



Thinking Skills Assessment Oxford

4502/11

November 2021

1 hour 30 minutes

SECTION 1

INSTRUCTIONS TO CANDIDATES

Please read this page carefully, but do not open the question paper until you are told that you may do so.

This paper is Section 1 of 2. Your supervisor will collect this question paper and answer sheet before giving out Section 2.

A separate answer sheet is provided. Please check you have one.
You also require a soft pencil and an eraser.

Please complete the answer sheet with your:

- TSA candidate number
- Centre number
- Date of birth
- Name

Speed as well as accuracy is important in this section. **Work quickly, or you may not finish the paper.** There are no penalties for incorrect responses, only marks for correct answers, so you should attempt **all** 50 questions. Each question is worth one mark.

Answer on the sheet provided. Questions ask you to show your choice between five options. Choose the one option you consider correct and record your choice on the separate answer sheet. If you make a mistake, erase thoroughly and try again.

You **must** complete the answer sheet within the time limit.

You can use the question paper for rough working or notes, but **no extra paper** is allowed.

Calculators are NOT permitted.



UNIVERSITY OF
OXFORD

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Please wait to be told you may begin before turning this page.

This paper consists of 34 printed pages and 2 blank pages.



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- 1 'How much does an aeroplane weigh?'; 'Why are manhole covers round?'. Despite the popularity of bizarre questions like this in interviews for jobs in the big technology companies, they have been proved to give little insight into the applicant's ability or personality. Applicants faced with such questions would be well-advised to reconsider their interest in working for such companies. A study which investigated why these approaches persist concluded that these 'brainteaser' questions are popular with interviewers who like to protect and enhance their self-esteem by appearing to know the answers to impossibly difficult questions. They enjoy the feeling of power and superiority over the candidate, revealing a narcissistic or sadistic personality. No-one wants to work for someone like that.

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

- A Brainteaser questions are popular in interviews with the big technology companies.
 - B Use of brainteaser questions in interviews gives little insight into a candidate's ability or personality.
 - C Interviewers who use brainteaser questions show personality traits of narcissism or sadism.
 - D Job applicants faced with brainteaser questions should think carefully about working for that company.
 - E No-one wants to work for someone with a narcissistic or sadistic personality.
- 2 The fairy lights on a Christmas tree are in three colours, blue, green and silver. The blue lights flash every 5 seconds, the green lights flash every 8 seconds and the silver lights flash every 12 seconds. The lights have all just flashed at the same time.

How many times will they all flash at the same time in the next 45 minutes?

- A 5
- B 22
- C 45
- D 108
- E 112

- 3** A supermarket chain is to remove traditional plastic bags for loose fruit and vegetables from its stores by spring next year and 5p single-use plastic bags by March, replacing them with compostable bags in each case. This will save 134 million plastic bags, the equivalent of 500 tonnes of plastic a year, and make it the first nationwide chain to remove them from the fruit and vegetable aisles. However, there are problems associated with the compostable bags that will replace the plastic ones. This plan to replace plastic bags should be opposed.

Which one of the following best expresses the flaw in the above argument?

- A** It does not establish that saving 500 tonnes of plastic a year will not be beneficial.
 - B** It considers only one alternative to the plastic bags.
 - C** It assumes that compostable bags can be used for the same range of food items as plastic bags.
 - D** It fails to show that the problems associated with compostable bags would be as severe as those associated with plastic.
 - E** It fails to provide evidence that there are benefits to removing traditional plastic bags from stores.
- 4** There is often talk of this or that job being 'exploitative' or of people on low wages being 'exploited' by their employers, as if there were something deeply unjust about paying someone poorly. But this misses a fundamental point about injustice. You cannot be unjustly treated voluntarily: if you agree to the action, you are not being unjustly treated. Anyone who accepts a job, regardless of the pay, is not being unjustly treated by their employer. Obviously this does not apply to someone forced into a job against their will. But if they have accepted their job, even if the reasons pushing them to accept it might be deemed unfair in a wider sense, the act of employing them cannot itself be deemed unjust.

Which one of the following illustrates the principle used in the above argument?

- A** An aid worker who freely goes to work in a war zone and then gets kidnapped and held for ransom cannot complain about the actions of their captors.
- B** A patient who gives fully informed consent to take part in a clinical trial for a new drug has no right to complain about experiencing the drug's stated side effects.
- C** A person who deviates from the terms of their contract cannot complain if they are dismissed for misconduct.
- D** If someone gives out their credit card details to a cold-caller over the phone, they cannot complain about becoming a victim of fraud.
- E** Someone who suffers as a result of the policies of a party they did not vote for has a right to claim they have been unfairly treated.

- 5 Genuine apologies are an expression of regret and repentance on the part of the person who has acted wrongly. However, in some recent cases government ministers have apologised for unjust policies of previous governments, in which they personally played no part; some of these actions occurred before the person apologising was even born. Apologies for offensive comments or language are sometimes expressed in terms which suggest that the fault lies with those who are offended: 'I am sorry if anyone was offended by what I said.' Some people – especially children – apologise because they are being forced to do so by someone in a position of power over them, such as a parent.

Which one of the following can be drawn as a conclusion from the above passage?

- A It can be appropriate for someone to apologise even if they did nothing wrong.
 - B Governments are deemed to have a continuing identity, despite changes in personnel.
 - C People should apologise if what they say causes offence.
 - D Some apparent apologies are not genuine.
 - E You can forgive somebody only if they give a sincere apology.
- 6 I have received the following message that is encrypted with a Caesar cipher:

JYMDWEFTQEBAF

This Caesar cipher replaces each letter of the plaintext (the message to be encrypted) with a letter that is a certain fixed number of positions along the 26-letter English alphabet. Knowing this fixed number of positions (the shift parameter) is the key to decrypt the message. For example, if the letter in the plaintext is A (the 1st letter of the alphabet) and the shift parameter is 4, then the encrypted letter is E (the 5th letter of the alphabet). Similarly, with a shift parameter of 7, Y (the 25th letter of the alphabet) is encrypted as F, which is the 32nd letter if the alphabet is repeated immediately after Z.

I would like to decrypt the message that I have received but I do not know the shift parameter. I only know that the first letter of the plaintext is X.

What is the sixth letter of the decrypted message?

- A P
- B Q
- C R
- D S
- E T

- 7 Gordon's family are keen cyclists and regularly cycle around town (urban) and a nearby forest (rural). He has become concerned recently that the air they are breathing whilst cycling is causing his family respiratory problems. He has decided to buy his whole family anti-pollution cycling masks, by buying two adult and two child masks. Jo, his wife, has asthma which is caused by pollen and his son has allergies to clothing.

