KINGDOM OF BAHRAIN

مملكة البحرين

EDUCATION & TRAINING QUALITY AUTHORITY

هيئة جودة التعليم والتدريب

Directorate of National Examinations

إدارة الامتحانات الوطنية

Grade 12 National Examinations

الامتحانات الوطنية للصف الثاني عشر

Mathematical Skills

امتحان المهارات الرياضية

Duration: 120 minutes

مدة الامتحان: ١٢٠ دقيقة

Read the following instructions:

Answer **all** the questions on the answer sheet.

Read the instructions on the answer sheet.

Use **pencil** only.

The use of dictionaries is NOT permitted during the exam.

You must complete the answer sheet within the time limit.

At the end of the test, hand in your answer sheet.

Additional materials: Ruler and eraser.

Students are permitted to use calculators.

This document consists of **32** printed pages

MS12/SY

1 Hussain is the owner of a restaurant. He needs a driver for home delivery service. He posted an advertisement in the newspaper that interested candidates should apply with the information of their age, experience and the number of accidents, if they had any. He will interview only those candidates who are under 40 years of age, have more than 3 years of experience and have fewer than 5 accidents.

The following are the details of applications received:

Name	Age	Years of experience	Number of accidents
Ali Abbas	32	5	4
Ahmed Salman	24	3	0
Mohammad Yusuf	26	2	6
Hamza Rashid	41	9	9
Basit Sharif	39	10	0
Khalid Jalal	37	7	3
Usman Tariq	45	10	5
Shahid Khan	36	4	6

How many candidates will **not** be short-listed for the interview?
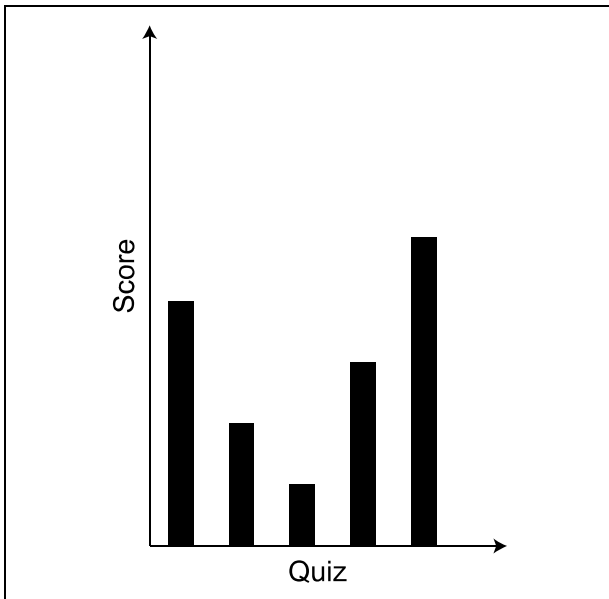
A 2

B 3

C 4

D 5

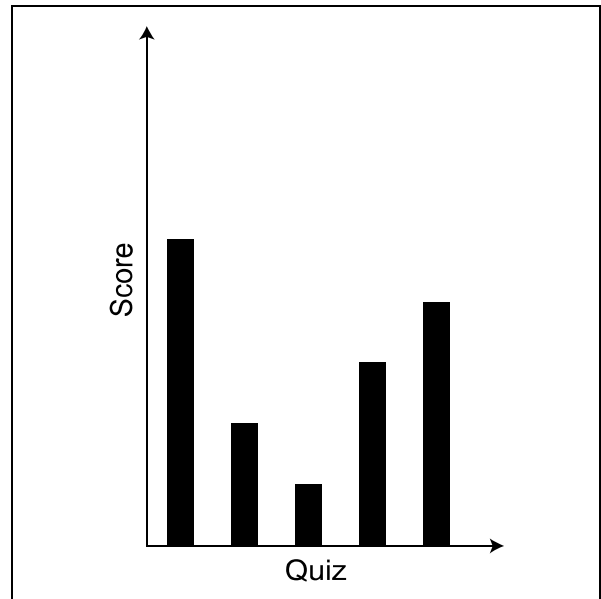**2**   The table below shows Mohammad's scores in five different quizzes in Arabic language subject.

