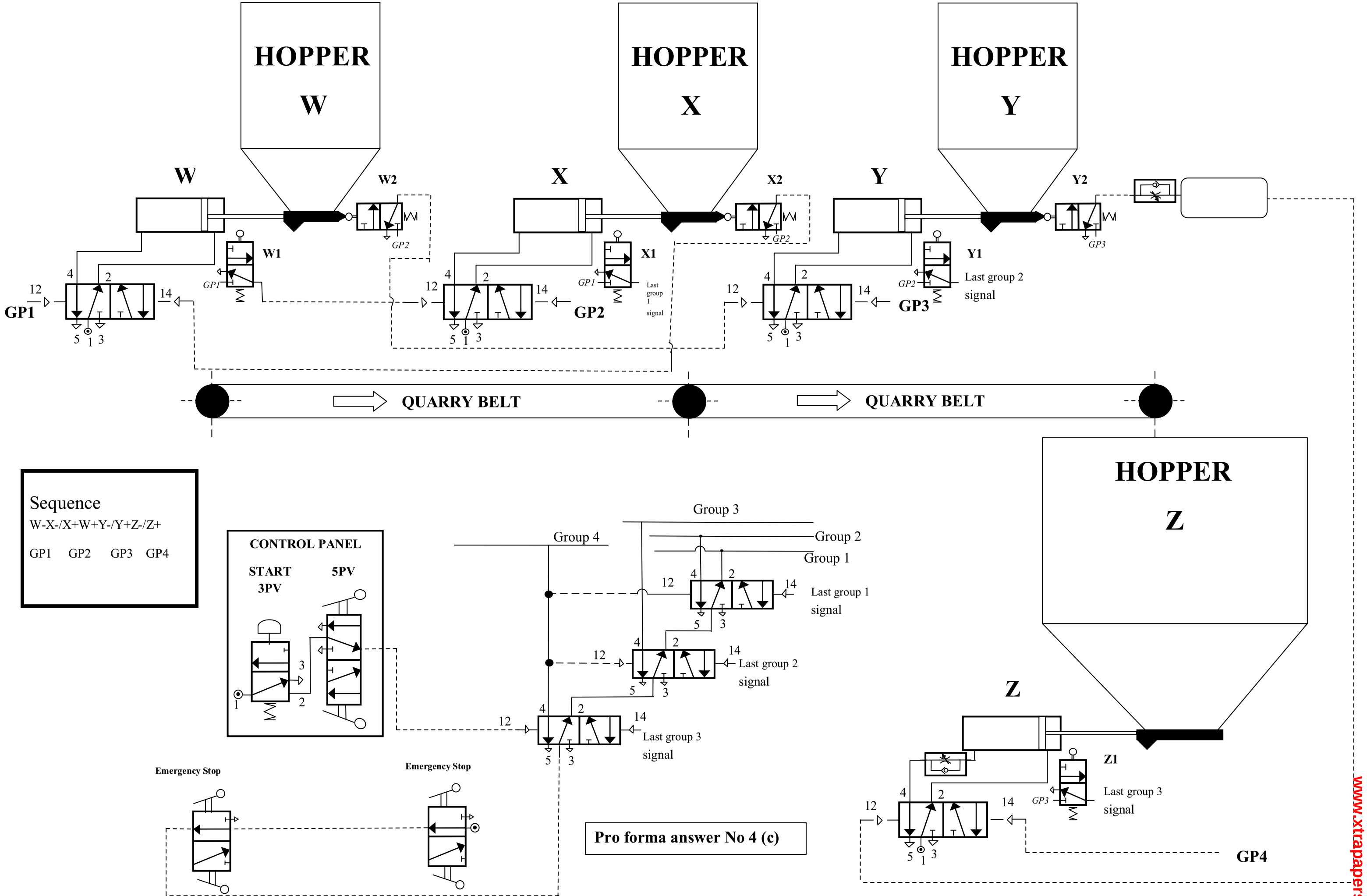




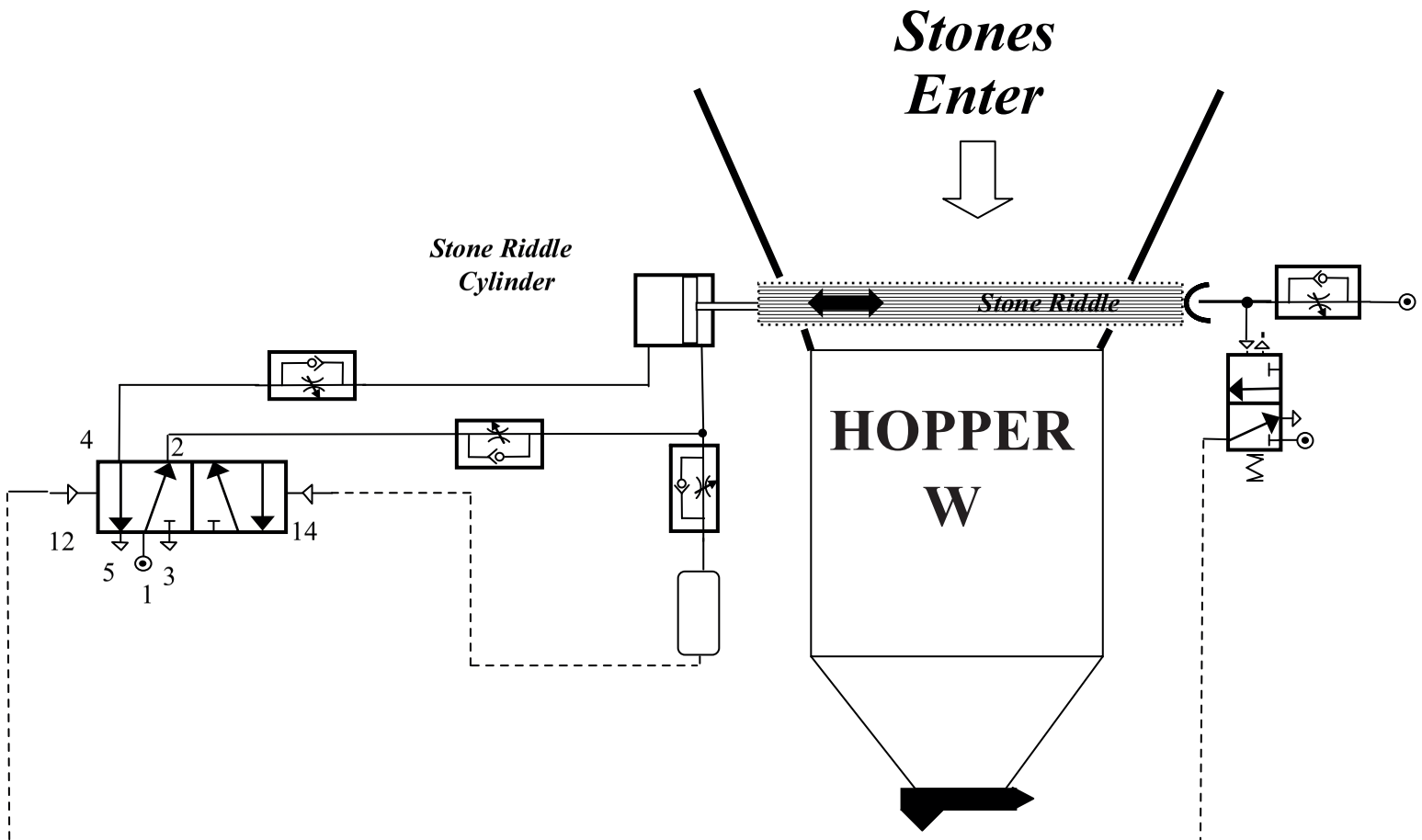
Pro forma answer 3(d)(ii)

Shaft 10mm
Minimum Cam Diameter =40mm
Follower Roller =20mm
Direction Anti-Clockwise

0–180 Uniform Acc/Retard with lift 60mm
180–240 Dwell
240–270 Uniform Velocity fall 20mm
270–360 Simple Harmonic Motion fall 40mm