Information about five cycling masks is shown below in the table.

| | <i>Air-1</i> | <i>GXi</i> | <i>Optiair</i> | <i>Speed</i> | <i>Breathe</i> |
|--|--------------|------------|----------------|--------------|----------------|
| exhaust fume filtration | x | ✓ | ✓ | x | ✓ |
| replaceable filter system | ✓ | ✓ | x | ✓ | x |
| size: children | ✓ | x | ✓ | x | ✓ |
| size: adult | ✓ | ✓ | ✓ | ✓ | ✓ |
| dust and pollen filtration | ✓ | x | ✓ | ✓ | ✓ |
| hypoallergenic (kind to allergy sufferers) | ✓ | ✓ | x | ✓ | ✓ |
| urban environment | x | ✓ | ✓ | x | ✓ |
| rural environment | ✓ | x | ✓ | ✓ | ✓ |
| cold environment | ✓ | x | x | ✓ | x |

Gordon wants to buy the brand of cycling mask which fits the whole family's requirements.

Which cycling mask should he buy?

- A Air-1
- B GXi
- C Optiair
- D Speed
- E Breathe

- 8** A signal transmitter transmits a message in binary form. (In other words, the message is coded in 'bits'. Each bit is represented either by the digit '1' or by the digit '0'.)

To add an element of security, the signal is embedded within other random bits (so that there are other 1s and 0s before and after the message), creating a 26-bit transmission.

A particular 12-bit message is transmitted as follows:

01100010111001010011000100

The same message is transmitted again, as follows:

10101001111011100101000101

What is the 12-bit message contained within these two transmissions?

- A** 001010011000
 - B** 001111011100
 - C** 010011000100
 - D** 101110010100
 - E** 111101110010
- 9** Part-time undergraduate numbers have fallen by more than 50% since 2010 – this represents a lost opportunity for people wanting to improve their job options. More needs to be done to provide support for people to take short, flexible part-time courses. A survey was conducted of 830 people who had considered studying part-time, but decided against it or dropped out. They were asked what barriers needed to be removed. Flexibility of courses was seen to be an important factor, with 44% wanting more flexible courses to fit around their other commitments. However, financial concerns were most important, with 59% wanting cheaper tuition fees and 37% wanting more support for living costs.

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

- A** Part-time undergraduate numbers have fallen by more than 50% since 2010.
- B** The decline in part-time undergraduate numbers is a lost opportunity for people wanting to improve their job options.
- C** More needs to be done to provide support for people to take short, flexible part-time courses.
- D** Flexibility of courses was seen to be an important factor in people deciding against part-time study.
- E** Financial concerns are the most important issue for people considering part-time study.

- 10** The mobile phone was said to be the ultimate liberating device. Rather than being forced to stay, not just inside a house, not just in a particular room, but almost literally chained to a wall, you could now go anywhere to talk to someone. The irony is, however, that mobile phones have actually made us a lot less mobile. Not only are we more sedentary than ever before, but evidence suggests we now spend longer indoors than we did before mobile phones became prevalent. We should rename our beloved devices 'immobile' phones. Why would we feel the need to go anywhere, after all, if we can obtain all the information we need and communicate with anyone we want from the comfort of our own homes?

Which one of the following, if true, most weakens the above argument?

- A** Not everyone owns a mobile phone.
 - B** There are other sources of technology besides phones through which people can communicate effectively and procure information.
 - C** Many people use their phones to help monitor their physical activity in the hope that it will get them to exercise more.
 - D** People may want to leave their homes for reasons other than communicating with others or to obtain information.
 - E** People who do not own mobile phones exhibit the same trend towards spending longer indoors.
- 11** A lot of people who fear snakes imagine that their skin is slimy. Snakes are not slimy but have smooth, dry skin. Therefore, if these people were better informed, they would lose their fear of snakes.

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

- A** Many people who are on Facebook think they have more friends than people who are not. They don't have more friends, so they should stop using Facebook.
- B** A lot of birds that get fed become lazy about finding food, and are less able to survive in the wild. If people knew this, they would stop feeding birds.
- C** Many people who know that ice floats do not know it is less dense than water. Ice is less dense than water. If people knew this, they would know why ice floats.
- D** A lot of so-called modern art is regarded as rubbish by people who visit galleries. Not all art is rubbish. If it were, people would not go to art galleries.
- E** Many people who won't vote Conservative think that Conservatives are all posh. If they knew that not all Conservatives are posh, they would be willing to vote for them.

- 12** Help Yourself! is a restaurant in which customers can help themselves to as much food as they wish from a buffet for a fixed price of \$10 for adults and \$6 for children.

A Family Meal Ticket is available for \$400 that allows unlimited visits to the restaurant for 2 adults and 2 children for one year. Any families with more than 2 children are charged half the children's price for every additional child, every time they eat.

Mr and Mrs Monroe and their 3 children made good use of their Family Meal Ticket last year, eating at Help Yourself! 30 times.

How much did the Family Meal Ticket save the Monroe family last year compared to if they had just paid per visit?

- A** \$470
- B** \$560
- C** \$590
- D** \$650
- E** \$740

- 13** Jason's workplace offers a special deal on any four breakfast items. He can choose from bacon, sausage, eggs, toast, tomatoes and beans.

Jason will not have bacon and sausage together, nor will he have egg with beans.

How many different combinations of the six items will be acceptable to Jason?

- A** 2
- B** 3
- C** 4
- D** 5
- E** 6

- 14 Cyclists in a small town were surveyed about their age. A table was produced to show the percentages and numbers of cyclists in five categories of their age. Some of the survey data was added to the table.

| age categories | cumulative percentages of cyclists | numbers of cyclists |
|----------------|------------------------------------|---------------------|
| up to 10 years | 15% | 270 |
| up to 18 years | 50% | |
| up to 40 years | 80% | |
| up to 60 years | 90% | |
| up to 85 years | 100% | |

How many cyclists in the survey were above 40 years of age?

- A 180
 - B 200
 - C 270
 - D 360
 - E 540
- 15 The government should be active in promoting marriage. Notwithstanding bad marriages, research shows that married adults are happier, have better health, are less likely to be involved in crime, and enjoy many other advantages related to their personal welfare and the welfare of their family. Research also shows that children are most likely to flourish in the married-couple family. Marriage rates are declining and non-marital birth rates are rocketing, taking a toll on the nation's welfare. Government promotion of marriage is not only justified but also necessary.

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

- A People are strongly against government promotion of marriage.
- B The government has a right to influence the family arrangements of its citizens.
- C Promotion of marriage is the most important endeavour for the government.
- D The government is already involved in the promotion of marriage.
- E The nation's welfare problems would be resolved if more people raised children within a marriage.

