

THINKING SKILLS

9694/11

Paper 1 Problem Solving

October/November 2019

1 hour 45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)



READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

There are **30** questions on this paper. Answer **all** the questions.

For each question there are four possible answers **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet. Ignore responses numbered 31–40 on the answer sheet.

DO **NOT** WRITE IN ANY BARCODES.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

This document consists of **19** printed pages and **1** blank page.

- 1 Shaaron and her two sisters, Anna and Bonnie, have apps on their phones so that at any moment Shaaron can see the distance in kilometres between her and each of her two sisters.

Shaaron looks at her phone and sees:

Anna 15 km away from you
Bonnie 20 km away from you

Which of these **cannot** be the distance between Anna and Bonnie?

- A 10 km
B 20 km
C 30 km
D 40 km
- 2 Penthesilea has three girdles to send to her sister, Hippolyta. She could put them in one, two or three parcels. The girdles weigh 0.8 kg, 1.9 kg and 8.0 kg.

The postage rates are

Not exceeding	Price
1 kg	\$7
2 kg	\$10
5 kg	\$17
10 kg	\$23
20 kg	\$35

What is the minimum total price to post all three items?

- A \$30
B \$33
C \$35
D \$40

- 3 In the sport of *targetball* a goal scores 1 point, 2 points or 5 points, depending upon where the ball hits the goal target.

The table below lists all the players who played for the Shorwell Sharpshooters last season, together with their statistics for the season.

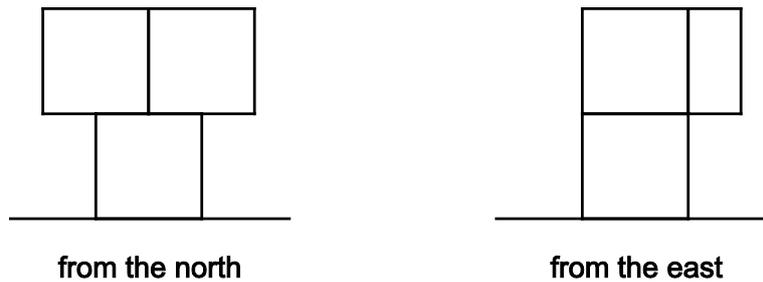
<i>Name</i>	<i>Matches played</i>	<i>Goals</i>	<i>Points scored</i>
Carl Breeze	20	30	68
Quentin Cumber	17	25	66
Leslie Finn	22	36	75
Vernon Gann	6	7	18
Andrew King	23	27	78
Ben Lowe	17	28	63
Richard Mee	28	33	71
Denzil Nye	14	18	43
Michael Ocean	25	31	76
Tom Potts	14	21	54
Edward Sterne	15	18	40
Simon Tate	9	11	27

Separate lists are produced for most matches played, most goals and most points scored.

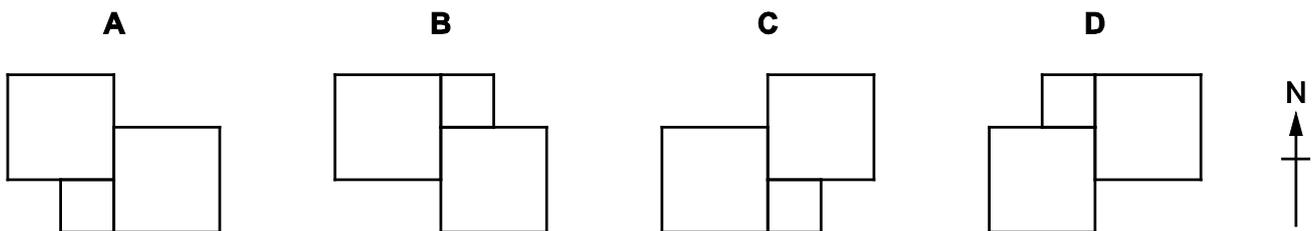
Which player appears in the top three of all three lists?

- A Leslie Finn
- B Andrew King
- C Richard Mee
- D Michael Ocean

- 4 A sculpture in the centre of the local park is made from three identical cubes. The views from the north and east are shown below.



