BioMedical Admissions Test   **4500/11**

Wednesday 30 October 2019   **60 minutes**

SECTION 1   **Aptitude and Skills**

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 3. Your supervisor will collect this question paper and answer sheet before giving out Section 2.

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

Please complete the answer sheet with your:

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

Speed as well as accuracy is important in this section. ***Work quickly, or you might not finish the paper.*** There are no penalties for incorrect responses, only marks for correct answers, so you should attempt **all** 35 questions. Each question is worth one mark.

Answer on the sheet provided. Questions ask you to show your choice between options by shading one circle. 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.

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

This question paper consists of 28 printed pages and 4 blank pages.

     PV5

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1 The total cost of a flight between two cities is made up of three parts: a basic cost, taxes and a booking fee. Last year, for any flight, the basic cost and the taxes were in the ratio 3:2 and the booking fee was fixed at $50. This year, the basic cost of a flight has been increased by 20%, the taxes have been increased by 10% and the booking fee has been halved.

What is the new total cost of a flight that last year cost a total of $330?

A $335.00

B $344.20

C $349.80

D $374.80

E $407.80

2 The rise of the internet-connected smartphone and similar devices poses a risk to the ties that bind us together within society. It is true that for many people, these devices provide ready access to a wealth of information and help them to maintain existing interpersonal relationships and to develop new ones. Yet the devices can also act as a significant obstacle within one of the most important relationships of all: that between a young child and his or her caregivers. With many users of smartphones checking them hundreds of times a day, psychologists are increasingly worried about the potential 'cyber effect' of parents and others shifting more of their attention away from the young children around them. Eye contact and other features of face-to-face 'real world' interaction are essential for the social and emotional development of young children.

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

A   In previous generations, families across the world tended to have larger numbers of children.

B   Internet-connected devices help some people who find face-to-face interactions difficult cope better with day-to-day life.

C   More young children are now being entertained with videos and other content on smartphones rather than being encouraged to interact with people around them.

D   In a hundred years or so, many households in both poor and rich countries will own robots that are capable of interacting with us as if they were human.

3   The table shows details of six hire cars.

model	engine	style	doors	sun roof	air con	cost 1 day	cost 3 days	cost 7 days	pick up/ drop off hotel	pick up/ drop off airport
Ashla	900 cc	Hatch	3		✓	$35	$90	$150		✓
Bezza	1000 cc	Hatch	3			$35	$85	$140	✓	✓
Cronal	1200 cc	Hatch	5	✓	✓	$40	$100	$150	✓	✓
Dega	1400 cc	Saloon	5	✓		$40	$100	$150	✓	✓
Elox	1600 cc	Saloon	5	✓	✓	$45	$120	$180	✓	✓
Fire	2000 cc	MPV	5		✓	$50	$130	$150	✓	✓

I will need to hire a car for my holiday and I have a number of requirements. I want to pick up the car at the hotel at the beginning of the holiday, but drop it off at the airport at the end of the holiday. The car must have a sun roof and air con. However, I do not want a car above 1600 cc, and I can only afford to pay up to $160 for 7 day hire.

Which one of the six cars suits my requirements?

A   Ashla

B   Bezza

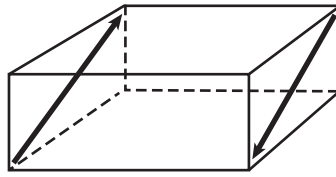**C**   Cronal

D   Dega

E   Elox

F   Fire

4 It never fails. The only time both political parties are willing to work together in the US Congress is when they're cooking up really bad ideas. If they've found a new way to cause trouble, reduce freedom, or generally damage the health of the nation, they work together just fine. This time, the brilliant idea is a sales tax on goods bought on the internet, similar to the current sales tax imposed upon goods bought in physical stores. If the economy is to get stronger, charging consumers more is not a wise move. A tremendous number of people buy online, and if the cost of buying online increases, internet sales will go down, and companies will sell fewer products and have lower profits. Net tax receipts will therefore be less, which means that states and the federal government will collect less revenue, and have less to spend on things like education and healthcare. This is why an internet sales tax is such an unbelievably bad idea.

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

A It attacks the people who came up with the idea rather than the idea itself.

B It fails to take into account the possibility that people who would have bought online will buy from physical stores instead.

C It wrongly proceeds on the basis that the economy will suffer only if sales fall.