- 16** Many drivers think that the laws that make it compulsory to use a seat belt are an intrusion into their private lives – a denial of an autonomous lifestyle choice. But state intervention in our freedom is justified when, because of our short-sightedness, impulsiveness or carelessness, we act in a way that actually or potentially restricts our freedom – especially when dangerous and irreversible consequences are involved. In those cases, the law should protect our future selves from the short-sighted and foolish choices of our earlier selves. It should require us to act in the way that we would act if we carefully took into account our long-term welfare. The legal requirement to wear a seat belt is thus a protection of drivers' freedom and future selves.

Which one of the following best illustrates the principle used in the above argument?

- A** Pedestrians are legally prohibited from crossing railway tracks except at designated points.
- B** Passengers must be in possession of a valid ticket when boarding a train.
- C** The state funds a campaign to raise awareness of the health hazards of drug use.
- D** Cigarettes are legally required to be in plain, unbranded packs.
- E** Cyclists are advised to wear a helmet to protect their head.

- 17** Intensive farming, designed to give the greatest food yield per hectare, is widely believed to create higher levels of pollution and damage to the environment than organic farming. But the reality is that the opposite is the case: a global research team measured what they call 'externalities' – the environmental costs such as greenhouse gas emissions, fertiliser and water use – of producing a given amount of food on both high-yield and low-yield farms. In its study of dairy farming in Switzerland, it found that high-yield systems were actually less damaging to the environment than organic, which by contrast took up twice as much land for the same volume of milk and caused at least one-third more soil loss than conventional dairy farming.

Which one of the following best expresses the flaw in the above argument?

- A** It confuses externalities with the central issues of food production and land use.
- B** It assumes that any land which is not used for farming will instead be used for environmental projects.
- C** It claims that high-yield farming is environmentally friendly, then draws this as a conclusion.
- D** It bases a broad generalisation on the specific example of Swiss dairy farming.
- E** It ignores the economic realities that are the real motives for intensive farming.

- 18 Tim and Jerry are business partners. Tim lives in New York (Eastern Time Zone) and Jerry lives in San Francisco (Pacific Time Zone). They both agree to meet in Oklahoma (Central Time Zone).

| <i>time zones relative to Pacific Time Zone</i> | | |
|---|----------|----------|
| Mountain | Central | Eastern |
| +1 hour | +2 hours | +3 hours |

Tim set off at 10 am local time but shortly afterwards he realised he had left his ticket at home. As a result he missed his 4 hour flight to Oklahoma, so had to get the 12 pm (midday) flight instead.

Jerry travelled by train for 2 hours to Salt Lake City (Mountain Time Zone), leaving San Francisco at 6 am local time. He then immediately boarded a bus from Salt Lake City to Oklahoma, where he arrived 6 hours later.

Which one of the following is true?

- A Jerry arrived in Oklahoma 3 hours before Tim.
- B Jerry arrived in Oklahoma 1 hour before Tim.
- C Jerry and Tim both arrived in Oklahoma at the same time.
- D Tim arrived in Oklahoma 1 hour before Jerry.
- E Tim arrived in Oklahoma 3 hours before Jerry.

- 19 Martha is hoping that her parents will agree to a family visit to Rockworld Zoo as a treat for her 16th birthday. This would include Martha, her mum and dad, her brothers aged 14, 12 and 9 years old and her grandmother, who is 62.

They have looked at the price tariff for tickets and have decided that they would want to book online the day before the proposed visit and that they could go either on Martha's birthday or on the day before it.

The table shows the possible ticket prices.

| <i>Type of ticket</i> | <i>At the gate on the day</i> | <i>Booked online 1 day in advance</i> | <i>Booked online 7 days in advance</i> |
|-----------------------|-------------------------------|---------------------------------------|--|
| Adult (16–59 years) | \$17.00 | \$15.00 | \$14.00 |
| Senior Citizen (60+) | \$15.00 | \$13.00 | \$12.00 |
| Child (3–15 years) | \$13.00 | \$11.00 | \$10.00 |
| Family of 4* | \$54.00 | \$49.00 | \$46.00 |
| Family of 5** | \$63.00 | \$57.00 | \$54.00 |

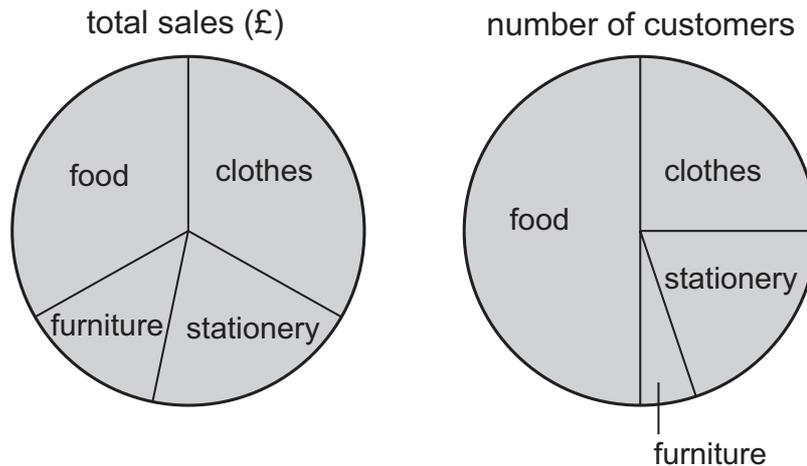
* Family of 4 can be 2 adults and 2 children or 1 adult and 3 children

**Family of 5 can be 2 adults and 3 children or 1 adult and 4 children

What would be the smallest amount that the family could pay for their tickets?

- A \$76
- B \$81
- C \$84
- D \$87
- E \$91

- 20 The sales for the four departments of a store are shown in the two pie charts below.



Which one of the following lists the departments in order, from highest average amount spent per customer to lowest?

- A clothes, furniture, stationery, food
 - B food, clothes, stationery, furniture
 - C food, stationery, clothes, furniture
 - D food, stationery, furniture, clothes
 - E furniture, clothes, stationery, food
- 21 If we were ever to detect an alien transmission from outer space, ought we to reply? There are good grounds for keeping silent. After all, how do we know that any such aliens will be peaceable? But the truth is that it is too late for such precautions. Since World War II, we've been broadcasting TV, radio, and radar inadvertently into the heavens. Admittedly, these signals would be very weak at light years' distance. But the difficulty extraterrestrials would have in picking these up is nothing compared to the challenge they'd face in launching weaponry our way. Any society with the capability to threaten Earth will certainly already have the kit required to pick up the leakage we've been wafting skyward for seven decades.

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

- A There are good grounds for keeping silent if we ever happen across an alien transmission.
- B We do not know that any aliens we encounter will be peaceable beings.
- C It is too late to worry about keeping silent if we come across an alien transmission.
- D It is easier for extraterrestrials to pick up signals than to launch weaponry.
- E A society which has the capability to threaten Earth likely possesses the technology to be aware of our existence.