What does the sculpture look like from above?



- 5 Four online retailers are offering special deals to customers buying video games. The offers available are shown in the following table.

<i>Company</i>	<i>Offer</i>	<i>Cost of 1 game</i>
Cheap Videos	Buy 2 get a third one free	\$15
Dollarland	10% off everything	\$11
Fun City	Buy 3 get a fourth one free	\$13
Games4all	2 for the price of 1	\$19

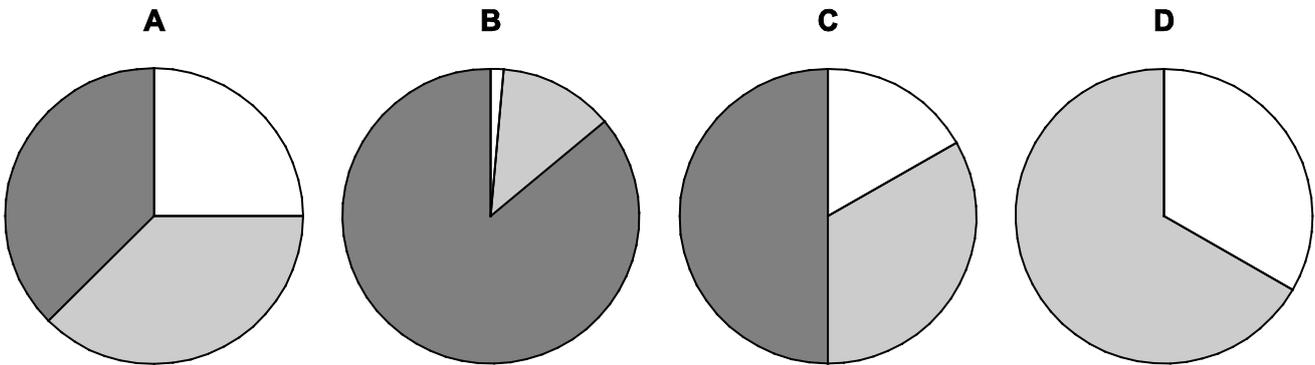
Jackson has been saving up and he intends to buy 12 video games. He will buy all the video games from the same retailer.

Which retailer should Jackson choose for the cheapest possible cost?

- A** Cheap Videos
- B** Dollarland
- C** Fun City
- D** Games4all

- 6 In a class of 21 pupils, each pupil chose one favourite subject out of science, history and geography.

Which one of these pie charts, suitably labelled, could represent the results?



- 7 In the year when Charlotte was born there were 5 Mondays in July. There are 31 days in the month of July.

Which one of the following must have been true in the year when Charlotte was born?

- A There were exactly 4 Saturdays in July
- B There were 5 Tuesdays in July
- C 2nd July was not a Wednesday
- D 3rd August was not a Saturday
- 8 The Codray Swimming Club has its own pool, for use by members only. The club has 400 members.

A survey was carried out last week of how frequently members used the pool. The results were as follows:

<i>Age group</i>	<i>Number of members who used the pool last week:</i>			
	<i>Never</i>	<i>Once</i>	<i>Twice</i>	<i>More than twice</i>
Under 25	8	15	54	23
25 – 39	15	42	61	32
40 – 64	21	35	24	10
65+	14	26	15	5

What percentage of the members under 40 used the pool more than once last week?

- A 46%
- B 56%
- C 62%
- D 68%

- 9 Fred went to a carpet shop and bought two carpets for \$299 each and underlay for \$140. He paid $\frac{1}{6}$ of the total cost when he bought them and the rest in 12 equal monthly instalments.

How much did he pay each month?

- A \$10.25
- B \$30.49
- C \$51.25
- D \$61.50

- 10 Septimus has a seven-sided coin.



He turns it over from right to left in front of him, rotates it $\frac{3}{7}$ turn clockwise, turns it over again in the same way, and then turns $\frac{1}{7}$ anticlockwise.