D It assumes that, if internet sales fall after introducing an internet sales tax, then the introduction of an internet sales tax will have been the cause of the falling sales.
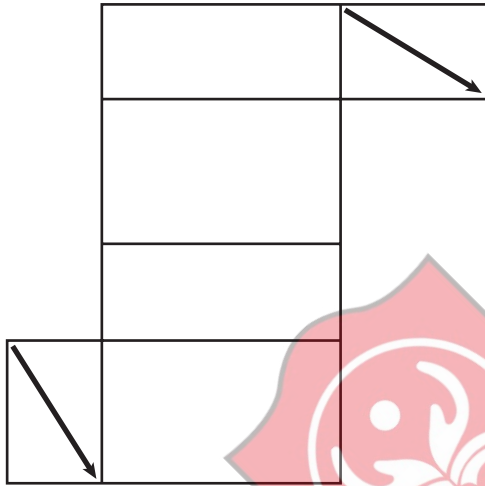
5   The transparent box shown below has identical arrows painted on one pair of opposite faces.
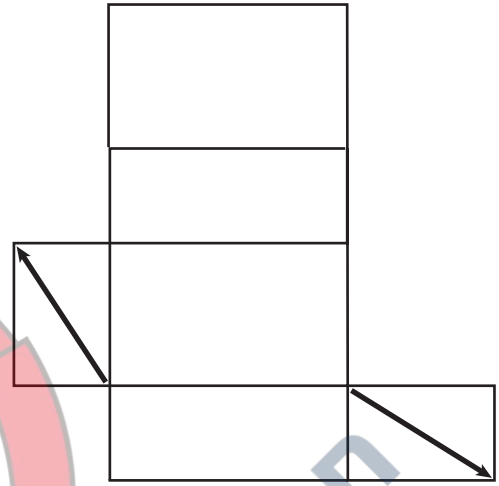

[diagram not to scale]

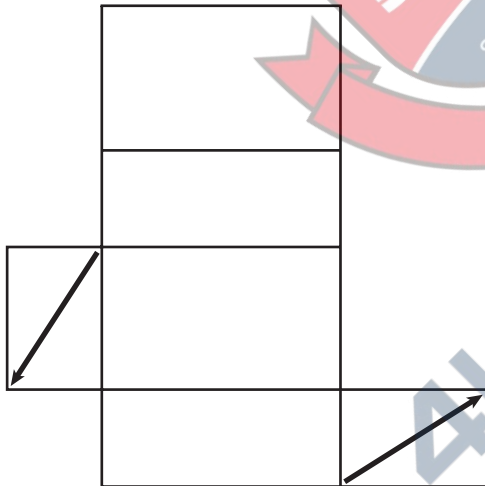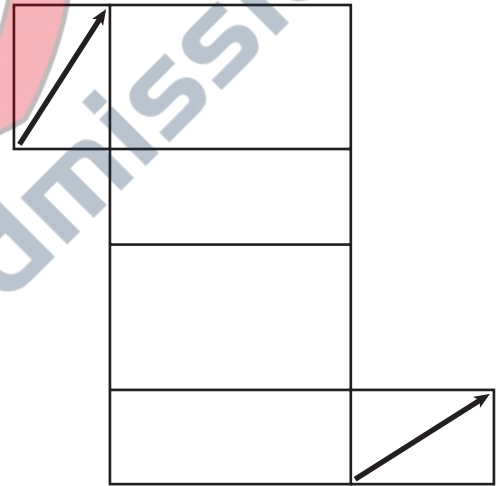Which one of these nets will **not** fold up to make the box?

A

B

C

D

6   How much value does a particular new product or service bring to our lives? This is hard to quantify, and yet traditional economics has provided us with a neat means for doing so: look at how much it costs. In a free market economy, how much something costs tells us how much people are prepared to pay for it. And how much people are prepared to pay for something is a direct sign of how much they value it. The problem with this model – using the market price to assess value – is that it is starting to break down with new technologies. Many of the products and services we value most, including popular apps and social media platforms, are provided for free. While there may indeed be a cost, such as a loss of privacy, this is not a financial cost.

Which one of the following statements is best supported by the above passage?

A   It is impossible to measure the true value of any given product or service.

B   There is no such thing as the true or real value of a given product or service.

C   We need to find alternatives to using cost if we want to measure the value of a product or service.

D   If we want to determine the actual value of a product or service, there are more serious costs to consider than merely financial ones.

7   A medical consultant devises a test to diagnose the presence or absence of a particular disease in children. After many years the test proves itself to be 90% accurate. In other words, on 10% of tests done on children who do actually have the disease, the test will erroneously indicate that they do not have it. These 10% of tests are known as 'false negatives'. Similarly, on 10% of tests done on children who do not actually have the disease, the test indicates incorrectly that they do have it. These 10% of tests are known as 'false positives'.

The hospital serving a small town tests 1000 children for the presence of the disease. The table below provides the results as expected in terms of the test's 90% accuracy level.

	disease actually present	*disease actually absent*	*total*
positive test results	72 (true positive)	92 (false positive)	164
negative test results	8 (false negative)	828 (true negative)	836
total	80	920	1000

If a child has a positive test result, what is the probability that s/he does actually have the disease?