- 22** We have long known that if women take folic acid supplements during the first months of pregnancy (and preferably just before getting pregnant too), it decreases the likelihood of babies being born with neural tube defects. Research has shown, however, that not enough women in the UK are choosing to take the supplements. Obviously, the Government's public information campaign about folic acid supplementation is not succeeding. It is time that the UK followed the lead of countries that require that flour and some other basic or staple foods are fortified with folic acid during the manufacturing process. This strategy provides the necessary levels of folic acid to women who become pregnant, without the need for supplements and without bringing any harm to the wider population.

Which one of the following, if true, most strengthens the above argument?

- A** Diet trends mean that increasing numbers of women do not eat food made with flour.
 - B** Women may not realise they are pregnant until after the first months of the pregnancy have passed.
 - C** It is possible to add folic acid to flour and other foods at home after buying them.
 - D** Some people object to what they see as excessive government interference with food production.
 - E** Women need adequate levels of calcium and vitamin D to ensure a healthy pregnancy.
- 23** Conditions in some of the UK's prisons are scandalous. Inspectors found some prisons to be dirty, vermin-infested places, with frightening levels of violence and prisoners having easy access to illegal drugs. Some critics attribute the poor management of these prisons to the fact that the government has allowed private companies to run many prisons, although inspectors also criticised some state-run prisons. Others say the real problem is one of drastic funding cuts, affecting both state-run and privately-run prisons. Either way, we have allowed the situation to become very serious – and why? Because for the most part, we do not care. The truth is that, personally, we can much better imagine that at some point we'll need a clean, well-run hospital than a decent criminal justice system.

Which one of the following can be drawn as a conclusion from the above passage?

- A** People are more likely to support spending on hospitals than on prisons.
- B** The general public are not sufficiently aware of the scandalous prison conditions.
- C** The government should not allow private companies to run prisons.
- D** Funding cuts are the cause of the poor conditions in prisons, both state-run and private.
- E** Hospitals have been made a greater priority for spending than prisons.

- 24** A cinema uses magnetic letters to write the title of the most popular film that it is screening on its advertisement board. A set of magnetic letters includes the letters of the English alphabet in both upper and lower cases, i.e. 26 capital letters and 26 small letters. The cinema has just enough sets to be able to write the following title:

STAR WARS The Force Awakens

It is now considering putting this title up all in capital letters:

STAR WARS THE FORCE AWAKENS

What is the minimum number of extra sets of magnetic letters that the cinema needs to buy?

- A** 0
- B** 1
- C** 2
- D** 3
- E** 4

- 25** I run a bakery and sell two sizes of loaf. Small loaves (weighing 240 g) sell for 80p, and large loaves (weighing 400 g) sell for £1.20.

I buy dough, ready-made, at the start of each day. Small boxes (5 kg of dough) cost me £10.00 each, and large boxes (15 kg of dough) cost me £20.00 each.

The baking process causes each loaf to lose 20% of the weight of the unbaked dough.

I expect to sell 40 small loaves and 50 large loaves each day. I buy enough dough to be able to make these, and any unused dough at the end of the day has to be thrown away.

Assuming that I do not buy any more dough than necessary, what proportion of the dough that I buy each day do I have to throw away?

- A** 5.2%
- B** 6.3%
- C** 7.5%
- D** 17.8%
- E** 34.8%

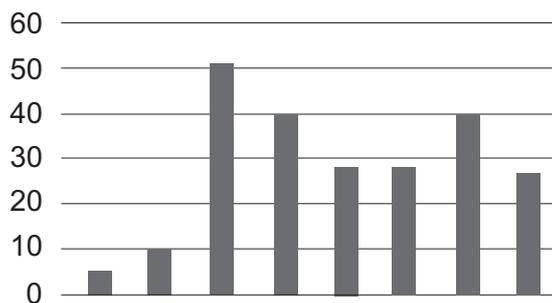
- 26 The Zambezi River Basin plays a key role in water management for the following eight countries.

The table below shows the percentage of people with access to clean drinking water in each country in 2004.

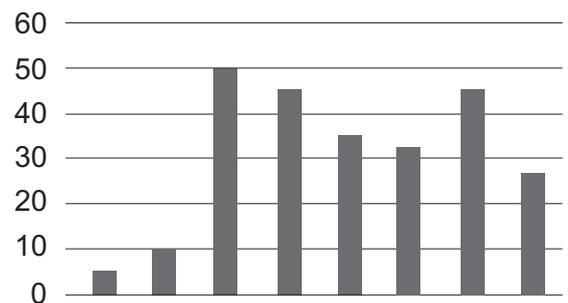
| | <i>percentage with access to clean drinking water (%)</i> | |
|------------|---|-------|
| | urban | rural |
| Angola | 40 | 34 |
| Botswana | 100 | 90 |
| Malawi | 95 | 44 |
| Mozambique | 81 | 41 |
| Namibia | 100 | 67 |
| Tanzania | 90 | 57 |
| Zambia | 88 | 48 |
| Zimbabwe | 100 | 73 |

Which one of the following graphs, suitably labelled, shows the difference in the percentages of people with access to clean water in urban versus rural areas in these countries?

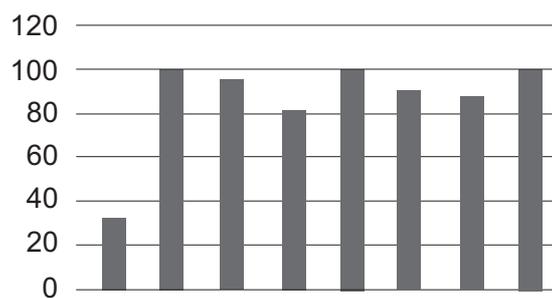
A



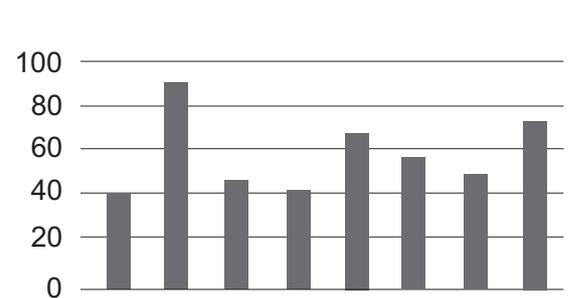
B



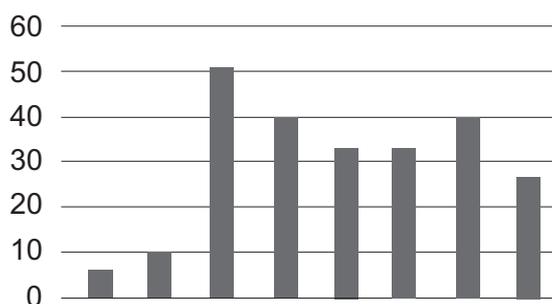
C



D



E



- 27** Rhona is a self-employed IT technician. Some of her clients are also friends. When she checks a computer for problems, she sees what is stored on the hard disk. She has sometimes teased friends in front of others about the websites they have been visiting and the pictures she has seen stored on their computers. She should not have done this, because it is wrong for people to reveal sensitive information which they know only because of their work.