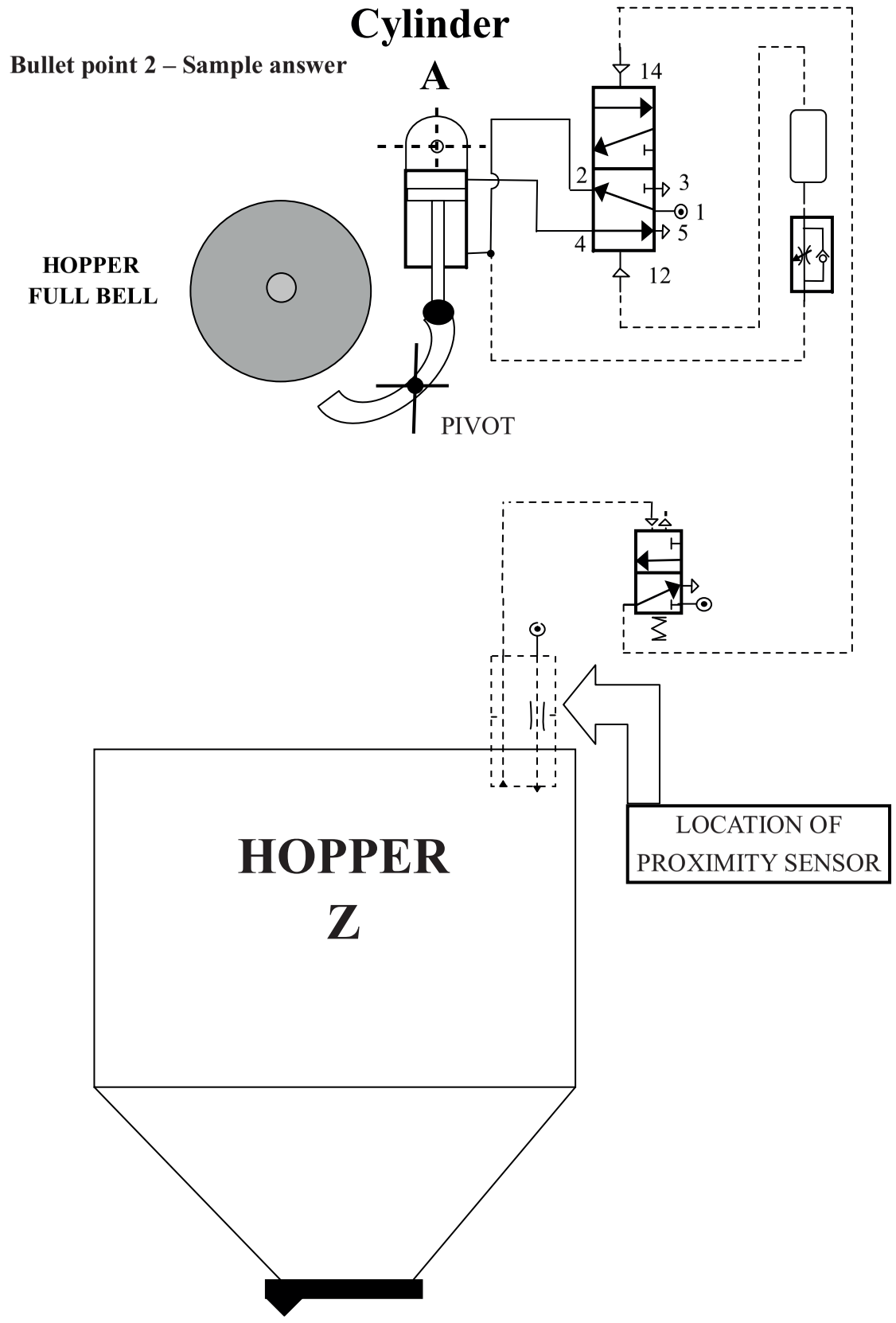

HOPPER
W
HOPPER
X
HOPPER
Y
W
W2
W1
GP2
GP1
X
X2
X1
GP2
GP1
Last group 1 signal
Y
Y2
Y1
GP3
GP2
Last group 2 signal
GP1
GP2
GP3
12
14
4
2
5
1
3
QUARRY BELT
QUARRY BELT
Sequence
W-X-/X+W+Y-/Y+Z-/Z+
GP1 GP2 GP3 GP4
CONTROL PANEL
START
3PV
5PV
Group 3
Group 4
Group 2
Group 1
Last group 1 signal
Last group 2 signal
Last group 3 signal
Emergency Stop
Emergency Stop
HOPPER
Z
Z
Z1
GP3
Last group 3 signal
GP4
Pro forma answer No 4 (c)
8618.01F
www.xtrapapers.com

Bullet point 1 – Sample answer



Correct drawing and piping of air bleed	[1]
Correct piping 5PV	[2]
Time Delay activator	[1]
Speed control	[1]

Bullet point 2 – Sample answer



Time delay	[1]
Correct piping of Proximity Sensor/Diaphragm 3/2	[2]
Correct piping	[1]
Lever Mechanism	[1]