A   72 out of 92 (approx. 78%)

B   828 out of 1,000 (approx. 83%)

C   836 out of 920 (approx. 91%)

D   164 out of 836 (approx. 20%)
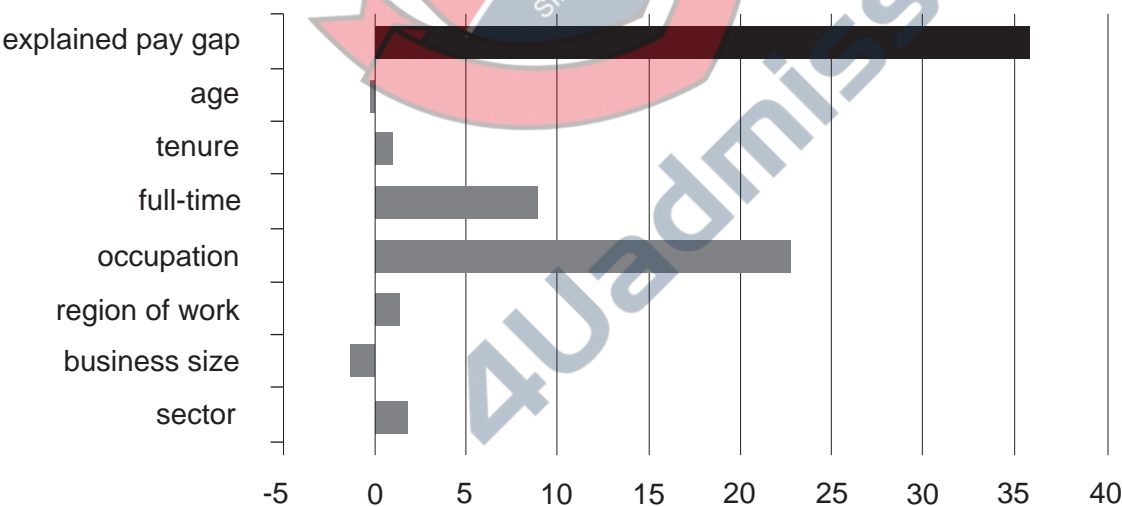
E   72 out of 164 (approx. 44%)

Questions **8-11** refer to the following information.

The gender pay gap is calculated as the difference between the average hourly earnings of men and the average hourly earnings of women, expressed as a proportion of the average hourly earnings of men. In 2017, average weekly earnings for full-time employees in the UK were £550, up 2.2% from £539 in 2016. Men were paid more than women on average: for full-time employees, the gender pay gap was 9.1%, down from 9.4% in 2016. This is the lowest since the survey began in 1997, when the gap was 17.4%, although it has changed relatively little in recent years.

A recent study used statistical analysis to calculate the percentage of the gender pay gap (for all employees) that can be explained by factors such as common differences between the kinds of job that men and women do. It found that a proportion of the gap is due to the fact that more men are in senior roles in companies, which means they are in jobs which have a higher salary attached to them, and also because relatively more women work part time, which is paid less per hour. But when the analysts adjusted for these factors they found that they could only account for 36% of the average hourly pay gap. The rest (64%) was still unexplained, raising the possibility that discriminatory behaviour by employers might be partly responsible.

The analysts said that this did not mean that two thirds of the gap must be attributable to pay discrimination by employers, because women's relative academic qualifications and domestic caring responsibilities are also likely to be factors that they did not capture in their modelling exercise. But they did say that pay discrimination might be part of the explanation for the unexplained gap. Figure 1 outlines how the factors that were investigated contributed to the explained part of the gap.
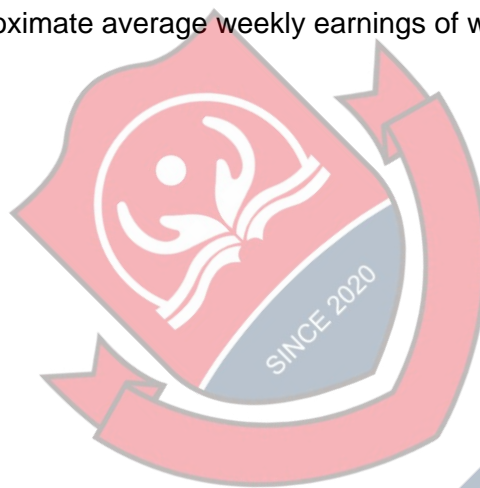
Figure 1
Percentage of the gender pay gap accounted for by variation in other explanatory factors

8 Which one of the following could be drawn as a conclusion about the role of discrimination in the gender pay gap?

   A   The fact that more men than women are in senior roles in companies is evidence of discrimination.

   B   The fact that two thirds of the gender pay gap cannot be explained proves that some of it is the result of discrimination.

   C   Another study, which takes into account factors not considered in this one, will provide greater evidence of discrimination.

   D   There is no evidence to support the suggestion that the gender pay gap may be partly the result of discrimination.

   E   The extent to which discrimination is responsible for the gender pay gap is not known.

9 Assume that the numbers of women and men working full-time are the same.

   What were the approximate average weekly earnings of women in full-time employment in 2017?

   A   £450

   B   £475

   C   £500

   D   £525

   E   £550

10 Figure 1 indicates that one of the factors that partly explain the gender pay gap is tenure (length of time in current post). Which of the following statements is/are consistent with this finding?

> **1** Women tend to have longer tenures in their jobs than men, and the longer someone's tenure in their job, the greater their average hourly earnings.
>
> **2** Women tend to have shorter tenures in their jobs than men, and the longer someone's tenure in their job, the greater their average hourly earnings.
>
> **3** Men tend to have longer tenures in their jobs than women, and the longer someone's tenure in their job, the smaller their average hourly earnings.
>
> **4** Men tend to have shorter tenures in their jobs than women, and the longer someone's tenure in their job, the smaller their average hourly earnings.