Which one of the following illustrates the principle used in the above argument?

- A** Anyone who, in the course of their work, discovers evidence of terrorism should report it to the police.
- B** Police officers should be dismissed if they pass confidential information to journalists about cases they have investigated.
- C** Doctors and nurses should have access to patients' medical records in order to give them the correct advice and treatment.
- D** Ex-boyfriends and ex-girlfriends should not share personal or intimate information about their former partners, because such knowledge is private.
- E** Teachers often come to know quite a lot of information about the families of their pupils, which they should report if they have any concerns.

- 28** Following a few simple rules can help you keep your job. For instance, if you arrive late for work, you will definitely get fired. You lost your last job so you must have arrived late for work.

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

- A** You need a membership card to use the services of the gym. You do not have a membership card so you cannot use the gym.
- B** If a company wants to be successful, it needs to insist on the punctuality of its employees. This company does not take the punctuality of its employees seriously, so it will not be successful.
- C** Disciplinary action is initiated against all workers who do not wear a helmet on the building site. Meera must have always worn a helmet on the site because no disciplinary action has been initiated against her.
- D** If you turn up the volume, the music gets louder. The music is very loud now, which means that you must have turned up the volume.
- E** In order to anger a hippo, it is enough to get close to it in a boat. They are getting close to this one, so it will become angry.

- 29** As a result of a recent initiative, energy providers are encouraging their customers to have 'smart meters' installed in their properties. Smart meters are recommended because they help you to control your energy usage and therefore mean that you will have lower bills. However, you should refuse to have one installed. The device only tells you how much energy you are using – it doesn't suggest a cheaper alternative and, as a result, the information is not useful to the customer. In fact, the information is far more useful to the energy companies in saving them money.

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

- A** Smart meters help you to control your energy usage.
 - B** Having a smart meter will lead to having lower bills.
 - C** You should refuse to have a smart meter installed.
 - D** Smart meters cannot suggest ways for you to reduce your energy usage.
 - E** The information provided by smart meters is only useful to the energy companies.
- 30** I am planning a party next weekend. I have invited 100 people. Last week I took advantage of an offer at my local supermarket where I was able to get 10% off the total price of party food if I spent more than \$75. I paid \$108 and I estimate that the food that I bought will be enough for 60 people. I've now had replies to the invitations and I know that there will be 80 people at the party. This afternoon I will buy the remaining food that I need.

What is the total price of the extra food that I need?

- A** \$32.40
- B** \$36.00
- C** \$40.00
- D** \$72.00
- E** \$80.00

- 31** Aliyah is planning a 2 week holiday in Spain with her friend Kyra and her husband. They have chosen their hotel and are calculating what the total cost will be for the 3 of them. They have decided on a departure date of May 21st and will be ready to make the booking in early January.

The following table shows dates and prices.

All prices shown are £s per person.

| <i>duration</i> | <i>Mar 29– Apr 22</i> | <i>Apr 23–29</i> | <i>Apr 30– May 6</i> | <i>May 7–13</i> | <i>May 14– June 10</i> | <i>June 11–17</i> | <i>June 18–24</i> |
|-----------------|---------------------------|----------------------|--------------------------|---------------------|----------------------------|-----------------------|-----------------------|
| 7 nights | £580 | £600 | £650 | £670 | £700 | £700 | £700 |
| 14 nights | £900 | £900 | £970 | £1000 | £1050 | £1050 | – |
| 21 nights | £1200 | £1230 | £1300 | £1350 | £1400 | – | – |

Single room supplement: £11 on all dates.

Upgrade to a sea view room supplement: £3.

Supplement prices are per person, per night.

Early booking discount: if booked by 31st January is 5% up to a total of £2500, and 10% on any total above £2500.

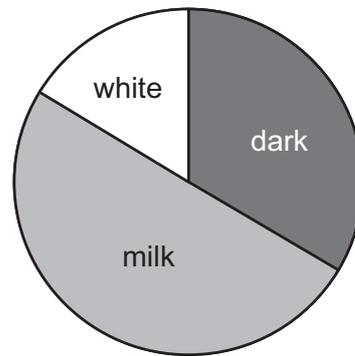
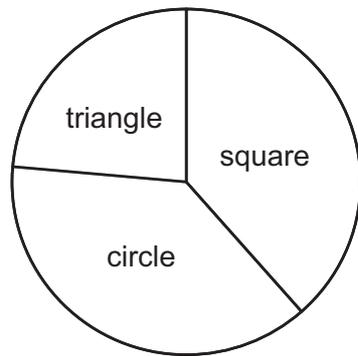
Aliyah needs a single room. Kyra wants to upgrade the room for her and her husband so that it has a sea view.

What will be the total cost of the hotel booking for the 3 friends?

- A** £2181.20
- B** £2910.60
- C** £2973.60
- D** £3049.20
- E** £3218.60

- 32 A tin of 60 chocolates contains dark chocolates, milk chocolates and white chocolates. Each of these types of chocolate is present in three different shapes – square, circle and triangle.

The distributions of the chocolates in the tin, by type and shape, are shown in the pie charts:



Which one of the following tables, detailing the contents of the tin, is consistent with the pie charts?

A

| | dark | milk | white |
|----------|------|------|-------|
| circle | 8 | 10 | 2 |
| square | 8 | 14 | 4 |
| triangle | 4 | 6 | 4 |

B

| | dark | milk | white |
|----------|------|------|-------|
| circle | 5 | 10 | 5 |
| square | 8 | 10 | 2 |
| triangle | 8 | 6 | 6 |

C

| | dark | milk | white |
|----------|------|------|-------|
| circle | 5 | 11 | 6 |
| square | 5 | 11 | 6 |
| triangle | 5 | 8 | 3 |

D

| | dark | milk | white |
|----------|------|------|-------|
| circle | 8 | 8 | 4 |
| square | 6 | 12 | 2 |
| triangle | 5 | 10 | 5 |

E

| | dark | milk | white |
|----------|------|------|-------|
| circle | 9 | 10 | 4 |
| square | 9 | 10 | 4 |
| triangle | 2 | 10 | 2 |

- 33** Rats, like wood pigeons, badgers and foxes, are synurbic – i.e. a species that thrives in urban habitats. Cities provide perfect conditions for rats, offering warmth and shelter and plentiful supplies of food – and cities are getting bigger. Human antipathy to rats is well founded: they breed quickly and spread disease. Until recently, unwanted rats have been controlled by the use of warfarin, a blood-thinning (anticoagulant) drug used medicinally on humans. It has been the perfect poison for rats, being odourless and colourless; rats will return to eat food laced with warfarin until a lethal dose is accumulated. But rats are developing resistance to warfarin and passing this resistance to their offspring. We do not yet have an alternative. The rat population will continue to increase as cities grow.

