

Sixth Form Entrance 2019

GENERAL PAPER

1 hour 20 minutes

Total: 80 marks

Section A: (20 marks) Multiple choice logic problems

Section B: (20 marks) Linguistics challenge

Section C: (20 marks) Comprehension task

Section D: (20 marks) Short Essay

This is a long paper and you are not expected to comfortably finish it.

You need to work at the average rate of a mark a minute and you are advised to spend about 20 minutes on each section.

Complete Section A on the separate answer sheet.

Complete Section B in this question paper.

Complete Section C on sheets of lined paper (name each sheet clearly)

Complete Section D on a new sheet of lined paper (name each sheet clearly)

Your Full Name (Capital Letters):

Present School:

Section A [20 marks] – Multiple choice

Read the questions and circle the correct letters on the answer sheet:

1. Sometimes poverty is defined in relation to average income. For example, people may be said to be poor if their income is less than 60 per cent of the average income for the population. This is not a legitimate definition, because it is a measure of inequality rather than poverty. This is obvious if we consider the consequences of using the definition. It means that a huge pay rise for middle managers automatically throws some people into poverty, even though their income has not changed. On the other hand, the definition implies that in a society where almost everyone is starving, no one is poor.

Which of the following best expresses the main conclusion of the above argument?

- A Having a relatively low income is not the same as being poor.
- B It is impossible to find an appropriate definition of poverty.
- C It is wrong to define poverty in relation to average income.
- D A huge pay rise for middle managers makes other people poor.
- E There is no inequality in a society where most people are starving.

2. Socialist politicians are often taunted by their opponents for leading lifestyles similar to those of their capitalist counterparts. The theme of the taunts runs like this; 'You object on socialist principles to gross inequalities in the distribution of wealth; yet you enjoy a higher personal standard of living than the majority of the population. Therefore you are not really a socialist'. But the jibe can easily be answered, for there is no hypocrisy in arguing, even from a privileged position, for a fairer and more equal society.

Which of the following is a conclusion which can be reliably drawn from the passage as a whole?

- A Socialists who enjoy personal wealth cannot object to others who amass even greater wealth.
- B Someone can be a genuine socialist whilst enjoying a high standard of living.
- C Calls for reform are more effective if they come from the more privileged classes of society.
- D There is nothing immoral about inequalities in the distribution of wealth.
- E It is hypocritical to claim to be a socialist if one enjoys a standard of living above the average.

3. I have so many four digit code numbers to remember that I cannot keep them all in my head. The banks say you should not write down your Personal Identification Numbers (PINs) for cash and credit cards and keep them in a wallet with the cards. So I can find out what the numbers are, I have devised a code which should be complicated enough to confuse any thief who steals my wallet. I code all the numbers using 1=A, 2=B up to 9=I, 0=J. Then I write the coded numbers down backwards so 1234 is written DCBA. Finally at the end of each coded number I add an extra letter between A and J to say what that particular code is of: C is for credit card; F is for phone card; B is for bicycle lock combination; E is for my Eastern Bank card and D is for my Denton Building Society card.

My list looks as follows:

A D G E F

C J D B E

B G F A C

G J A C D

D F G C B

What is my bicycle lock combination?

A 4673

B 5741

C 7613

D 4356

E 3764

4. Some of the great sea-mammals, such as the sperm whale, have brains many times larger than ours. It is a fact of evolution that organs do not grow or remain large unless they are used; if they are not used they shrink or even disappear. It must be concluded therefore that the sperm whale makes intelligent use of the vast brain it possesses, perhaps at thought levels well beyond our understanding.

Which of the following would, if true, weaken the argument?

A Humans have developed intelligence despite having smaller brains than whales.

B Whales lack the ability to communicate in language.

C Large brains may have uses that do not involve intelligence.

D There is no correlation between the size of the animal and the size of its brain.

E Whale intelligence may be of a kind that humans do not recognise.

