

**UNIT 11****Questions 23 – 26**

In this unit, a *palindrome* is a number that is the same whether it is read from left to right or right to left. For example, the number **1438341** is a palindrome but the number **13481314** is not.

For any number, if the sum of its odd-numbered digits (1st + 3rd + 5th, etc.) equals the sum of its even-numbered digits (2nd + 4th + 6th, etc.), it is divisible by 11. This is called the *odd-even rule*. For example, the number 12067 is divisible by 11 because  $1 + 0 + 7 = 2 + 6$ .

**Question 23**

Consider the following three numbers: **135797531**, **1357913579** and **1357997531**.

Which of the three numbers is a palindrome?

- A All three numbers are palindromes.
- B The first two numbers are palindromes and the third one is not.
- C The last two numbers are palindromes and the first one is not.
- D The first and last numbers are palindromes and the middle one is not.

**Question 24**

According to the odd-even rule, which one of the following numbers is divisible by 11?

- A **1257352**
- B **2584053**
- C **3695241**
- D **5193286**

**Question 25**

According to the odd-even rule, which one of the following palindromes is divisible by 11?

- A **173282371**
- B **398565893**
- C **446676644**
- D **504818405**

**Question 26**

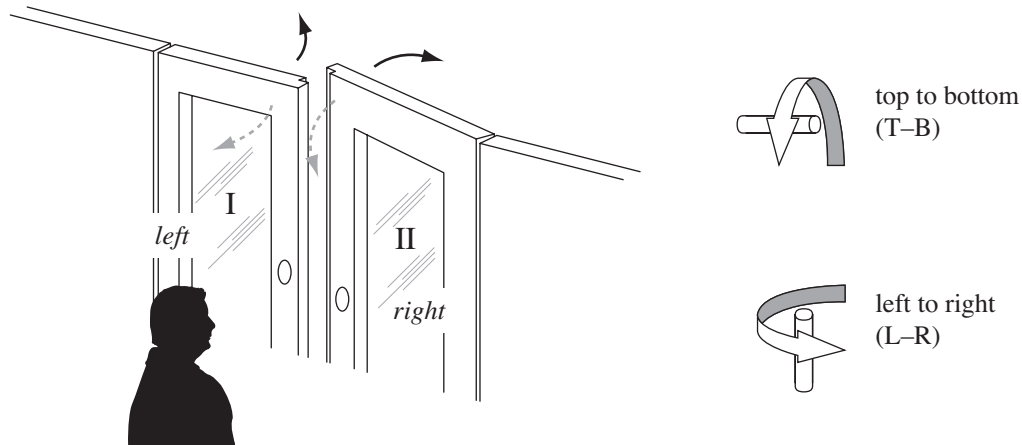
Which one of the following statements is correct?

- A All numbers that are palindromes are divisible by 11.
- B All palindromes that have an even number of digits are divisible by 11.
- C Only palindromes that have an odd number of digits are divisible by 11.
- D Only some palindromes that have an even number of digits are divisible by 11.

## UNIT 12

### Question 27

Two doors in a shop (shown in Figure 1) open outwards, or away from the viewer (solid arrows). Because of the way the cut-out sections of the doors overlap, Door II has to open first.



**Figure 1**

The owner of the shop wants the doors to open inwards, towards the viewer (dashed arrows), and is considering how to change them, but still use the same doors. Two possible changes are to:

- (i) turn each door around a horizontal axis so that the top goes to the bottom (T-B); or
- (ii) turn each door around a vertical axis, so that the left side of each door goes to the right (L-R) — this requires that Door I will become the right door and Door II will become the left door.

Suppose that the owner wants the doors to open inwards (dashed arrows), with Door II still opening first and to the viewer's right.

Which of the following possible changes will produce this result?

- A T-B only
- B L-R only
- C T-B and L-R together
- D neither T-B nor L-R

## UNIT 13

### Questions 28 – 30

#### In the Night

Out of my window late at night I gape  
 And see the stars but do not watch them really,  
 And hear the trains but do not listen clearly;  
 Inside my mind I turn about to keep  
 Myself awake, yet am not there entirely. 5  
 Something of me is out in the dark landscape.

How much am I then what I think, how much what I feel?  
 How much the eye that seems to keep stars straight?  
 Do I control what I can contemplate  
 Or is it my vision that's amenable?<sup>1</sup> 10  
 I turn in my mind, my mind is a room whose wall  
 I can see the top of but never completely scale.

All that I love is like the night, outside,  
 Good to be gazed at, looking as if it could  
 With a simple gesture be brought inside my head 15  
 Or in my heart. But my thoughts about it divide  
 Me from my object. Now deep in my bed  
 I turn and the world turns on the other side.