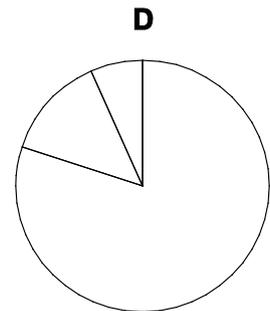
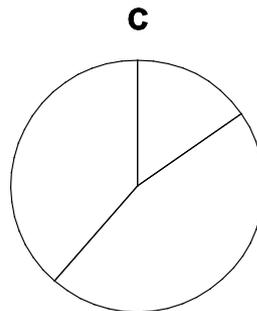
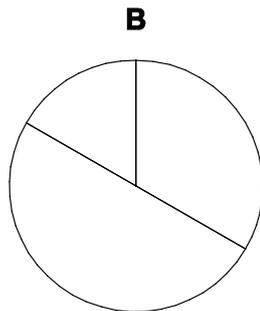
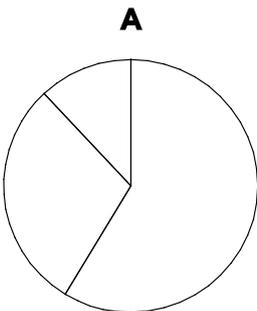
This is the same as a clockwise turn by which of the following?

- A $\frac{2}{7}$
- B $\frac{3}{7}$
- C $\frac{4}{7}$
- D $\frac{5}{7}$

- 11 A Jeweller creates the following record of his stock while auditing his safe one day.

<i>Items of</i>	Silver	Gold	Platinum
<i>Total weight</i>	5000g	2500g	1000g
<i>Value per gram</i>	\$10	\$30	\$25

Which of the following charts represents the value of each of the materials?



- 12 Mr and Mrs Black want to stay at the Hotel Costa for 7 nights in July, on half board with a full sea view room.

HOTEL COSTA

Hotel prices are in dollars per person.

	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>
7 nights	399	419	449	479	499	519	479	449	399
14 nights	739	799	869	899	939	999	899	869	739

Supplements per person per night in dollars.

	<i>Low Season</i>	<i>Medium Season</i>	<i>High Season</i>
Half board	15	20	25
Full board	25	30	35

Supplement per room per night in dollars

Side sea view	15
Full sea view	30

<i>Low Season</i>	<i>Medium Season</i>	<i>High Season</i>
March, April, November	May, June, September, October	July, August

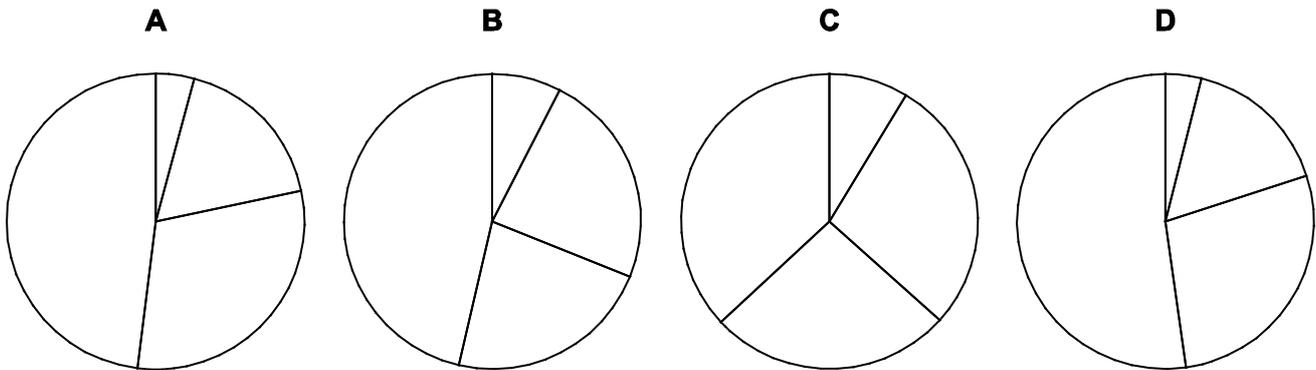
How much will their stay at the hotel cost?