5. A long-running play in London's West End is performed every evening except Sunday. In addition, there are matinee performances every Wednesday, Thursday and Saturday. What is the maximum number of performances that can be given during a calendar month of 31 days?

A 36

B 38

C 39

D 41

E 42

6. You can become a good pianist if you start to learn at an early age. You did not start to learn until you were an adult, so you cannot become a good pianist.

Which of the following has the same structure as the above argument?

- A Children can become fluent in two languages if they start learning when very young. My children learnt two languages when young, so they speak them fluently.
- B You can cure your headache if you are willing to try acupuncture. You refuse to try acupuncture, so you will not be able to cure your headache.
- C You can avoid being overweight if you take sufficient exercise. You take sufficient exercise, so you will not become overweight.
- D Children have fewer ear infections if they take cod liver oil. My children have very few ear infections, so they do not need to take cod liver oil.
- E You can become a good singer if you have perfect pitch. You are a good singer, so you must have perfect pitch.

7. If you intend to have a fire you will need dry kindling wood and a firelighter. Unfortunately the kindling wood has been left out overnight in the damp. So, even though you have a firelighter, you will not be able to light the fire.

Which of the following arguments has the same structure as the argument above?

- A To be sure of catching the train from Paddington, you should have allowed enough time to get to the station and to find the platform. You may get to the station in time but Paddington is very large so you probably won't be able to find the platform in time. Therefore you are going to miss the train.
- B To pass your exam you need to be hard-working and intelligent. You have done very little revision and your score in intelligence tests is very low. Therefore you are going to fail your exam.
- C Your car is below the high tide line and it is stuck in the sand. The tide will be at its maximum height in 30 minutes and the tow truck is not due for 45 minutes. So you are not going to be able to save your car from by the sea.
- D To get to Nottingham you will either have to go up the motorway or go on the train. The motorway is blocked due to an accident and will not be open for several hours. Therefore you will have to take the train
- E For breakfast you like to have either toast or cereal. Unfortunately there is no bread and I have just eaten the last of the cereal. So you will not be able to have any breakfast.

8. Below is part of an itinerary for flying from London to Kampala. It involves changing flights at Dubai with a wait of 5 hours 15 minutes. All times are local times. Dubai is 4 hours ahead of London and Kampala is 1 hour behind Dubai.

DEPART LONDON (HEATHROW) 22:30 FRI

DEPART DUBAI 14:30 SAT

ARRIVE KAMPALA (ENTEBE) 20:45 SAT

What is the total time spent in the air?

- A 12 hrs 30 mins
- B 14 hrs 00 mins
- C 15 hrs 00 mins
- D 17 hrs 00 mins
- E 19 hrs 15 mins

9. Belgian golfer, Hercule Potts, appeared to throw away his big chance to win the Open Championship, after giving up what could only be described as an unassailable lead. Most players would have been distraught to have victory snatched from them in such a way. But, interviewed afterwards, Potts pointed out that it was, after all, only a game: There are worse things in life, he said. Really? It may be refreshing to hear a top competitor express such a philosophical attitude, but it also explains fully why the prize eluded him. At that level you have to believe that nothing is worse than losing.

Which one of the following is an underlying assumption of the above argument?

- A If winning had mattered more to him, Potts could have won.
- B Anyone can win the top tournaments if they believe they can do it.
- C Nothing in sport is worse than losing.
- D Potts was very unlucky in the last stages of the game.
- E Potts should have cared more about losing.

10. A small mail order company sends out three sizes of parcel in about equal numbers which require postages of 24p, 30p and 72p. They stock stamps in denominations of 6p and 30p and use the minimum number of stamps on each parcel.

What proportion of the two denominations of stamps should the company buy?

- A 1 x 6p for every 4 x 30p
- B 1 x 6p for every 1 x 30p
- C 2 x 6p for every 1 x 30p
- D 5 x 6p for every 1 x 30p
- E 11 x 6p for every 2 x 30p

Section B [20 marks] – Linguistic Puzzles

1. Aragonese [4 marks]

Aragon is a region in Spain. The list below shows eleven words in Aragonese, their plural forms and their translations. Write into the table the missing plural forms.