*Elizabeth Jennings*

<sup>1</sup> amenable: easily commanded or told what to do.

#### Question 28

Which of the following phrases best describes the poem as a whole?

- A an attempt to remain calm
- B a vivid treatment of the misery of sleeplessness
- C a growing fear that the world is without meaning
- D an attempt to understand the self in relation to the world

#### Question 29

The poem suggests that the speaker is

- A afraid of going mad.
- B worried about a personal problem.
- C grappling with an unanswerable question.
- D on the verge of a life-changing realisation.

#### Question 30

The speaker's regret is that

- A her emotions have been blunted.
- B the world will continue on without her.
- C she feels detached from what is dear to her.
- D she will never know if she has been forgiven.

## UNIT 14

### Questions 31 – 34

*The following passage is from a book on the development of products used in the modern world. It outlines the introduction of elevators in the United States.*

The elevator, or lift, is one of those inventions whose ‘ripple effect’<sup>1</sup> is often overlooked. Just think of the practicality of any building over eight or ten stories without an elevator. Then imagine a modern city without buildings over ten stories! Along with structural steel and reinforced concrete, the elevator was essential to the development of the modern skyscraper and thus to the common form of the modern urban centre.

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The elevator’s practical impact was almost matched by its symbolic impact. The 1880s were years of immense urban growth, and the influx of newcomers to the cities included middle-class career people as well as factory workers. With property values skyrocketing in the cities, the middle-class families could not afford single family homes. Apartment building owners promoted apartment living with advertisements of ‘high-tech’ amenities: hot and cold running water, telephone systems, central gas for cooking and lighting, fully equipped bathrooms and elevators.

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Moreover, with all of these modern conveniences, apartment living captured the middle-class imagination as the embodiment of a new organisation of domestic duties. Buildings came with centralised heating, ventilating and plumbing systems; some had kitchens in the basement which would prepare food for individual apartment dwellers; some even had a centralised vacuum system with nozzles in each room connected to a pump in the basement.

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The elevator was even extolled as a contributor to democracy. In an elevator-equipped building, it made little difference which floor one lived on; every floor was equally accessible. By contrast, in Europe, wealthy families were generally found on the middle floors where they did not have to climb many flights. Poorer families were usually confined to the basement or the upper floors.

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<sup>1</sup> ripple effect: the effect of spreading out like ripples on a pond

### Question 31

What does the passage say about the introduction of elevators in buildings?

- A Its effects were more symbolic than practical.
- B It had consequences outside its original purpose.
- C It increased the divisions between the social classes.
- D It brought about changes that were dramatic but short-lived.

**Question 32**

According to the passage, the elevator was seen as a contributor to democracy.

To which of the following possible characteristics of democratic society does this refer?

- A abolition of social class
- B equality in the eyes of the law
- C universal access to decent housing
- D absence of segregation according to wealth

**Question 33**

What does the last paragraph imply about conditions in Europe in the 1880s, compared with the United States?

- A Lifts remained rare.
- B Wealth was less evenly distributed.
- C People were not interested in democracy.
- D There were more restrictions on wealthy people.

**Question 34**

The passage suggests that the lift contributed to democracy because poorer families were no longer confined to certain floors (lines 19–23).