- A \$1383
- B \$1453
- C \$1558
- D \$1768

- 13 Liam works for Cars2Go, selling cars. He was given a target of selling 160 silver cars during the first four months of 2014. The following table shows the running total of the number of silver cars that he had sold by the end of each month.

Month	January	February	March	April
Total number of silver cars sold since January 1st	12	50	86	136

Which one of the following pie charts, suitably labelled, could represent the number of silver cars that Liam sold each month?



- 14 Clare has invented a new way of judging cats. She awards each cat a score for each property. The scores can be positive, negative or zero. Each cat's average score must be zero and the average score for each property must be zero.

	Gladys	Hamish	Poppy	Thunder
Friendliness		3		-4
Beauty			0	
Cuddliness		1		
Furriness	2		-3	

How many more scores does Clare need to give before someone else would be able to work out all the scores?

- A** 3
B 4
C 9
D 10

- 15** Meg and Dave are a married couple. On Saturday afternoons, Meg goes to orchestra practice while Dave stays at home. He watches television and then prepares and cooks dinner for them both. The practice begins at 14:00 and lasts at least 4 hours, but no more than 4 hours 30 minutes. Meg's drive home takes between 30 minutes and 45 minutes, depending on the traffic.

Today Dave is cooking a meal that will take him 25 minutes to prepare, followed immediately by 50 minutes cooking time. The meal will be spoilt if they do not start eating it within 15 minutes of cooking being complete.

What is the earliest time that Dave can begin preparing the meal so as to be certain that Meg will be home in time to eat it?

- A** 17:00
- B** 17:45
- C** 18:00
- D** 18:15

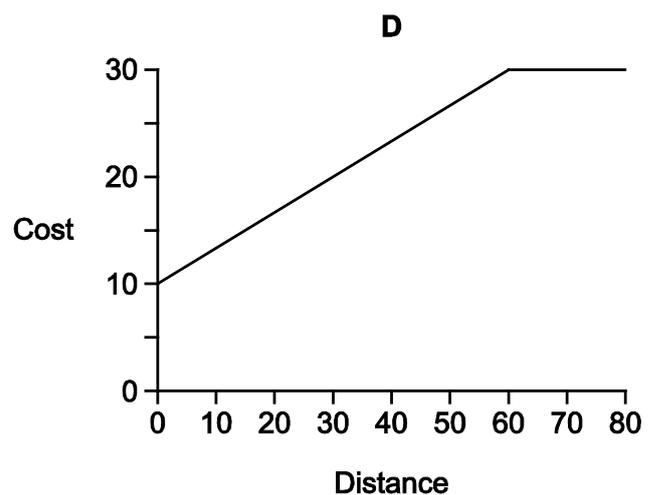
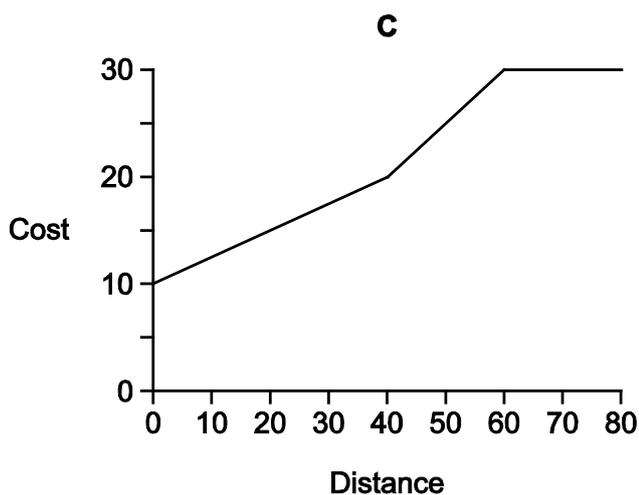
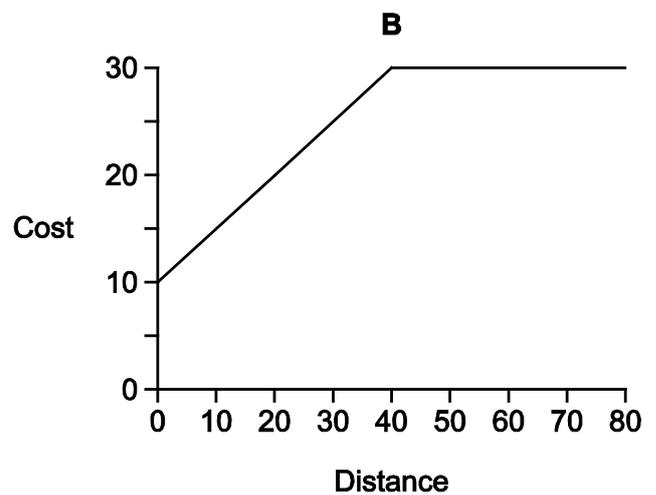
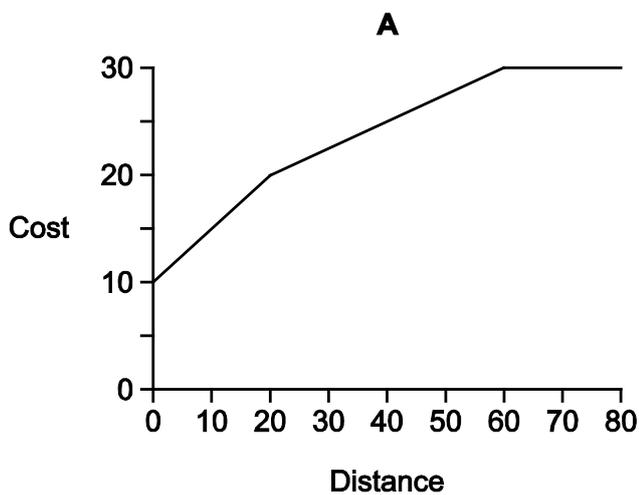
- 16** Fred does not drive and so he regularly uses taxis. There are three local taxi firms – Quickhops, Big Green Taxis and Simply Cars. For each journey, Fred always chooses the firm that will cost him the least.