Valley	Bal	Bals
Stool	Banquet	Banquetz
Stone	Cantal	Cantals
Awake	Concordau
Chocolate	Chicolat
Union	Chunta
Unhanded	Deixau	Deixaus
Eclipse	Eclix
Character	Personache	Personaches
Fish	Peix	Peixes

2. Georgian [4 marks]

Below are the names of some countries in South America, written in the Georgian language, together with their transliterations into English (sometimes these are not identical but very close letter by letter conversions).

Write the names, in English, of the two untranslated countries below (also in South America):

ბრაზილია	Brazil
პერუ	Peru
ურუგვაი	Uruguay
არგენტინა	_____
კოლუმბია	_____

(There are two marks each for the two countries but up to two method marks will be given for translating individual symbols if the answers are not complete or correct.)

.....

3. Lalana Chinantec [7 marks]

This is a language spoken by approximately 10,000 people who live in the Oaxaca region of Mexico. In this language a colon (:) marks a long vowel, and the (?) symbol marks a glottal stop (these are not relevant to the translation).

kalakwa: kwi: li:ʔ	The beautiful corn grew.
miɫaɖʒö mo:h kya	My pineapples have turned out well.
li:ʔ kalane kwi: kwa: kya	My tall corn yellowed beautifully.
ɖʒö kalaro:h mo:h ne kya	My yellow pineapples ripened well.
kaladʒö kwi:	The corn turned out well.
miɫakwa: kwi:	The corn has grown.

- (a) What does the word **kya** mean?
- (b) What does the word **kwa** mean?
- (c) What does the word **ro:h** mean?
- (d) What does the word **li:ʔ** mean at the end of a sentence?.....
- (e) What is the effect of moving a word like **li:ʔ** to the start of a sentence?
.....
- (f) Translate the following sentence into English:

miɫaro:h kwi: ne

.....

4. Reportspeak [5 marks]

Recently discovered in the school archives, reports sent home in the eighteenth century reveal a distinctive King's language, even more opaque than the phrases used by some teachers today.

The eleven adjectives used in these extracts are all simply either a 'good' or 'bad' attribute.

As you would expect, there is consistency in the use of this language:

'and' implies that both adjectives in the sentence are good or that both are bad;

'but', 'although', 'despite' all imply that the two words differ in meaning, in either order.

"Charles has been **molistic** and **spatty** in Classics this term."

"Josiah's Latin verse is **cluvious** and **brastic**."

"John's Algebra was **spatty** but **danty**."

"Thomas has mostly been **danty** and **thoovy**."

"Despite his **frumsiness**, James was **sloshful** in Rhetoric this half."

"Always **strungy** and **struffy** in History, Peter was a pleasure to teach."

"Bartholomew has been **blitty** but **thoovy**."

"Though sometimes **weasy**, **John** is also **strungy**."

"William has been **blitty** but, conversely, also **struffy**."

"The form were often **cluvious** but not **spatty**."

"Jeremiah is a **sloshful** and **weasy** boy."

The King's School archivist has spent a good deal of time working out what the teachers might have meant by these terms. Can you solve the code too?

- (a) Given the above sentences, which (one or two or three) of the following additional phrases are consistent with the meanings of the adjectives? Circle the letter(s) A and/or B and/or C of any consistent sentences:

A "Richard has been **blitty** and **brastic** recently."

B "The boy was not only **molistic**, also **cluvious**."

C "Martin's approach has been **danty** but **sloshful**."

- (b) Which qualities from the following, if any, would you be pleased to see on your reports?
Put a ring around any positive ones:

blitty

weasy

cluvious

frumsy

sloshful

- (c) Invent two plausible English adjectives along these lines and given them each a short but precise definition:

(i).....
.....
.....

(ii).....
.....
.....

Section C [20 marks] – Comprehension

Read the passage and then answer the questions which follow on a separate sheet of paper.