A 1 only

B 2 only

C 3 only

D 4 only

E 1 and 3 only

F 1 and 4 only

G 2 and 3 only

H 2 and 4 only

11 Between 1997 and 2016, the average hourly earnings of men working full-time rose by approximately 75%.

Assume that the numbers of women and men working full-time were the same during this period.

By approximately what percentage did the average hourly earnings of women working full-time rise in the same period?

A 59%

B 67%

C 75%

D 83%

E 92%

F 100%

12   A ferry company operates a route between port X and port Y with the following daily timetable:

departures from X	departures from Y
00:00	00:45
01:30	02:15
03:00	03:45
04:30	05:15
06:00	06:45
07:30	08:15
09:00	09:45
10:30	11:15
12:00	12:45
13:30	14:15
15:00	15:45
16:30	17:15
18:00	18:45
19:30	20:15
21:00	21:45
22:30	23:15

The crossing takes 2 hours and 30 minutes, and the ferries need to spend at least 1 hour in port to unload and reload before their next sailing. The ferries operate throughout the day, and ports X and Y are in the same time zone.

How many ferries does the company need to operate this timetable?

A   3

B   4

C   5

D   6

E   8

13 The standard price for a cup of coffee in Italy is €1 (about £1), but in the UK you can be charged as much as £4. But why? The biggest part of the cost of serving a cup of coffee certainly isn't the coffee. The most significant cost is staff wages, though in fact that's not the key difference. It's the difference in drinking culture that has the greatest effect on the difference of the price of a cup of coffee: British coffee drinkers spend far longer on a coffee than Italians, who order a coffee at the bar and drink it standing up, allowing Italian cafés to make more sales for the same costs. The opposite extreme is in Greece, where people sit over a single coffee for hours. As a result, Greece has some of the most expensive coffees in Europe, despite having lower wages.
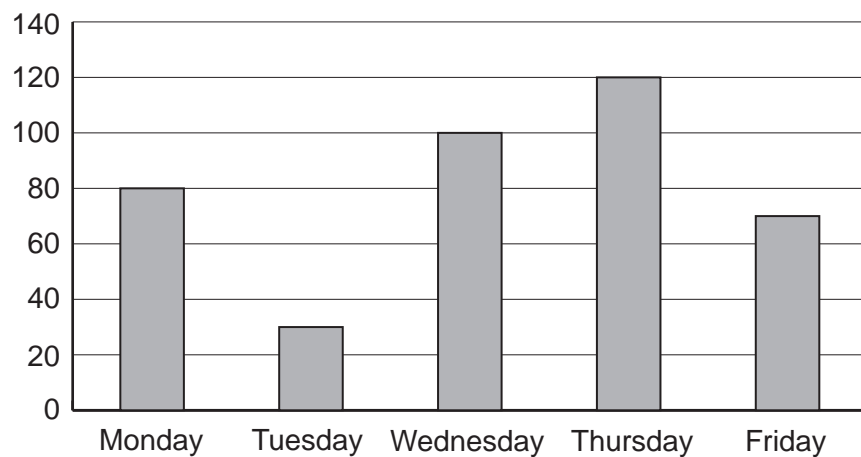
Which one of the following best expresses the main conclusion of the above argument?

A The biggest part of the cost of serving a cup of coffee is not the coffee but the staff wages.

B The difference in drinking culture has the greatest effect on the difference in the price of a cup of coffee.

C Greece has some of the most expensive coffees in Europe, despite having lower wages.

D Italians who order a coffee at the bar and drink it standing up allow Italian cafés to make more sales for the same costs.

14 Terence drew the bar chart below to represent the sales from his shop on each day from Monday to Friday last week.

He also drew the following pie chart, but forgot to include one of the days.

Which day was missed out on the pie chart?

A Monday

B Tuesday

C Wednesday

D Thursday

E Friday

15 People seem to love words that give a sense of size, terms like 'umpteen' and 'zillion'. These terms are referred to as 'indefinite hyperbolic numbers' – 'indefinite' because they do not represent actual numbers, and 'hyperbolic' because they are used to imply a larger size than the reality. What's interesting is that everyone roughly agrees on the size these vague terms refer to, and that is because there are language models that underpin the terms and allow a general understanding of their meaning. For example, the word 'umpteen' has a generally agreed meaning of 'big, but not bigger than a hundred', using the language model '-teen' from the two-digit numbers thirteen to nineteen. And the indefinite hyperbolics 'gazillion' and 'bazillion' use 'ga' and 'ba' as intensifiers to the root word 'zillion' (itself an indefinite hyperbolic) to suggest a number more than a billion or even than a zillion!

Which one of the following could be drawn as a conclusion from the above information?

A Indefinite hyperbolic numbers encourage exaggeration and rhetoric.

B Indefinite hyperbolic numbers are not misunderstood by native speakers.

C Indefinite hyperbolic numbers are more rule-based than might be apparent at first sight.

D Indefinite hyperbolic numbers use language models in unusual ways.