Quiz	1st	2nd	3rd	4th	5th
Score	10	4	2	6	8

Which one of the following graphs could represent Mohammad's scores?
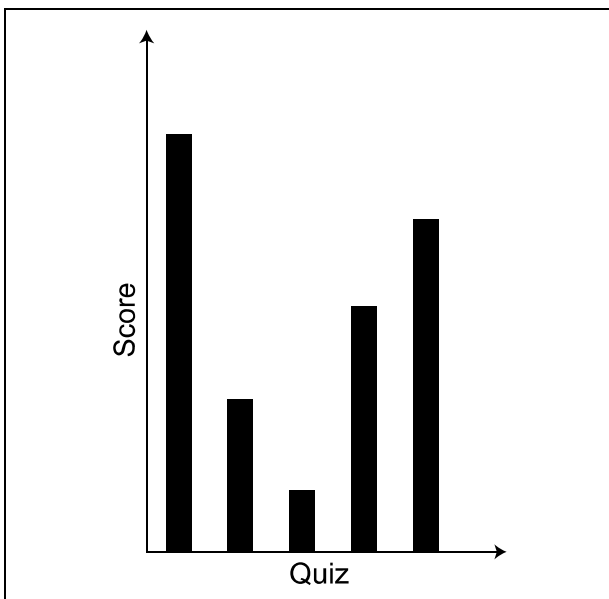
A

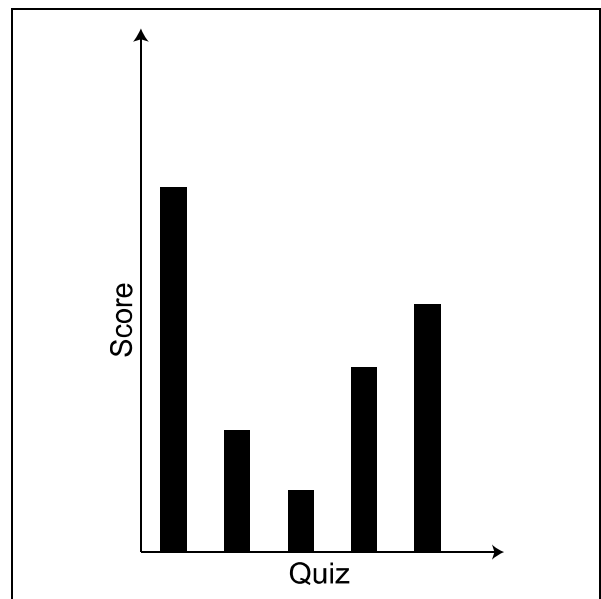
B

C

D

3 The following table shows the rates for shipping packages via express mail:

Express Mail Shipping		
Country	**Weight (kg)**	**Rate (BD)**
GCC countries	First 0.5 kg	4.5
	Every additional 0.5 kg	1
Other Arab countries	First 0.5 kg	5
	Every additional 0.5 kg	1
Europe – India – Sri Lanka – Pakistan – Southeast Asia	First 0.5 kg	5
	Every additional 0.5 kg	2
Canada – North America – South America	First 0.5 kg	7
	Every additional 0.5 kg	2

A person wants to send two packages: one weighing 2.5 kg, to Kuwait, and one weighing 3 kg, to India.

What will be the total cost for sending the two packages?

A BD 9.5

B BD 12.5

C BD 23.5

D BD 26.5

4 Ahmad noticed that his colleague, Rashid, is quick at typing numbers, so he asked him to type all the numbers from 1 to 100, inserting a space each time between the numbers. Rashid did it in less than a minute without making any mistakes.

How many times did Rashid press on the keyboard keys?