Conversation is, among other things, a mind-reading game and a puzzle. We constantly have to guess why others say what they do. We can never be sure when words will dance with each other's, opinions caress, imaginations undress, topics open. But we can become more agile if we wish.

"It's good to talk," says British Telecom's advertisement. But of course that's only half the truth. Nobody could say simply, "It's good to eat," without adding that many of the things we like to eat do us no good at all. If we used diet-books for our conversations, as much as for our meals, they would warn us of many different kinds of talk, and they would not find it easy to say where we could go to taste the *haute cuisine* of conversation.

"It's good to talk" is the slogan of the twentieth century, which put its faith in self-expression, sharing information and trying to be understood. But talking does not necessarily change one's own or other people's feelings or ideas. I believe the twenty-first century needs a new ambition, to develop not talk but conversation, which does change people. Real conversation catches fire. It involves more than sending and receiving information.

But how can conversations make so much difference? They can't if you believe that the world is ruled by overpowering economic and political forces, that conflict is the essence of life, that humans are basically animals and that history is just a long struggle for survival and domination. If that's true, you can't change much. All you can do is have conversations which distract or amuse you. But I see the world differently, as made of individuals searching for a partner, for a lover, for a guru, for God. The most important, life-changing events are the meetings of these individuals. Some people get disappointed, give up searching and become cynics. But some keep on searching for new meetings.

[Moving from the 19th to the 20th century] the ideals of conversation remained masculine, until women changed the subject. They showed that talking about the emotions could not only improve the way that the sexes treated each other, but also diminish brutality and aggressiveness in general. This new conversation was like vegetarian cooking: it convinced only a minority. Most men continued to prefer the bawdiness, slapstick, shop talk or academic disputation which they could indulge in when women were not present.

But not every man or woman has the gift of being able to converse: what about those who are naturally quiet, or introverted, and what about the enormous numbers who are shy? What part can they expect to play, if conversation were to become the most important kind of interaction, and the main agent of change?

I don't think you have to be talkative to converse, or even to have a quick mind. Pauses in conversation do no harm. One of the most memorable conversationalists in history, the French diplomat Talleyrand, who suffered from a lonely upbringing, would often sit through a party without saying a word, but then suddenly come out with a sentence which people said was the sort they never forgot. What matters is whether you are willing to think for yourself, and to say what you think. Many people are not, either because they've been told too often that they are just ordinary people and they assume they have nothing of importance to say, or because they have received too many knocks from life.

My answer is that throughout history, ordinary people have suddenly come out with the most amazing statements, when they find the courage. What matters most is courage. The most rewarding discovery I have made in my study of history has been about the way people who do not think of themselves as brave forget their reticence, their hesitations and do brave things. Since so many of those who have power and authority are failing to move the mountains on our behalf, let us see what we can do ourselves, using our own brains and our own tongues.

Adapted from *Conversation: How Talk can change your life* by Theodore Zeldin (1998)

- (a) Going on the extract above, within 'non-fiction' what section of the library or bookshop do you think this book would be most appropriate to be kept in? Briefly justify your answer. [3 marks]
- (b) Discuss the effectiveness of the diet analogy used here. [4 marks]
- (c) What kind of 'effects' can a good conversation have? [3 marks]
- (d) At the end of the book Zeldin lists thirty-six topics of conversation that might naturally arise from an intelligent reading of his text. Pick one of the following and write a brief conversational response (no more than 100 words). [5 marks]

What can a letter do that a conversation cannot?

How does one improve one's skill at guessing what people mean but do not actually say?

Does a good conversation have to be between equals?

- (e) How do you think conversation (in any language) may have evolved in the twenty years since this book was written? [5 marks]

Section D [20 marks] – Short Essay

Write your answer to this section on a **separate sheet of writing paper** (start a fresh sheet after section C).

Choose **one** of the titles below and write a **short** 'essay' (200-400 words) addressing the question.