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

- A** Alternatives to warfarin to control the rat population will not be found.
 - B** Warfarin will become a less effective anticoagulant for humans.
 - C** Other synurbic animals are less dangerous than rats.
 - D** We have no protection against the diseases carried by rats.
 - E** All humans experience antipathy to rats.
- 34** The dark tendencies humans may have, such as psychopathy (lack of empathy), narcissism (excessive self-absorption), egoism and sadism are based on the same single underlying source: a drive to maximize one's individual interests, and to disregard or malevolently cause harm to others' interests. These tendencies often underlie the most serious violent crime in any society, usually dealt with by imprisonment. Psychiatrists say that people with these characteristics are notoriously difficult to change. This suggests that these personality traits are likely to be inherited genetic dispositions over which people have no control. It is wrong, therefore, to punish people for the actions that have resulted from such tendencies. The justice system should not imprison someone for actions over which they had no control.

Which one of the following best expresses the flaw in the above argument?

- A** It fails to show the research on which the psychiatrists' conclusions were based.
- B** It ignores differences in punishments between different countries.
- C** It implies that imprisonment is the only option for sentencing.
- D** It suggests that ways of altering serious antisocial behaviour can never be found.
- E** It assumes that the only objective of imprisonment is punishment.

- 35** Surely there can be few things more commendable than donating to charitable organisations. Yet there are compelling strategic reasons to rethink the charitable model used for tackling social problems in many countries. Relying on voluntary public donations to fund charitable work can leave important but less popular causes without the support they require. For instance, many people are more willing to donate to charities assisting cancer patients or neglected animals than to those helping drug addicts, who are often viewed less sympathetically. Also, in some countries, the largest donors are wealthy individuals given tax reductions in exchange for their charitable donations. Such 'tax breaks' reduce the government's revenue, meaning that they have less money to fund a more comprehensive public service approach to addressing society's problems.

Which one of the following, if true, most weakens the above argument?

- A** Many non-wealthy taxpayers would prefer to give money to charities of their own choosing rather than to government agencies.
- B** Charities are often better than governments at testing innovative approaches that make a significant difference to tackling social problems.
- C** The number of charitable organisations is much higher in some parts of the world than in others.
- D** Some people in real need of assistance are more reluctant to accept help from charities than from government bodies.
- E** Most money donated to charity is spent on the administrative costs of running charities, rather than on the causes they are meant to help.

- 36 A game is played involving two dice. Both dice are 6-sided cubes with the following shapes on their faces:

red square
blue square
green square
red circle
blue circle
green circle

The two dice are thrown and the player scores points according to the following system:

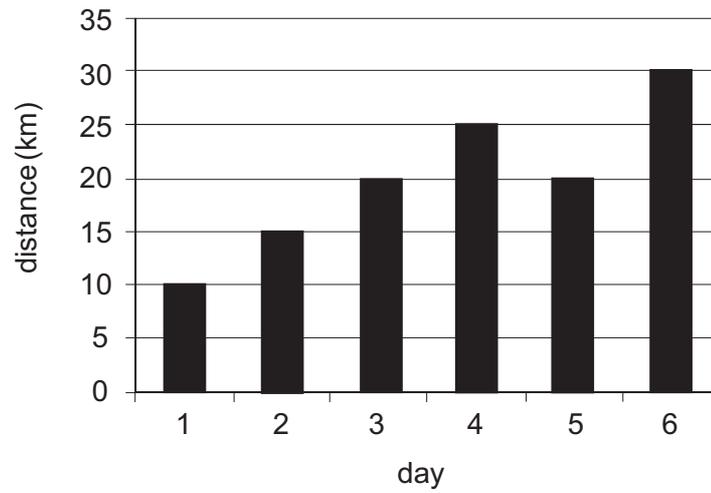
| <i>outcome</i> | <i>points scored</i> |
|--------------------------|----------------------|
| Each circle displayed | 1 |
| Each red shape displayed | 1 |
| Both same shape | 1 |
| Both same colour | 2 |

The maximum possible score from a single throw of both dice is 7 (both dice displaying red circles).

Which one of the following scores is **not** possible from a single throw of both dice?

- A 2
- B 3
- C 4
- D 5
- E 6

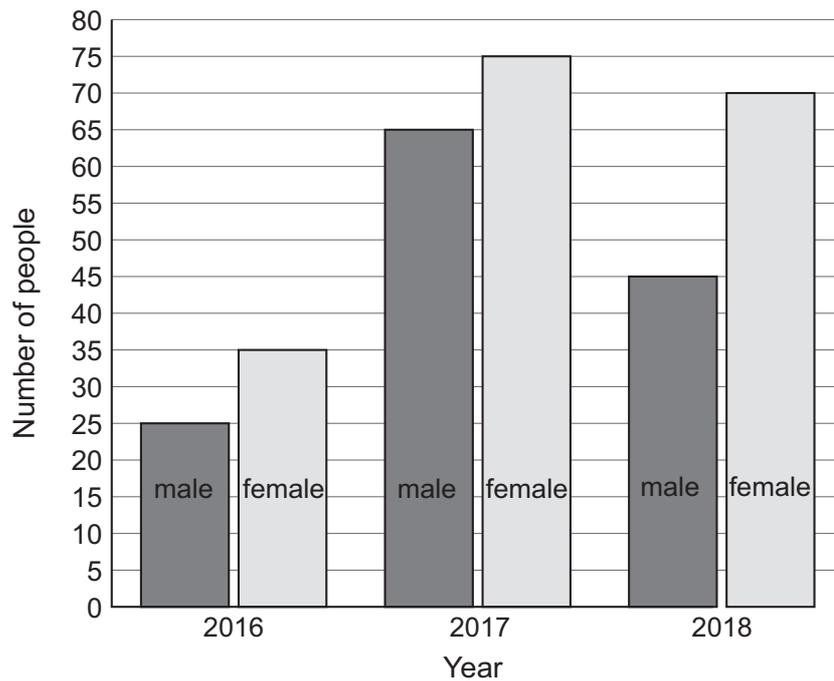
- 37 On a six-day hiking holiday, a group of friends travelled part of the trail by walking and part by bus. On average they walked 15 km per day over the six days. By the end of the 5th day, they had travelled 30 km by bus. The chart below shows the total distance covered each day.



How far did they travel by bus on the 6th day?

- A 0 km
- B 5 km
- C 10 km
- D 15 km
- E 30 km

- 38 The numbers of males and females enrolled at a college in 2016, 2017 and 2018 are shown in the graph below.