Quickhops charges \$10 per journey, plus \$0.50 for every kilometre.

Big Green Taxis charges \$20 for a journey up to 20 km, then an additional \$0.25 for each further kilometre.

Simply Cars charges \$30 per journey, regardless of the distance.

Which of the following graphs represents the amount that Fred pays for taxi journeys over different distances?



- 17** Two containers of equal volume are each filled with a mixture of juice and water.
The ratio of juice to water in the first container is 2 juice : 3 water.
The ratio in the second container is 9 juice : 1 water.
The contents of the two containers are combined in a larger container which was previously empty.

What is the ratio of juice to water in the larger container?

- A** 13 : 7
- B** 11 : 4
- C** 3 : 1
- D** 6 : 1

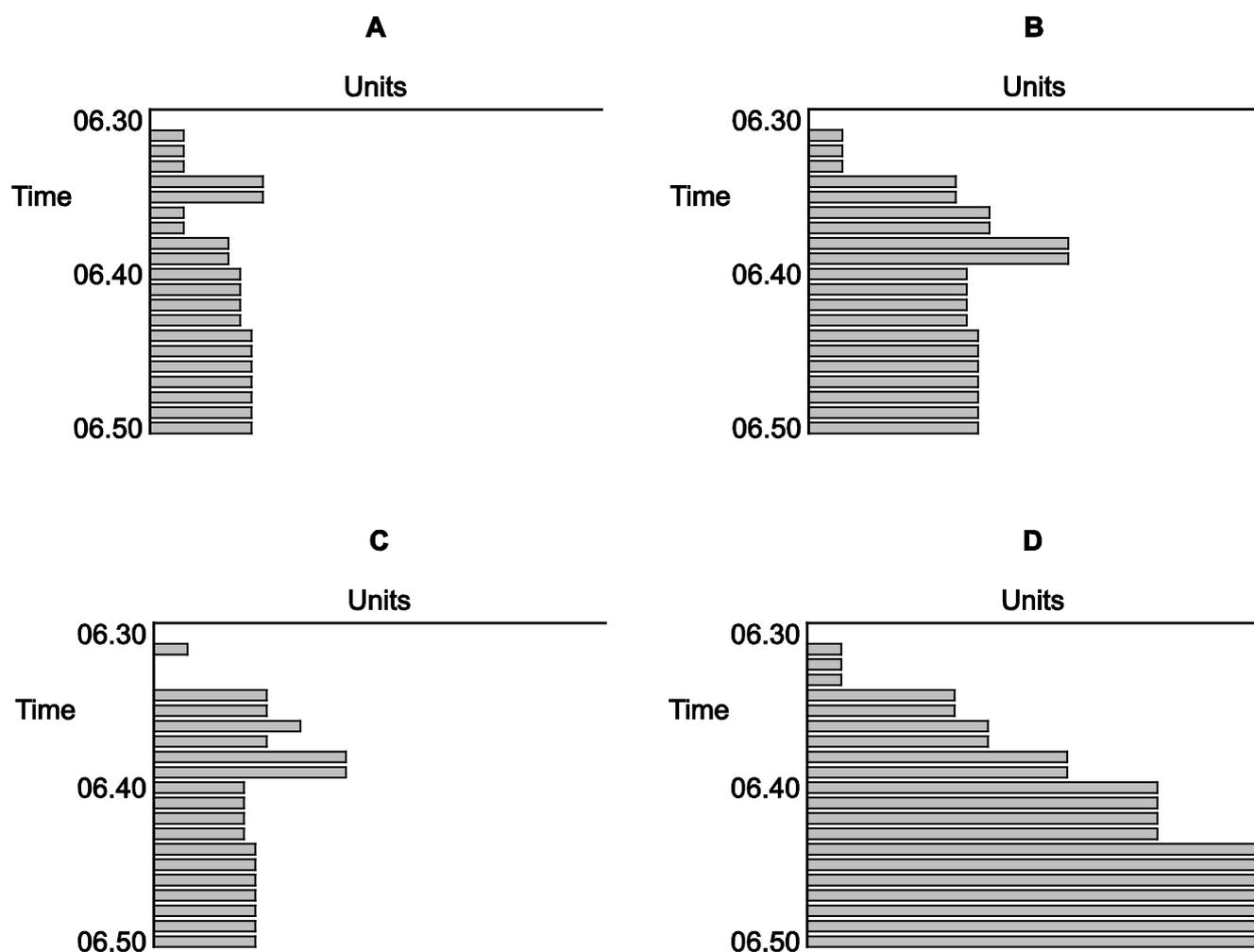
- 18 Some homes have been fitted with ‘smart’ energy display devices which allow householders to monitor energy usage.

The table below shows the energy consumption of various electrical devices in John’s house.

<i>Device</i>	<i>Units per minute</i>
Kettle	7
Microwave	8
Room light	3
Shower	10
Television	9

Waking at 06:30, John switches the bedroom light on at 06:31. His wife switches on the shower at 06:34 and it remains on for 6 minutes. John switches on the kitchen light at 06:36. At 06:38 the kettle is switched on for 2 minutes. The microwave heats up the porridge for 4 minutes from 06:40 and the television is switched on at 06:44.

Which of the displays below best represents the energy consumption over this period?



- 19** Yvonne needs to book an appointment to see the doctor this week. She works every day from Monday to Friday from 9 am until 6 pm, apart from Wednesday when she finishes work at 3 pm. She is able to take a one-hour lunch break each day, but it must not start before 11.30 am or finish after 2 pm. It takes Yvonne 10 minutes to travel between her work and the doctor's surgery.

Yvonne wants to book the appointment to keep the amount of time that she is away from work when she should be working as small as possible. She has been offered one of four possible appointment times. They are: Tuesday at 2.10 pm; Wednesday at 11.10 am or 1.40 pm; or Thursday at 3 pm. The appointment will last for 30 minutes.