1. When, if ever, is forgiveness wrong?
2. Should parking fines be based on the driver's income?
3. Albert Einstein wrote that "The whole of science is nothing more than the refinement of everyday thinking." Do you agree?
4. What changes in society will follow from increased life expectancy?
5. "Printing and the telephone were truly revolutionary inventions. All the internet brings is a difference in scale." Is this true?

END OF THE PAPER

Full name:.....

Present school:.....



Sixth Form Entrance 2019

GENERAL PAPER

Section A: (20 marks) Multiple choice logic problems

Circle clearly one letter for each question.

If you make a mistake, put a cross through the circle and circle a second letter.

- | | | | | | |
|-----|---|---|---|---|---|
| 1. | A | B | C | D | E |
| 2. | A | B | C | D | E |
| 3. | A | B | C | D | E |
| 4. | A | B | C | D | E |
| 5. | A | B | C | D | E |
| 6. | A | B | C | D | E |
| 7. | A | B | C | D | E |
| 8. | A | B | C | D | E |
| 9. | A | B | C | D | E |
| 10. | A | B | C | D | E |



Sixth Form Entrance 2018

GENERAL PAPER

1 hour 20 minutes

Total: 80 marks

Please complete Sections A and B on the question paper. Answers to Sections C and D should be completed on lined paper, using a fresh sheet for each section, and ensuring you clearly name each piece of paper used.

Name (Capital Letters):

Present School:

Section A [20 marks]

Read the questions and circle the correct letters below:

- | | | | | | | | | | | | |
|----|---|---|---|---|---|-----|---|---|---|---|---|
| 1. | A | B | C | D | E | 6. | A | B | C | D | E |
| 2. | A | B | C | D | E | 7. | A | B | C | D | E |
| 3. | A | B | C | D | E | 8. | A | B | C | D | E |
| 4. | A | B | C | D | E | 9. | A | B | C | D | E |
| 5. | A | B | C | D | E | 10. | A | B | C | D | E |

1. More than 60 per cent of highly able, highly skilled graduates are unemployed in the first year after leaving university. We need to make employers more aware of the wealth of talent available and give practical advice as to how they can go about recruiting these talented youngsters.

Which of the following, if true, would most weaken the argument?

- A Organisations are already aware of the talent available to them
- B Most graduates do not want a job in the first year after leaving university
- C There is a general lack of jobs in the current economic climate
- D It is often difficult to give practical advice on how to recruit
- E Most graduates are not a burden on society when unemployed

2. Children in Britain spend too much time indoors playing computer games and watching television these days and, as a result, become less sociable, have less exposure to the outside world and, significantly, have less sporting talent than they perhaps should.

Children in Australia and New Zealand, for example, spend a lot of time outdoors and consequently the sporting talent of youngsters in these countries outstrips that of British children. Due to this, and because of the other advantages derived from being outdoors, the Government should discourage the use of computer games and television for youngsters.

Which of the following best summarises the conclusion of the argument above?

- A Children should spend more time outdoors
- B Parents need to encourage their children to engage in more sporting activities than they do currently
- C Our Government should model itself on that of Australia or New Zealand

- D** Playing outdoors brings about many other positive changes than simply increasing sporting talent
- E** The Government needs to intervene to change the habits of youngsters

3. There was a time when the economic situation demanded that the Government either had to support the currency directly in the foreign exchange markets or it had to raise interest rates. But at that time to increase interest rates was political suicide. The Government therefore had to support the pound, costly though it turned out to be.

Which one of the following most closely parallels the reasoning used above?

- A** If he had followed the doctor's advice and stayed at home he would have recovered completely by now. But he could not take the time off, so is still unwell.
- B** You either have an allergy or have picked up a virus. If it is a virus there is no treatment that will help so you might as well treat it as an allergy
- C** She needed a painkiller and we had both paracetamol and aspirin. But she was allergic to paracetamol so had to take the aspirin.
- D** This treatment is available from a doctor's prescription or from a pharmacy but it is cheaper on prescription so I need to see my doctor.
- E** There are two doctors at the clinic, a man and a woman. The female is always agreeable but the male is unpleasant so I hope I see the woman doctor.