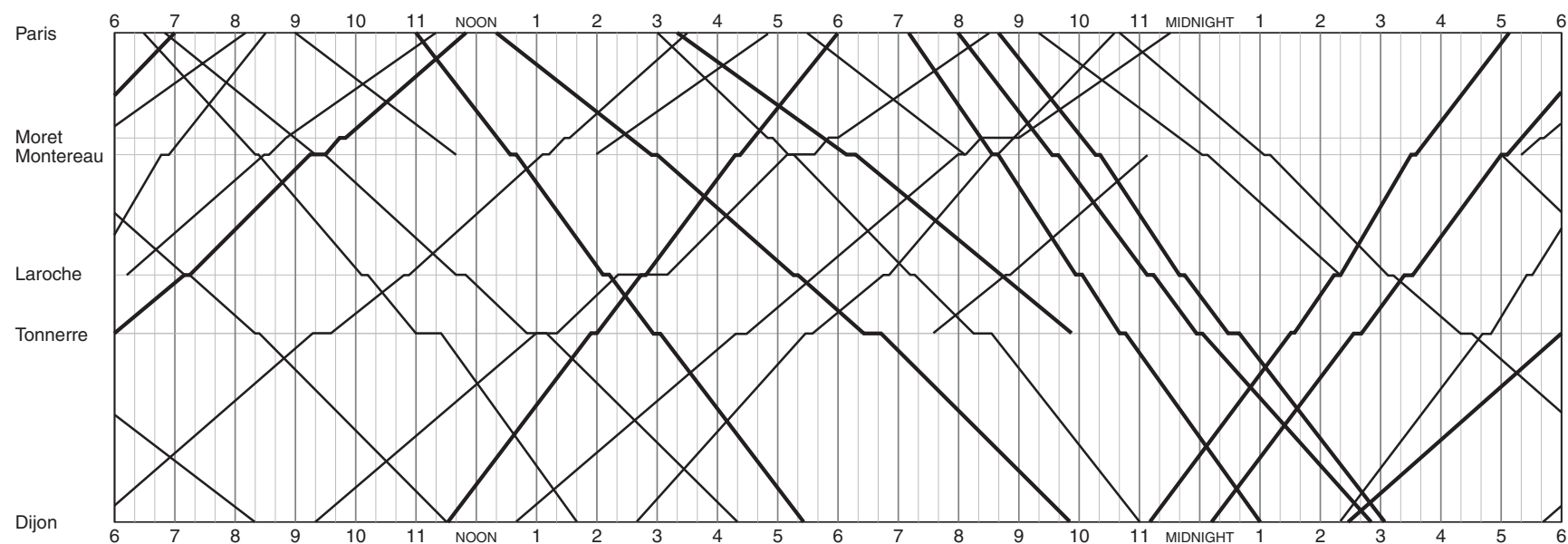
Which one of the following comments offers the strongest argument against this idea?

- A Not every building was necessarily equipped with a lift.
- B Not every poorer family would have preferred to live on the middle floors.
- C The quality of housing and social segregation were not necessarily important issues for the people of the 1880s.
- D Location of families within the building need not have had much effect on the choices or social interactions of poorer families.

## UNIT 15

### Questions 35 – 38

The timetable below shows the schedule for trains on the Paris to Dijon line in the 1880s. The time scale is shown along the top and bottom of the timetable, and the distance between vertical lines represents 20 minutes. Stations are shown on the vertical axis, spaced approximately in proportion to the actual distance between the places they represent. Each diagonal line represents one train.



**Question 35**

How many trains were scheduled to leave Dijon for Paris between 9 p.m. and 1 a.m.?

- |            |            |
|------------|------------|
| <b>A</b> 1 | <b>C</b> 3 |
| <b>B</b> 2 | <b>D</b> 4 |

**Question 36**

The longest time between departures from Dijon is about

- |                     |                     |
|---------------------|---------------------|
| <b>A</b> 4 ½ hours. | <b>C</b> 7 hours.   |
| <b>B</b> 6 hours.   | <b>D</b> 8 ½ hours. |

**Question 37**

The latest night train leaving Paris would finish its journey at

- |                    |                    |
|--------------------|--------------------|
| <b>A</b> 6 a.m.    | <b>C</b> 2.40 p.m. |
| <b>B</b> 8.20 a.m. | <b>D</b> 4.20 p.m. |

**Question 38**

Faster trains are represented by lines that are

- |                   |                      |
|-------------------|----------------------|
| <b>A</b> thicker. | <b>C</b> steeper.    |
| <b>B</b> thinner. | <b>D</b> less steep. |