16 The table below shows the results of an eye test carried out on the population of a small village. The bottom row of the table shows the percentage of each gender group that were able to read the bottom line of the eye-test chart:

	5 to 17 years old		adults	
	female	male	female	male
numbers tested	50	50	200	150
percentage who could read the bottom line	28%	32%	12%	18%

What percentage of all those tested could read the bottom line of the chart?

A 18%

B 20%

C 21%

D 22.5%

E 25%

17   During World War I (1914–1918), three hundred British soldiers were executed by firing squad for the offences of desertion and disobeying an order. To later generations, these sentences seemed so severe that a movement was set up to exonerate the executed men. Prolonged debate took place within the UK government about whether it was appropriate to issue a legal pardon. Wisely, it was decided that this was not appropriate. Too much time has elapsed for individual cases to be reviewed fairly, and a blanket pardon that made no distinctions between individual circumstances would be no more just. Social norms have changed so much that there can be no reliable evaluation of judgements made under the terrible circumstances of the war.

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

A   It is impossible to draw conclusions about any event that took place a hundred years ago or more.

B   A crime committed in wartime is more serious than the same crime committed in peacetime.

C   Capital punishment for desertion or disobedience was necessary to maintain discipline during the war.

D   Some of the death sentences handed out during the war may have been more deserved than others.

18 Jasper's school bag can carry up to 5 books. He stores the rest of his school books in his locker. He can visit his locker before school, at break time, and at lunch time to change the books he carries in his bag.

The tables below show his timetable and the number of books needed for each of his lessons. Each subject has completely different books.

Monday	Tuesday	Wednesday	Thursday	Friday
mathematics	music	mathematics	music	art
English	science	history	English	geography
break time				
history	geography	science	mathematics	science
lunch time				
music	English	Spanish	Chinese	mathematics
science	mathematics	English	science	English

subject	number of books needed
mathematics	3
English	1
science	2
music	1
history	2
geography	3
art	1
Spanish	2
Chinese	2

On which day does Jasper **not** need to visit his locker at break time?

A Monday

B Tuesday

C Wednesday

D Thursday

E Friday

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Questions **19–22** refer to the following information.

National daily newspapers

The sales of national daily papers in the UK reached a peak in the mid-1950s. Since then there has been a gradual decline in sales. The availability of multimedia news platforms has accelerated this decline in the 21st century, and by the close of 2014, no UK newspaper had daily sales exceeding two million.

Despite this decline, there is no denying the enormous power the national newspapers still have to influence public opinion. No papers have done this on a bigger scale than Rupert Murdoch's *Sun* and the *Mail* under Paul Dacre. And no issue has ever demonstrated it more clearly than the divisive issue of Brexit.

Dacre became editor at the *Mail* in 1992 and resigned in 2018 (Figure 1 relates to his time in charge). Before and during the 2016 referendum – on leaving or remaining in the European Union – the *Mail* openly backed the Leave campaign, along with the *Express, Star, Sun,* and *Telegraph*. The combined daily sales of these brands was over 4 million, dwarfing those of the four Remain-supporting papers. No surprise, therefore, that the majority of the UK population was persuaded to vote Leave.

Figure 1

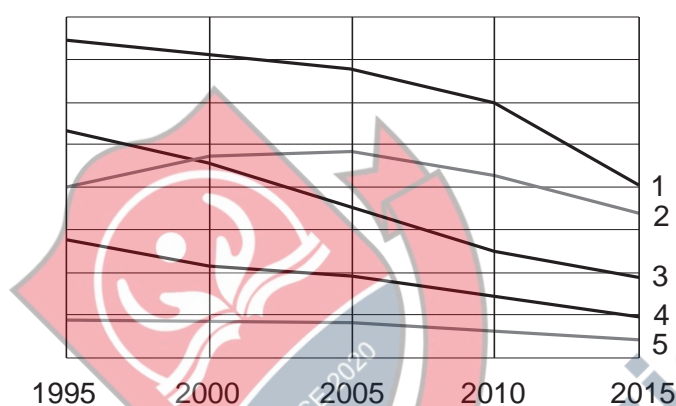Percentage change in national daily newspaper sales, 1992-2018

Figure 2

Average daily sales of the nine national daily papers

title	2018	2017	2016	2015	2010	2005	2000
Times	440 558	451 261	404 155	396 621	508 250	686 327	726 349
Mail	1 343 142	1 511 357	1 589 471	1 688 727	2 120 347	2 409 121	2 353 915
FT	189 579	188 924	198 237	219 444	390 315	422 519	435 478
Star	391 998	443 452	470 369	425 246	779 376	861 825	502 647
Sun	1 545 594	1 666 715	1 787 096	1 978 702	3 006 565	3 382 509	3 557 336
Telegraph	385 346	472 258	472 033	494 675	691 128	920 745	1 039 749
Guardian	137 839	156 756	164 163	185 429	302 285	376 816	401 560
Express	364 721	392 526	408 700	457 914	674 640	949 238	1 050 846
Mirror	583 192	724 888	809 147	922 235	1 218 425	1 748 327	2 270 543
Totals	5 381 969	6 008 137	6 303 371	6 768 993	9 691 331	11 757 427	12 338 423

19 Which one of the following is the best estimate of the average daily sales of the *Mirror* in 1992?

A 0.5 m

B 1.3 m

C 1.5 m

D 2.9 m

20 The following unlabelled graph compares the daily sales of five of the nine national daily papers between 1995 and 2015. Which of the five lines 1-5 corresponds to the data for the *Mirror?*

A line 1

B line 2

C line 3

D line 4

E line 5

21 Which one of the following, if true, most weakens the argument expressed in the second and third paragraphs?

A The papers with the largest sales do not necessarily present the best arguments.