4. The King's School old clock is rather curious. It shows the correct time every hour on the hour but owing to gravity the minute hand travels three times as fast going down to the 6 as it does back up to the 12. Within each half of its revolution the speed is constant.

What is the correct time when the clock shows 10.45am?

- A** 7.5 minutes to 11
- B** 10 minutes to 11
- C** 20 minutes to 11
- D** 22.5 minutes to 11
- E** 25 minutes to 11

5. Surveys of public opinion reveal that many people object to the idea of selling bodily organs for transplant. Some object on religious grounds claiming that the body is a sacred and holy thing that must not be violated. Others object on aesthetic grounds simply finding the idea of selling human livers for transplant somehow unpleasant or distasteful. But the sale of bodily organs can not be morally wrong. Everyone has the right to do what they want with their private property and each person owns their own organs.

Which is the best expression of the conclusion of this argument?

- A The body is a sacred and holy thing which must not be violated.
- B Everyone has the right to do what they want to with their private property.
- C Public opinion is strongly opposed to the sale of bodily organs for transplant.
- D The sale of bodily organs can never be wrong.
- E Surveys of public opinion reveal many people are opposed to the sale of bodily organs for transplant.

6. The battery life of laptop computers means that they cannot be used for the duration of a long haul flight without needing to be recharged from an onboard power point. Not all planes have this facility. Therefore laptop computers should not be allowed as carry-on items on long haul flights without power points, regardless of whether they are intended for personal or business use, as they will be of limited use to their owners and take up a disproportionate amount of space in the cabin.

Which is the best statement of the flaw in this argument?

- A Different models have different battery capacities
- B Some companies ask their employees to work on long flights
- C A laptop may run out of batter on a short haul flight, too.
- D The passenger cannot choose whether or not they book a flight with an onboard power point.
- E Passengers could make some use of their laptop even if the battery does run out.

7. Father Christmas needs to arrange his eight reindeer in four rows of two. However, he needs to observe the following rules about the reindeer:

Blitzen must always be on the left-hand side but not in the rear row

Comet and Cupid must be in either of the first two rows, but not necessarily in the same row

Dancer must always be directly behind Donner

Prancer must always be ahead of Dasher but never on the same side, and never next to Comet or Cupid

Vixen must be as far away from Blitzen as possible and not on the same side

From left to right, which two reindeer make up the rear row?

- | | | | |
|----------|-------------------|----------|-------------------|
| A | Prancer and Vixen | D | Dancer and Dasher |
| B | Dasher and Vixen | E | Vixen and Dasher |
| C | Dancer and Vixen | | |

8. Midas bought a golden jug at auction for £80. A year later the price of old gold had risen and he decided to sell it at auction, receiving £100. He immediately regretted his decision and approached the buyer who sold it back to him for £110. The next year, he needed some money so he sold the jug to a dealer for £120.

How much profit did Midas make on the jug overall?

- | | | | |
|----------|-----|----------|-----|
| A | £10 | D | £40 |
| B | £20 | E | £50 |
| C | £30 | | |

9. In the UK 45% of the workforce is female but the percentage of women in senior positions is significantly lower than this. This is unfair to women and bad for the economy, in that those who are promoted to senior positions may not be the most able.

Women may be discouraged from seeking promotion because employers require senior employees to work long and inflexible hours. Women may also be perceived as being unwilling to subordinate the demands of family life to the demands of the job. So employers must be urged to offer flexibility in working hours and to seek to move away from the UK culture of long working hours.

Which of the following is an assumption underlying this argument?

- A Most women are not currently interested in seeking promotion.
- B Men do not object to the promotion of more women.
- C Women would be better leaders than men if given the opportunity.
- D Women are no less likely than men to have the abilities needed for senior positions.
- E Working hours would become more flexible if employers promoted women to senior positions.