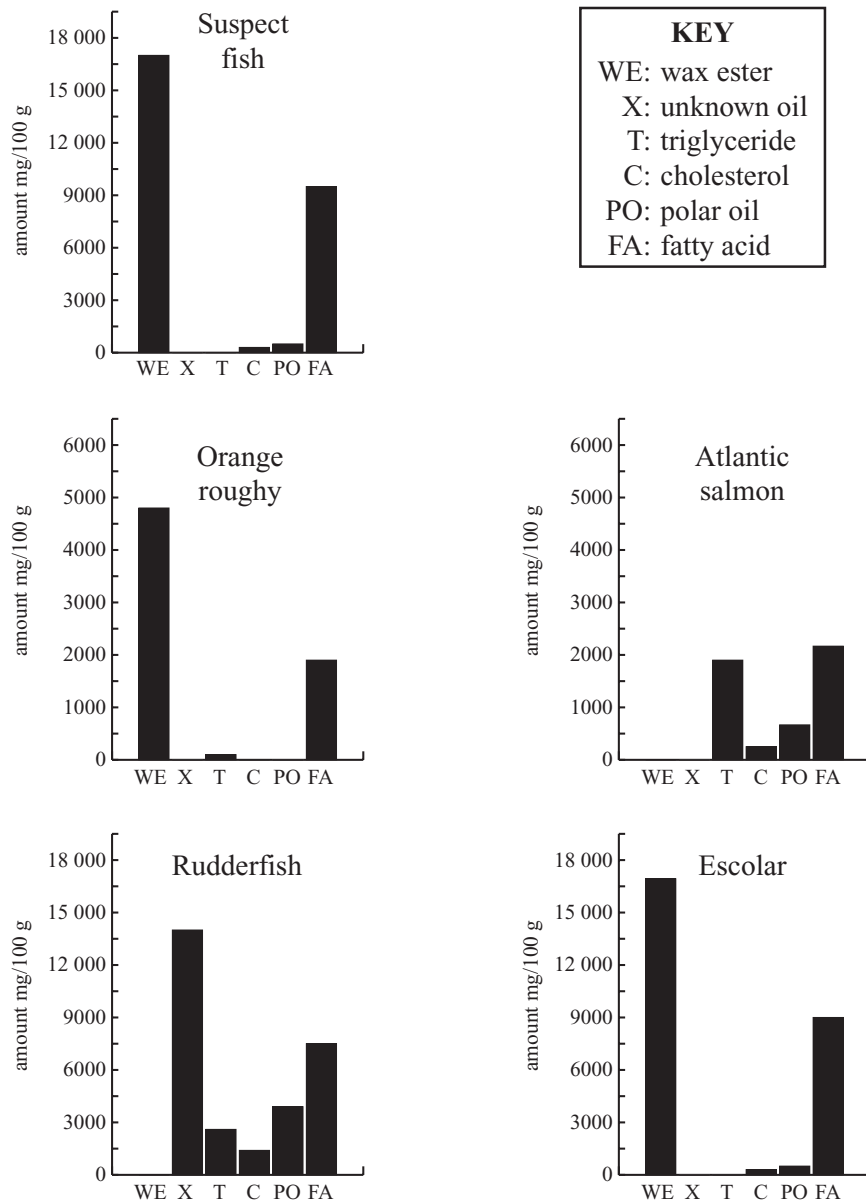
## UNIT 16

### Questions 39 – 42

Following reports of stomach problems linked to eating fish sold (incorrectly) as *rudderfish*, an investigation was made using fillets\* of the suspect fish. Genuine rudderfish does not cause a stomach reaction.

The oil content of the suspect fillets was investigated in a search for the cause of the reaction. Some fish contain unusual oils that can be indigestible, and might cause a reaction. Figure 1 shows oil profiles for equal-sized pieces of five different fish — the suspect fish, *rudderfish*, *escolar*, *orange roughy* and *Atlantic salmon*. Each column in an oil profile of a fish represents a different oil component. The observed oil components were wax ester (WE), triglyceride (T), cholesterol (C), polar oil (PO), fatty acid (FA) and an oil (X) whose name was not known at the time of analysis.

\* For this unit, a fish fillet is a piece of fish from which skin and bones have been removed.



**Figure 1: Oil profiles of ocean fish**



**Question 39**

According to the information in Figure 1, escolar and rudderfish both contain

- A** C, PO and FA.
- B** T, FA and PO.
- C** X, T and FA.
- D** WE, FA and T.

**Question 40**

The suspect fish is most likely to be

- A** Atlantic salmon.
- B** rudderfish.
- C** escolar.
- D** a fish with an oil profile different from **A**, **B** or **C**.

**Question 41**

If the suspect fish caused the reaction, which one of the following best accounts for this observation?

- A** Orange roughy contains WE.
- B** Atlantic salmon does not contain X or WE.
- C** Neither orange roughy nor escolar contains X.
- D** Escolar contains a very high amount of WE per 100 g.

**Question 42**

In an experiment, rats and human volunteers were fed bread soaked in one or more of the oils.

If the mass of the bread is the same as the fillets of fish, which one of the following is likely to be most useful in confirming that the suspect fish could have caused the reaction?

- A** Feeding rats bread soaked in WE at a concentration of 20 000 mg/100 g.
- B** Feeding rats bread soaked in a mixture of the six oils each at a concentration of 5000 mg/100 g.
- C** Feeding volunteers bread soaked in FA at a concentration of 5000 mg/100 g.
- D** Feeding volunteers bread soaked in WE at a concentration of 20 000 mg/100 g.

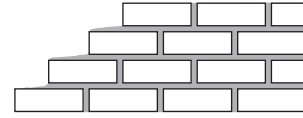
## UNIT 17

### Questions 43 and 44

Mortar is a mixture of sand, cement and lime. It is used to bind bricks together when making a wall.

A general-purpose mortar mix consists of 6 parts sand to 1 part cement to 1 part lime (by volume). Water is added to the ingredients, and thorough mixing is carried out.