Which of the appointments should Yvonne choose?

- A** Tuesday 2.10 pm
 - B** Wednesday 11.10 am
 - C** Wednesday 1.40 pm
 - D** Thursday 3 pm
- 20** Lin is going on a long-distance flight from Afar to Calo. The flight stops at Biffa on the route, and she transfers to an aeroplane for the rest of the trip to Calo that flies at a lower average speed than the one from Afar to Biffa. Lin has her schedule which details the departure time from Afar, the arrival and departure times for Biffa, and the arrival time at Calo. All these times are local times. Lin knows that the times in Biffa and Calo are ahead of the time in Afar, with Calo's time being twice as far ahead as Biffa's.

Which of the following would enable Lin to calculate how many hours Calo's local time is ahead of Afar's?

- A** The average speed between Afar and Biffa, and the average speed between Biffa and Calo
- B** The flight distance between Afar and Biffa, and the flight distance between Biffa and Calo
- C** The flight distance between Afar and Biffa, and the average speed between Biffa and Calo
- D** The average speed between Biffa and Calo, and the flight distance between Biffa and Calo

- 21** A game is played with a set of 40 cards numbered 1–10 in each of the colours red, blue, green and yellow. Points are scored for the following combinations:

Two cards of the same number: 2 points
Run of three consecutive numbers: 3 points
Two or more cards totalling twelve: 2 points

The colour of the card is irrelevant and cards may be used multiple times in scoring points.

Kascper has the red 5, the blue 5, the green 6 and the blue 6. He will take one more card before finding his score.

Which of the following cards will give him the greatest score?

- A** Yellow 4
 - B** Yellow 5
 - C** Yellow 6
 - D** Yellow 7
- 22** Bill regularly travels from his home just outside Kimster to visit his father Charlie in Manter. To get there, he has to catch a bus to Kimster station, then a train to Manter station, and finally walk to Charlie's house.

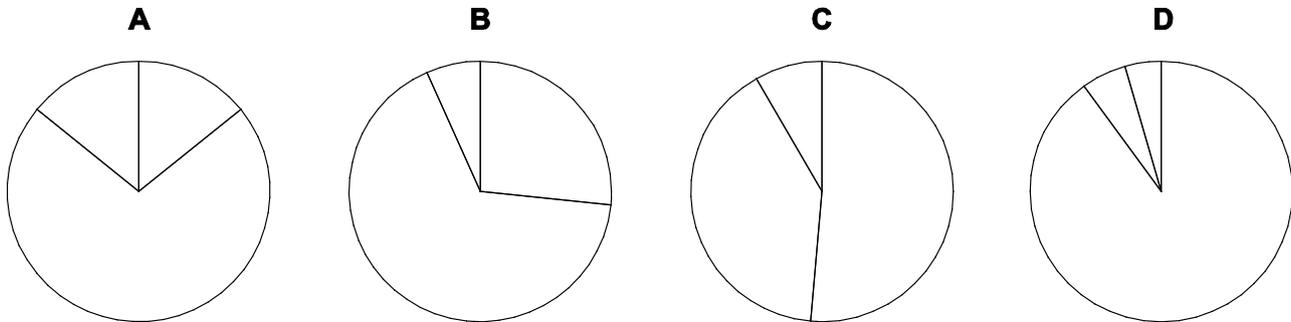
Buses leave from the bus stop outside Bill's home on the hour and at 15, 30 and 45 minutes past each hour. The journey time to the station is between 15 and 20 minutes. Fast trains leave Kimster station on the hour and at 30 minutes past each hour and take between 35 and 45 minutes to reach Manter station. Slow trains leave at 40 minutes past each hour and take an hour for the same journey. The walk from Manter station to Charlie's house takes between 15 and 20 minutes. Bill wants to meet Charlie by 11:00 at the latest.

What is the latest bus that Bill can catch from outside his home?