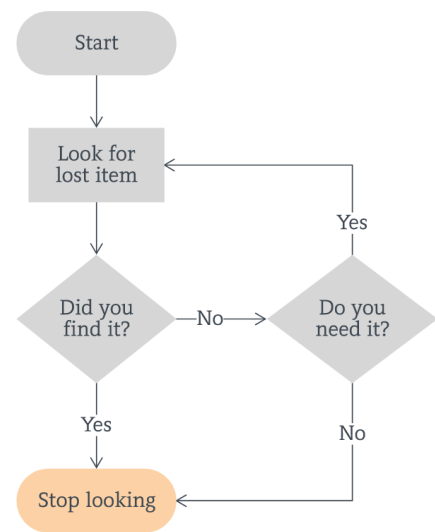
10. Many drivers deliberately break traffic laws, both because they are convinced that there is little chance of being caught and because if they are caught the penalties do not act as a sufficient deterrent. For example, people who would never think of stealing money even when they needed it, think nothing of exceeding a 30mph limit even in a street where children are playing. It is clear, then, that a substantial reduction in road accidents can be achieved only by catching more motorists who break the law and by increasing the penalties for such law-breakers.

Which of the following is an assumption of the above argument?

- A The number of road accidents is increasing because motorists are ignoring the traffic laws.
- B Drivers who have been convicted of a traffic offence think nothing of continuing to break the law.
- C People who break the traffic laws are a significant cause of road accidents.
- D If the penalties for stealing were less severe, people would think nothing of stealing money when they needed it
- E If the penalties for traffic offences were increased, drivers would not break the law so frequently

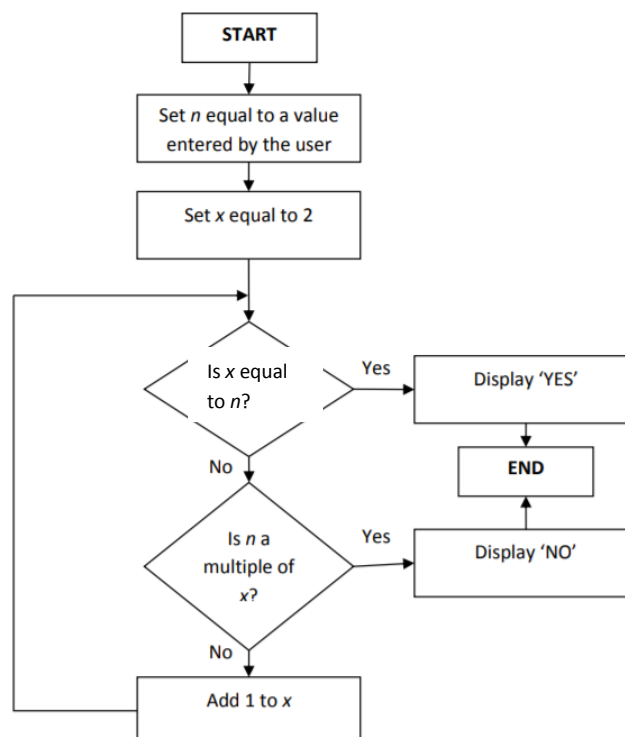
Section B [20 marks] – Algorithms

Computer programs work by executing a set of instructions called an algorithm. Although computers read their instructions in specific programming languages, the algorithms that they use may be represented using flow diagrams. An example of such an algorithm is shown. It models a computer (or logical person) looking for lost items. The computer executes the instructions in the rectangular boxes and then moves on to the next stage according to the direction of the arrows. Sometimes the computer is required to make a decision; this is represented by a diamond-shaped box. After making the decision, the computer proceeds according to the outcome of the decision.



Note that every box must have at least one arrow entering it and one arrow leaving it. The only exceptions are the START and STOP/END boxes.

(a) Study the algorithm below. It is designed to display either YES or NO depending on the value of a number n entered by a user. You may assume that the user enters a positive whole number.