B Most people want newspapers to report facts rather than present opinions.

C A growing number of people now access news on their phones and tablets.

D People buy the newspapers which express the views they already have.

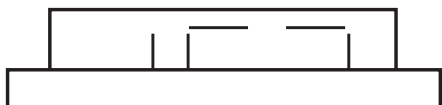**22**   Which of the following statements is/are supported by the data in Figure 2?

1   Between 2017 and 2018 the combined sales of the nine national daily papers fell by between 11% and 12%.

2   In 2016 the sales of the five pro-Leave newspapers accounted for more than 70% of the combined sales of the nine major daily papers.
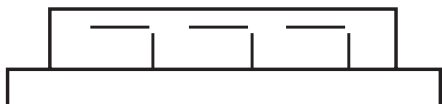
A   1 only

B   2 only

C   both 1 and 2

D   neither 1 nor 2

23 As a cricket fan, one of the perks of my job is that my office overlooks Old Bridge cricket ground. I have a good view of the playing area, but an ill-placed advertising hoarding means that I can only see the very top of the electronically operated scoreboard. So for a score of 167 I see:
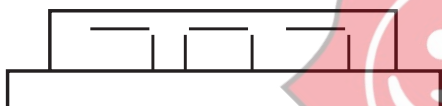
There is a match currently in progress. Returning to my desk a few minutes ago, all I could see of the score was:
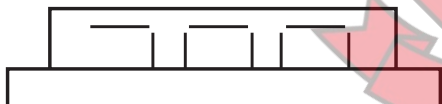
Since then one of the batsmen has scored 4, 6, 4, 6, 6 and 4 from consecutive balls.

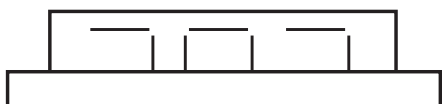After the first 4 the part of the score that I can see didn't change.

After the first 6 it changed to:

It didn't change again until after the third 6, when it became:

After the last 4 it returned to:

What is the correct score now?

A 293

B 297

C 302

D 303

E 307

24 The chore of raising young chicks is one some birds manage to avoid. By laying their eggs in the nests of others, they dupe those others into feeding the babies once hatched. Such 'brood parasitism' has been noted in at least three groups, namely cuckoos, cowbirds and honeyguides. It provides a good example of convergent evolution, in which unrelated groups with similar ways of life evolve similar adaptations that help them thrive. The adaptation noted in these three groups of birds is that the shells of their eggs are significantly thicker than those of the birds they parasitise. To demonstrate that this is an example of convergent evolution, a benefit has to be shown to be associated with the adaptation. In this case, the thicker shells have been shown to provide greater warmth, enabling the parasitic chicks to hatch sooner than the chicks of the host bird – giving a greater chance of survival.

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

A Cuckoos, cowbirds and honeyguides have evolved to avoid the chore of raising their young.

B The brood parasitism noted in cuckoos, cowbirds and honeyguides provides an example of convergent evolution.

C Chicks which hatch from eggs with thicker shells have a greater chance of survival.

D Convergent evolution can only be said to have been shown if a benefit is brought about by the life adaptation.

25 Venus bars cost 30p each, Whizz bars cost 40p each and Flaky bars cost 50p each. Nicola spends exactly £2.40 on chocolate bars.

Which of the following statements are incorrect?

1 She must have more than one type of bar.

2 She must have at least one Flaky bar.

3 She must have 5, 6 or 7 bars altogether.

4 She cannot have an equal number of each of the bars.

A 1, 2 and 3

B 1, 2 and 4

C 1, 3 and 4

D 2, 3 and 4

E all of them

26 People often comment on the fact that the sport of swimming has had a relatively high number of new world records set over the past few decades. Many other developments have occurred in the sport during that time, including the manufacture of swimsuits that create less resistance as swimmers move through the water, and improvements in the design of the starting blocks used in races. Even the engineering of swimming pools has evolved. Engineering advancements make it easier to maintain an optimal water temperature and other conditions in the pools where top competitions are held and the time records set. Most recently, computer software was developed that allows elite swimmers to analyse the tiniest part of their movement in the water in order to keep adjusting their swimming strokes.