The amount of mortar ingredients needed to make a wall can be estimated as follows:



- **Amount of Sand:**  $\frac{\text{number of bricks} \times 0.5}{1000}$  cubic metres of sand
- **Amount of Cement:**  $\frac{\text{sand quantity (cubic metres)} \times 40}{6}$  bags of cement
- **Amount of Lime:**  $\frac{\text{sand quantity (cubic metres)} \times 25}{6}$  bags of lime

### Question 43

A wall requires 1 cubic metre of sand for its mortar.

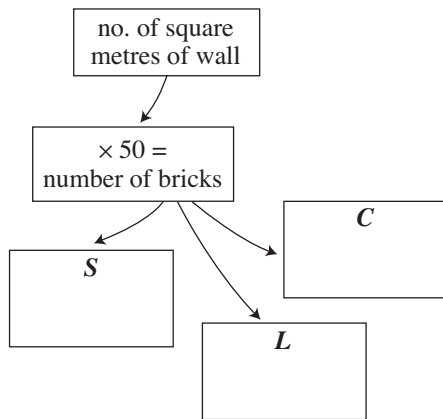
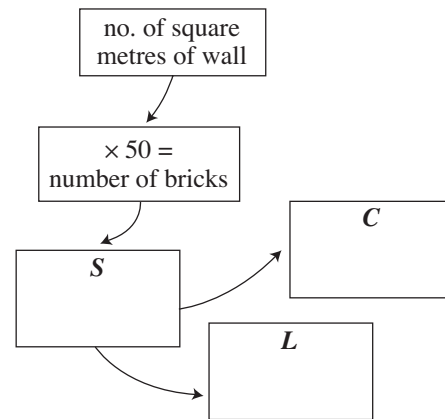
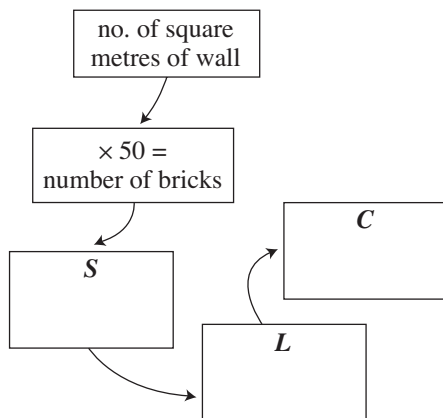
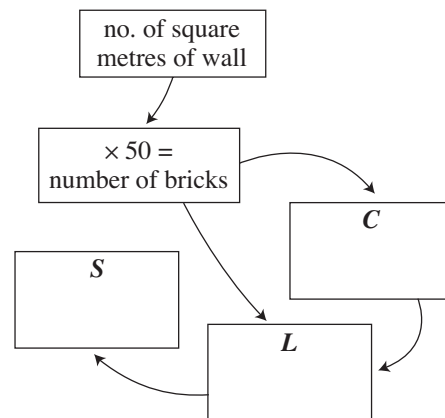
Given that whole bags must be provided, how many bags of cement will be needed?

- A six
- B seven
- C eight
- D more than eight

**Question 44**

Bob the builder tries to make a flow chart for an apprentice to show the relationships that apply when calculating the various quantities of mortar ingredients from the number of square metres of wall (where one square metre requires 50 bricks).

Which one of these flow charts best represents the relationships when  $S$  is the amount of sand in cubic metres,  $L$  is the number of bags of lime and  $C$  is the number of bags of cement?

**A****C****B****D**

**UNIT 18****Questions 45 – 47**

*The following is an anecdote recounted in a biography of Lord Melbourne (1779–1848).*

Lord John Russell described to a friend how at a party he had left the Duchess of Inverness to talk to the Duchess of Sutherland, because she was sitting farther from the fire which he found too hot.

‘I hope you told the Duchess of Inverness why you left her,’ said the friend.

‘No,’ said Lord John Russell after a pause. ‘But I did tell the Duchess of Sutherland.’

**Question 45**

Lord John Russell’s revelation to the Duchess of Sutherland is best described as

- A honest but foolish.
- B witty and charming.
- C courteous but insincere.
- D formal and conventional.

**Question 46**

Lord John Russell’s actions would most likely have

- A flattered both Duchesses.
- B flattered the Duchess of Inverness and offended the Duchess of Sutherland.
- C offended both Duchesses.
- D offended the Duchess of Inverness and flattered the Duchess of Sutherland.

**Question 47**

In offering his final comment to his friend, Lord John Russell would have sounded

- A defiant.
- B guarded.
- C untroubled.
- D embarrassed.