(i) Write down the outcomes displayed by the computer when it executes the algorithm for $n = 2$, $n = 3$ and $n = 4$. [3]

.....

(ii) This algorithm displays YES if n possesses a particular mathematical property. What is this property? [1]

.....

(iii) This algorithm is not very good. It is inefficient and also contains a flaw: if a particular positive whole number is entered as n the program will not work properly. What is the flaw, and which value of n will trigger it? [2]

.....

.....

.....

Algorithms are not restricted to the context of computing.

(b) Some animal decision-making can be described with simple algorithms. Using the three instructions and one decision given below, design a flow diagram for the decision-making algorithm of a gazelle in the African bush. [4]

START **Flee for 2 minutes** **Graze for 5 minutes** **Is there a lion present?**

(c) Many modern cars have 'cruise control', designed for making driving easier at high speeds. When cruise control is switched on at a speed selected by the driver, the driver can take his feet off the pedals and the car's computer keeps the car travelling at the selected speed. The computer continually checks to make sure that the car is going at the correct speed and if not, the computer adjusts the speed accordingly. If the driver presses the brake pedal, then the cruise control is immediately switched off.

(i) Design a flow-diagram for the cruise control algorithm. It should satisfy the following requirements:

- When the cruise control is switched on, the algorithm must immediately check the current speed and turn the cruise control off immediately if it is less than 25 mph.
- It should check the current speed at every 4 seconds and adjust the speed either up or down as appropriate.
- It should switch itself off if the driver presses the brake or accelerator pedals.

You may use the following instructions in your rectangular boxes in the flow diagrams. You will need to decide for yourself what should be contained in any decision boxes that you use. [8]

START

END

**Increase speed by 5mph
Set s equal to current speed**

**Decrease speed by 5mph
Wait 4 seconds**

(ii) Even a well-written algorithm for a cruise control would lead to an uncomfortable ride for the occupants of the car if it were limited to the instructions in the previous part of the question. Why is this? [2]

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Answer the following sections on lined paper.

Section C [20 marks] – A Just War

Read the passage and then answer the questions which follow.

For a war to be just three conditions are necessary. The first concerns the authority of the ruler within whose competence it lies to declare war. A private individual may not declare war; for he can have recourse to the judgement of a superior to safeguard his rights. Nor has he the right to mobilise the people, which is necessary in war. But since the responsibility for public affairs is entrusted to rulers, it is they who are charged with the defence of the city, realm, or province subject to them. And just as in the punishment of criminals they rightly defend the state against all internal disturbance with the civil arm, so they also have the duty of defending the state, with the weapons of war against external enemies. As Augustine says 'The natural order of men, to be peacefully disposed, requires that the power and decision to declare war should lie with the rulers'. Secondly there is required a just cause: that is that those who are attacked for some offence merit such treatment. Those wars are generally defined as just which avenge some wrong, when a nation or a state is to be punished for having failed to make amends for the wrong done, or to restore what has been taken unjustly. Thirdly, there is required a right intention on the part of the belligerents: either of achieving a good object or of avoiding some evil. As Augustine says: 'For the true followers of God even wars are peaceful, not being made for greed or out of cruelty, but from desire of peace, to restrain the evil and to assist the good'. So it can happen that even when war is declared by legitimate authority, and there is a just cause, it is, nevertheless, made unjust through evil intention.

Thomas Aquinas (c. 1225 – 1274)

(a) Summarise the passage in forty to fifty words. [6]

(b) Which one of the four conditions mentioned above do you consider the most important? Explain your answer fully. [14]

Section D [20 marks]

Write your answer to this section on a separate sheet of writing paper.

Choose one of the titles below and write an essay addressing the question.

1. Should the richest part of a country have the right to secede (become independent)?
 2. Is science a religion?
 3. What makes a good building? Discuss with respect to one public building you know.
 4. Should the judiciary be representative of the society it serves?
 5. How do apologies work?
 6. How is it different to know something and to be certain of it?
 7. Are there differences between the appearance and the reality of things?
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