Which one of the following is **not** true?

- A The percentage of males increased from 2016 to 2017.
- B The percentage of females increased from 2017 to 2018.
- C The percentage of males increased from 2016 to 2018.
- D The percentage increase in the number of males from 2016 to 2017 was greater than the percentage decrease in the number of males from 2017 to 2018.
- E The percentage increase in the number of females from 2016 to 2017 was greater than the percentage decrease in the number of females from 2017 to 2018.

- 39** In 1992, the bestseller *Men Are from Mars, Women Are from Venus* was published. Decades later, even in places where women and men occupy relatively similar positions in society, the notion of fundamental psychological differences between the sexes still has great appeal. However, this idea that ‘men and women are from different planets’ is as unfounded as it is enduring. Research has found no evidence of such profound, unalterable differences. Studies have debunked, for instance, the myth that women’s communication is more cooperative, and men’s more competitive. Many observed differences have been shown to be context-dependent and disappear when social circumstances are changed. But a news headline of ‘Men and women pretty similar, research finds’ just wouldn’t grab the same attention, would it?

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

- A** The idea that ‘men and women are from different planets’ has appeal even where relatively high levels of gender equality exist.
 - B** Research has found no reliable evidence of fundamental or unalterable differences between men and women.
 - C** The idea that ‘men and women are from different planets’ is as unsupported as it is persistent.
 - D** Old-fashioned notions about the sexes remain a stumbling block to gender equality.
 - E** Many apparent differences between women and men are actually dependent on the social context.
- 40** In order for a gritted road surface to freeze over, temperatures must fall to -10°C or below. Above this temperature, grit will continue to melt ice on the road. Since ice has formed even on treated surfaces in recent weeks, the temperature must have fallen below -10°C at times.

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

- A** In order to make bread successfully it is essential that the oven reaches a temperature of 200°C or above. If this is not reached or maintained, the bread will not rise properly. Since this bread has not risen, the oven must not yet be up to temperature.
- B** Temperatures of 37°C and above cause chocolate to melt and release some of the oils it contains. When it cools again a whitish residue is left behind. Since this chocolate has a white residue, at some point it must have been kept at a temperature exceeding 37°C .
- C** A fever is medically defined as an oral temperature exceeding 37.7°C , but a diagnosis of fever may be given below this point. Since the patient’s notes state that he had a fever on admission to hospital, we can be confident that his temperature was 37.7°C or above at that time.
- D** Iron melts at temperatures in excess of 1538°C . Without reaching this temperature it is impossible to cast iron. Although we do not know exactly how some of the earliest furnaces worked, since we have found evidence of cast iron in China from around 550 BCE, we can be sure that these ancient people found ways to reach temperatures exceeding 1538°C .
- E** Ideally coffee should be stored below 5°C once ground in order to help preserve its flavour. Stale coffee tastes bitter and can have a musty aroma. Since the coffee has been kept at room temperature, we should expect complaints about its flavour.

- 41** Advocates of alternative or complementary medicine frequently say things like, 'You need to treat the body, mind and spirit together', contending that mainstream medicine focuses too much on the purely physical. Alternative medicine prides itself on treating the person 'as a whole', taking account of their underlying psychological states as well as their physical symptoms. Suggest to an advocate of alternative medicine, however, that the effectiveness of such treatment may largely be due to the placebo effect (i.e. to the belief that the medicine will work rather than the medicine itself), and they will typically find this objectionable. Yet what is the placebo effect other than a perfect example of the mind and body working together, of the power of 'mind over matter'?

Which one of the following can be drawn as a conclusion from the above passage?

- A** The placebo effect is considerably more powerful than people typically give it credit for.
 - B** All medicine involves interplay between the body and the mind.
 - C** If they want to be consistent, advocates of alternative medicine ought to be more accepting of the possible role that the placebo effect plays in their treatments.
 - D** Supporters of alternative medicine ought to reassess the effectiveness of alternative treatments in comparison to the treatments of mainstream medicine.
 - E** The attempt to reduce any medical treatment to the purely physical fails to recognise the healing powers of the mind.
- 42** The 4-digit PIN for my credit card can be written as two 2-digit square numbers (between 10 and 100). When the four digits, which are all different, are written individually in words, they are in alphabetical order.

What is the last digit of my PIN?

- A** 1
- B** 4
- C** 5
- D** 6
- E** 9

- 43 Jun lives in Applecross and Aki lives in Damsonville. Both live a 10-minute walk from their local train stations, which both lie on the Applecross–Figtown line.

Trains on this line run throughout the day to the following timetable:

| <i>Applecross–Figtown</i> | | | | <i>Figtown–Applecross</i> | | | |
|---------------------------|------|----------|----------|---------------------------|------|----------|----------|
| <i>Applecross</i> | h:07 | h:27 | h:47 | <i>Figtown</i> | h:07 | h:27 | h:47 |
| <i>Bananagate</i> | h:17 | h:37 | h:57 | <i>Elderhampton</i> | h:13 | h:33 | h:53 |
| <i>Cherrytree</i> | h:25 | h:45 | (h+1):05 | <i>Damsonville</i> | h:27 | h:47 | (h+1):07 |
| <i>Damsonville</i> | h:34 | h:54 | (h+1):14 | <i>Cherrytree</i> | h:36 | h:56 | (h+1):16 |
| <i>Elderhampton</i> | h:48 | (h+1):08 | (h+1):28 | <i>Bananagate</i> | h:44 | (h+1):04 | (h+1):24 |
| <i>Figtown</i> | h:54 | (h+1):14 | (h+1):34 | <i>Applecross</i> | h:54 | (h+1):14 | (h+1):34 |

“h” refers to all hours from 06:00 to 21:00. For instance, the train departing from Applecross at 08:27 arrives in Figtown at 09:14.

Jun leaves his house at 10:00 to go to visit Aki at her house. He must be back home by 16:00 and will spend at least 1 hour at Aki’s house.

What is the difference between the maximum and minimum time that Jun can spend at Aki’s house?

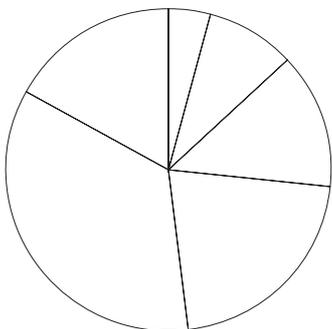
- A 2 hours 40 minutes
- B 2 hours 53 minutes
- C 3 hours 26 minutes
- D 3 hours 40 minutes
- E 3 hours 53 minutes

- 44 At the beginning of March, Suzy begins training for a marathon running event. At the end of each month from March until August, she records the total distance that she has run since the beginning of March. This information is shown in the following table.