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

1 Swimming is likely to have a relatively high number of new world records set over the next few decades.

2 Natural ability no longer matters all that much in determining what swimmers can achieve in their sport.

3 Technological progress has played a role in swimmers being able to set new world records.

A 1 only

B 2 only

C 3 only

D 1 and 2 only

E 1 and 3 only

F 2 and 3 only

G 1, 2 and 3

27 George enjoys reading newspapers and is considering whether he should take out any subscriptions.

Details of the daily cost and subscription tariffs for each of the five newspapers he reads are as follows:

	daily cost of printed newspaper	*12-month subscription packages*		
		online and tablet	*printed copy only*	*printed copy plus online and tablet*
Dispatch	£1.00	£30	£180	not available
Express	£0.80	£20	not available	£200
Mail	£1.20	£40	£200	£230
Reporter	£1.00	£40	£200	£220
Times	£1.50	£60	£240	£280

George decides he will read at least three different newspapers in one format or the other each week. One of these must be the Times but it doesn't matter which the other two are. He wants to read a printed newspaper twice a week.

What is the minimum George will need to spend in a year on his newspaper access?

A £110.00

B £131.60

C £143.20

D £149.60

E £153.60

F £173.20

G £200.00

H £260.00

28 Many countries are experimenting with legalising previously illegal substances, including marijuana and heroin. The rationale for the legalisation movement includes concerns about the financial and social burden of the so-called 'war on drugs', which is widely considered to be a failure, anyway. But what drug legalisation advocates forget is why certain substances were made illegal in the first place: taking them leads to behaviours that are harmful both to users and to the people around them. For evidence of such effects, we only need to look to Colorado in the USA. Following the state's recent legalisation of marijuana, the rates of murder and of violent crime overall increased. This example shows that the drug legalisation movement is as dangerous as it is misguided.

Which of the following describe(s) flaws in the reasoning of the above argument?

    1 It assumes that because the crime rise in Colorado occurred after marijuana was legalised, the rise was caused by this change in law.

    2 It fails to acknowledge the problems associated with other substances which are already legal and more socially acceptable.

    3 It concludes that drug legalisation has negative effects based just on the evidence from one place.

A   1 only

B   2 only

C   3 only

D   1 and 2 only

E   1 and 3 only

F   2 and 3 only

G   1, 2 and 3

29 A survey at a leisure centre has found that 70% of members use the swimming pool regularly and only 40% use the climbing wall.

The following statements have been made:

   1 At least 10% of members swim and climb.

   2 All members either swim or climb or do both.

   3 At least half of those who climb never swim.

Based only on the information given, which of the statements, taken independently, **could** be true?

A all of them

B 1 and 2
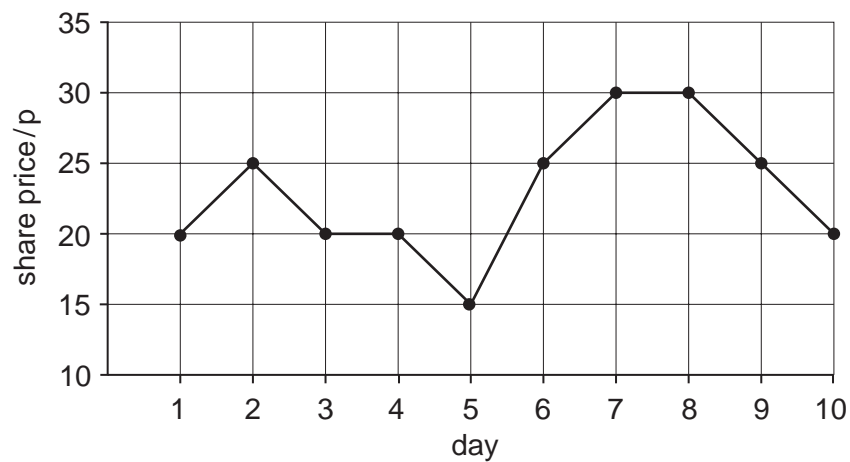
C 1 and 3

D 2 and 3

E none of them

30 A recent study found an association between the number of self-help books new mothers read about caring for their baby and the well-being of those mothers – and it goes in the wrong direction. The more books women had read claiming to show how to put babies into feeding and sleeping schedules, the worse they reported feeling. The number of depressive symptoms they reported correlated positively with the number of books they had read. Most of the mothers in the study had used routine-led baby manuals that advise mothers to implement routines of feeding and sleeping, implying that such routines are easy to establish. One in six of the mothers in the study said the books made them feel like a failure.

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

A Women are using self-help baby books rather than seeking advice from their own mothers.

B Mothers who find baby care difficult are more likely to buy self-help books.

C Some of the mothers experienced difficulty establishing feeding and sleeping routines for their babies.

D Self-help baby books are doing more harm than good.

31 The share price of a company varies each day.

The graph shows the share price over a period of 10 days:

I buy £6000 worth of shares in this company in a single purchase during this period, and then sell them again on a later day in the period.

There are no costs associated with buying and selling the shares.

What is the difference between the largest and smallest amount I could sell my shares for?