- A** 09:00
- B** 09:15
- C** 09:30
- D** 09:45

- 23** A decorative table top is covered in tiles of three different sizes: small, medium and large. The masses of individual tiles of each size are 0.05 kg, 0.1 kg and 0.2 kg respectively. The ratio of the number of small tiles to the number of medium tiles is 2 : 5 and there are 10 times as many medium tiles as large tiles.

Which one of the following pie charts could represent the total mass of each type of tile on the table top?



- 24** Jacques left Sachin's house yesterday, walking homewards at 6 kilometres per hour. After 19 minutes, he realised that he had left his mobile phone behind. Immediately, he turned round to walk back, stepping up his pace to 9 kilometres per hour, unaware that Sachin had already been running at 15 kilometres per hour for 2 minutes, trying to catch him up. They continued at 9 kilometres per hour and 15 kilometres per hour respectively until they encountered each other.

How far from Sachin's house did they encounter each other?

- A** 1025 metres
B 1200 metres
C 1375 metres
D 1500 metres

- 25 In the team sport of *Addon*, 7 points are awarded for a goal. Whenever a goal is scored, the captain of the team that has scored has to decide whether or not to attempt to score an *addon*. If an *addon* attempt is successful an extra 3 points are awarded; if an *addon* attempt is unsuccessful, 2 points are deducted.

Four matches were played last night in the National Addon League. According to one newspaper this morning, the results were as follows:

Comets	26	Scorpions	38
Eagles	33	Bulls	29
Panthers	41	Giants	23
Rockets	46	Dragons	19

The published result of which one of last night's matches cannot be correct?

- A Comets v Scorpions
 - B Eagles v Bulls
 - C Panthers v Giants
 - D Rockets v Dragons
- 26 When asked for \$3.53 at a shop yesterday, I pulled the loose change out of my pocket to discover that I had the following coins:

2 × \$1
 3 × 50¢
 4 × 20¢
 3 × 10¢
 2 × 5¢
 1 × 2¢
 5 × 1¢

I decided to pay the exact amount from this loose change, using as many coins as possible, to lighten the load in my pocket.

How many coins did I have left after I had paid for my purchases?

- A 4
- B 5
- C 6
- D 8

- 27 In a college there are 150 students. 40 of the students study science, 50 of the students study geography and 65 of the students study history. 12 students study all three of these subjects.

What is the smallest possible number of students studying **none** of these three subjects?

- A 5
- B 7
- C 17
- D 19

- 28 In a galaxy quite far away there live people who do not use numbers to display the time – they use letters instead. They have a 60-minute hour and a 24-hour day, just like us.

They use the letters *a* to *l* to represent the numbers 1 to 12.

The time is displayed using two 3-letter combinations: the first for the hours and the second for the minutes.

Each 3-letter combination must be in alphabetical order.

The hours or minutes are found by multiplying the values of their three letters together.

For example, 08:55 might be written as *aah:ae* or *bbb:ae*.

There are obvious limitations to this system, such as the inability to express 17 minutes past any hour. However, it is the preferred method of telling the time.

How many different ways of writing 12:24 are there in this system?

- A 2
- B 20
- C 486
- D 720

- 29 Cyril has to fill some 30-litre tanks with a certain liquid using four sources that are close together. The rate of flow of liquid in litres per minute from each source is shown in the table below.

	Source 1	Source 2	Source 3	Source 4
Rate of flow (litres/min)	12	8	6	4

Cyril has filled several tanks using all 4 sources simultaneously, when one of the sources dries up. Using the remaining 3 sources, it now takes 15 seconds longer to fill each tank.

Which source drying up would explain this?

- A Source 1
- B Source 2
- C Source 3
- D Source 4

- 30** Northbit and Southpart are villages on opposite banks of the River Tween. Every year teams from both villages take part in a tug-of-war across the river, until the losing team is pulled into the water.

25 years ago, Southpart had won exactly $\frac{3}{4}$ of the contests. However, following 16 wins in the last 25 years, Northbit have now increased their success rate to 40%.

How many times have Northbit won the tug-of-war against Southpart?

- A** 26
- B** 39
- C** 50
- D** 65

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.