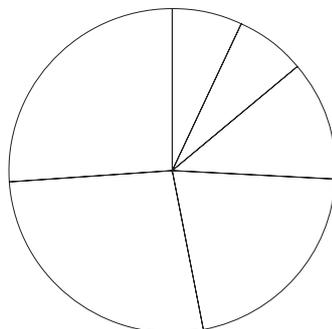
| <i>month</i> | <i>total cumulative distance</i> |
|--------------|----------------------------------|
| March | 60 km |
| April | 122 km |
| May | 186 km |
| June | 292 km |
| July | 478 km |
| August | 718 km |

Which one of the following pie charts, suitably labelled, could represent a comparison of the monthly distances run by Suzy?

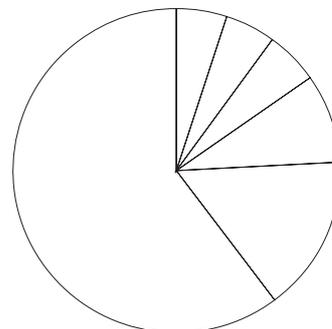
A



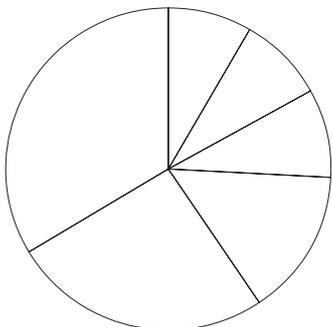
B



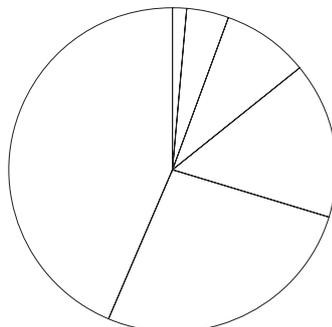
C



D



E



- 45** A charity dealing with homelessness in the UK has reported that its case workers have compiled a list of private landlords and commercial rental companies which have refused to undertake necessary repairs to properties. In some of those cases, tenants have been evicted simply for complaining about the conditions in which they were living. Acting unjustly towards vulnerable people in these ways is an abuse of power. Tenants therefore need to be protected from individuals and commercial companies which profit from owning and letting properties. Only not-for-profit housing associations should be allowed to let accommodation to people who cannot afford to buy their own homes.

Which one of the following best expresses the flaw in the above argument?

- A** The tenants who were evicted may have been unsatisfactory in other respects.
- B** People who rent accommodation from private landlords are not necessarily vulnerable.
- C** Harsh penalties for abusive landlords would not necessarily be effective.
- D** Some people who could afford to buy their own home may prefer not to do so.
- E** Not-for-profit housing associations may be no better than commercial companies or private landlords.

- 46 In August, Bill used his new, UK-based Bridgford Bank credit card for the first time. The summary details for this card are shown below.

Bridgford Bank Credit Card Summary Details

No interest for the first 12 months.

2.5% charged on cash withdrawals (minimum charge £3).

3.5% charged on all transactions made abroad (minimum £5).

All charges are added to the account at the time of the transaction and then the minimum monthly payment of 2% of the total shown on the statement is calculated at the end of each month.

He bought goods to the value of £2450. He also withdrew £300 in cash from a UK cash machine. Then, on holiday in Spain, he used the card to pay for £500 worth of goods.

What would be the minimum payment for his card use in August?

- A £65.00
- B £65.16
- C £65.25
- D £65.50
- E £65.56

- 47 Acting is surely the most overrated occupation of all time. Although top actors are held in high esteem, sometimes people walk into the profession without any training and win critical acclaim. In the film *Captain Phillips*, for example, Barkhad Abdi won several awards for best supporting actor, despite having never acted before in his life – he was chosen because of how he looked and, presumably, because he had some natural ability to act. Yet how difficult can something be if natural ability is enough to get by? And in any case, no one should be admired simply for having a natural ability. It is like being congratulated for being tall or having good eyesight. Film actors do not, therefore, deserve to be held in such high regard.

Which one of the following illustrates the principle used in the above argument?

- A We should not praise a five-year-old child who picks up a golf club for the first time and consistently strikes the ball cleanly.
- B The music Mozart composed towards the end of his life should be thought of more highly than that which he wrote when very young.
- C If we know that a writer has spent a long time drafting and re-drafting their work, then their work is automatically deserving of praise.
- D A successful musician who happened to be in the right place at the right time when they were first recognised does not deserve the accolades they receive.
- E Someone who has a photographic memory and is employed by the security services does not deserve the high salary they might earn.

- 48 A company analyses five possible cities to build a 5 storey office building. The total floor area of the 5 storeys required by the company is 3000 m^2 and the total land area required on which to build it is 600 m^2 .

The table below gives the land price and construction price in \$ per m^2 in five cities.

| <i>city</i> | <i>construction costs (\$ per m^2) of total floor area</i> | <i>land purchase costs (\$ per m^2)</i> |
|-------------|--|---|
| Calypsio | 1000 | 450 |
| Jaspoon | 2000 | 350 |
| Menoko | 1500 | 500 |
| Sontorius | 1300 | 400 |
| Zentium | 1600 | 350 |

The cost of building the office is the cost per square metre for the total floor space of all 5 storeys requirements and the plot land area purchase cost.

What is the difference in cost to build the office between the most expensive and least expensive of the five cities lowest and highest estimates for building the office?

- A \$870 000
- B \$1 210 000
- C \$1 410 000
- D \$2 700 000
- E \$2 940 000

- 49** Couples who want to divorce will face a less confrontational process under recent proposals to change UK law. The proposed changes would remove the need to show evidence of the other spouse's conduct and so avoid the 'blame game' that has existed when a marriage breaks down. Additionally, the opportunity for the other spouse to contest the intent to divorce will be removed. These reforms must be enacted as a matter of urgency. Since confrontations can create a lot of stress for couples, the changes would remove some of the emotional burden from the process of divorce. And with some divorce cases having taken five or more years to finalise, that is a lot of stress to put on a couple and their family members.

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

- A** The proposals would create a less confrontational process for divorce in the UK.
 - B** The proposals would help to avoid the breakdown of a marriage becoming a 'blame game'.
 - C** Reform of the UK divorce process must happen without delay.
 - D** Lengthy confrontations cause a lot of stress for couples and their family members.
 - E** The proposals would make divorce a less stressful experience in the UK.
- 50** The company that I currently work for pays its employees monthly. Pay day is the fourth Thursday of every month or the 26th, whichever is earlier. Since I joined the company the dates on which I have been paid (in order) have been:

24th

24th

26th

26th

23rd

26th

25th (last month)

On what date will I be paid this month?

- A** 22nd
- B** 23rd
- C** 24th
- D** 25th
- E** 26th

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