A   £2400

B   £3000

C   £3600

D   £4000

E   £8000

F   £8400

G   £9000

H   £9600

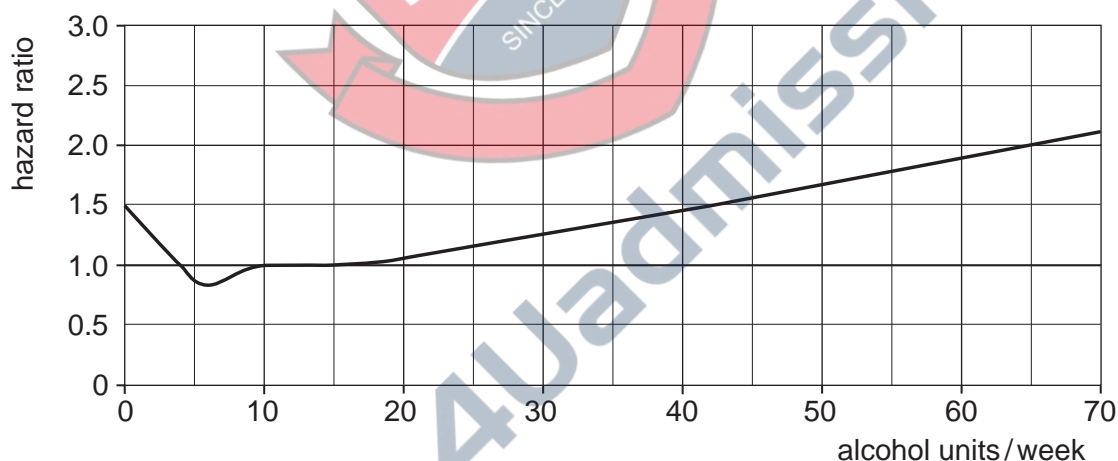Questions **32-35** refer to the following information.

Not drinking in middle age increases the risk of dementia as much as drinking too much, according to a new report. Published in the British Medical Journal, the data showed that abstinence (drinking no alcohol) in midlife was associated with a 45% higher risk of dementia compared with people who consumed between 1 and 14 units of alcohol per week. The risk of dementia increased steadily for higher rates of consumption. However, the report's authors concluded that the underlying mechanisms leading to dementia for heavy drinkers and those abstaining were probably different. The study did not take into account the subjects' drinking habits before middle age.

The study tracked the drinking habits of more than 10 000 London civil servants between the ages of 35 and 55 from 1985 to 1993. They were then monitored for, on average, another 23 years. Of 10 308 baseline participants, a total of 397 cases of dementia were recorded over a mean follow-up period of 23.2 years.

The findings of the study are summarised in the graph below, which shows how the likelihood of developing dementia later in life depended on the weekly rate of consumption of alcohol (X) during the eight-year period between 1985 and 1993. The 'hazard ratio' calculates this risk as the following ratio:

proportion of participants that consumed X units per week in midlife who went on to develop dementia
proportion of participants that consumed 14 units per week in midlife who went on to develop dementia

The reference point of 14 units per week represents the government's recommended maximum guideline for weekly consumption (equivalent to 7 glasses of wine or 7 pints of beer on average).

The graph shows that abstinence was associated with a higher risk of dementia when the reference point was alcohol consumption of 14 units per week. Consumption of more than 14 units per week was also associated with an increased risk of dementia.

The head of research at Alzheimer's Research UK, said: 'As this study only looked at people's drinking in midlife, we don't know about their drinking habits earlier in adulthood, and it is possible that this may contribute to their later life dementia risk. People who completely abstain from alcohol may have an earlier history of heavy drinking and this can make it difficult to interpret the links between drinking and health. Future research will need to examine drinking habits across a whole lifetime, and this will help to shed more light on the relationship between alcohol and dementia.'

32 According to the findings of the study, what level of alcohol consumption in middle age carries the lowest risk of dementia in later life?

A 0 units per week

B 4 units per week

C 6 units per week

D 14 units per week

E 18 units per week

33 The first sentence of the passage proposes a conclusion that the author draws from the information that follows.

Which one of the following is an assumption necessary to reach this conclusion?

A The relationship between alcohol and dementia risk does not vary with occupation.

B Drinking too much is defined as more than 40 units per week.

C Dementia is the only health risk associated with drinking.

D It is only in middle age that drinking habits increase the risk of dementia.

E People cannot develop dementia in middle age.

34 Approximately 40% of the study cohort consumed alcohol at the recommended rate of 14 units per week during the period 1985 to 1993. Of these, 80 went on to develop dementia in later life.

Based on this information and the findings of the study, what proportion of adults who drink the equivalent of 3 glasses of wine per day in mid-life are likely to develop dementia in later life?

A 1.8%

B 3.0%

C 6.0%

D 15%

E 30%

35 Which one of the following, if true, would most undermine the claim in the report that not drinking alcohol in mid-life causes as much risk of developing dementia as drinking too much?

    A Abstainers from consumption of alcohol in mid-life are more likely to become regular consumers during later life.

    B Heavy drinkers in mid-life are more likely to develop health problems that lead to a life of abstinence later in life.

    C Participants who were heavy drinkers in mid-life were more likely to die from alcohol-related causes before they had the chance to develop dementia.

    D People who are mentally astute in later life are more likely to have been able to make disciplined decisions to control their consumption of alcohol during mid-life.

END OF TEST

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