   **A** 192

    B 201

    C 287

    D 291

5 A wholesaler sells mineral water bottles which are packed in carton boxes of three sizes. Each box contains 4, 9 or 15 mineral water bottles; the wholesaler sells only full boxes.

Sarah will throw a graduation party where she will invite a group of family members and friends; she wants to buy exactly 50 mineral water bottles from the wholesaler.

What is the least number of boxes that Sarah needs to buy to cover the party she's having?

A   5

B   6

C   7

D   10

6
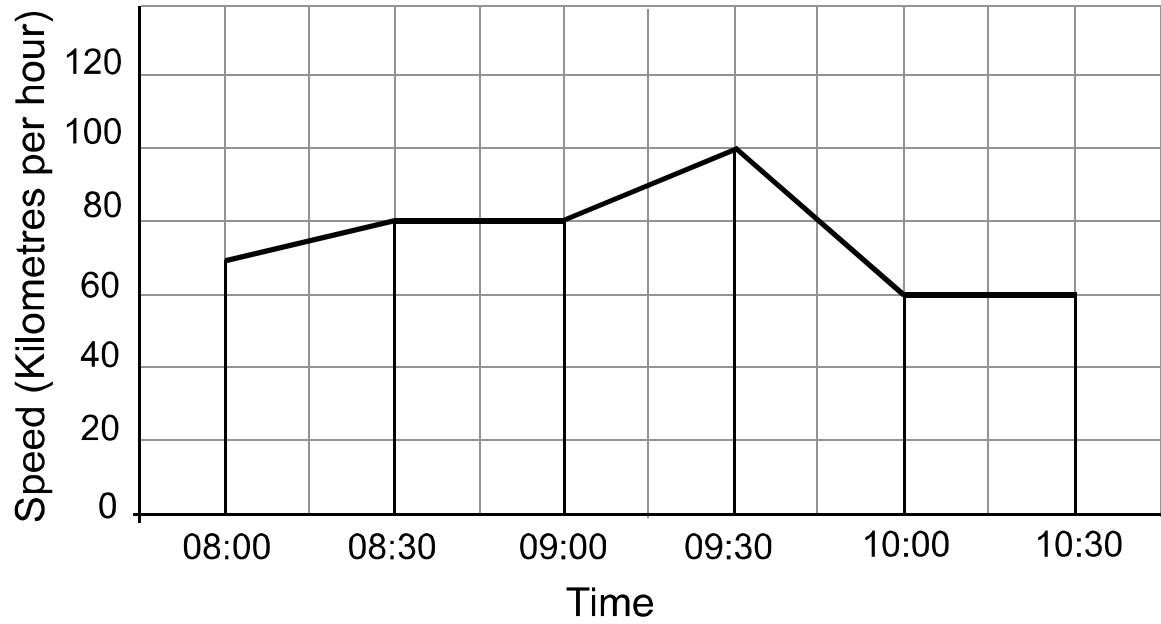
The graph above shows the speeds at which Mariam drove her car during a journey.

For what percentage of the time was Mariam driving at 80 kilometers per hour or faster during her journey?

A   20%

B   30%

C   40%

D   50%

7 Adam is staying in Kiel and wants to travel to Nurnberg for a business meeting. He searched on the website of the local train company and found four different routes that are suitable for his journey.

The chart below shows the distance in kilometres between the stations in the cities.

Kiel						
790	Halle					
880	667	Frankfurt				
975	653	382	Mannheim			
1045	819	348	280	Mainz		
1179	372	593	763	899	Bamberg	
1656	229	561	380	360	492	Nurnberg

Which of the following routes is the shortest for Adam to take?

A Route 1: Kiel → Bamberg → Nurnberg

B Route 2: Kiel → Frankfurt → Mannheim → Nurnberg

C Route 3: Kiel → Halle → Bamberg → Nurnberg

D Route 4: Kiel → Mannheim → Mainz → Nurnberg

8   A small ink cartridge has enough ink to print 600 pages. Three small cartridges can print as many pages as two medium cartridges, whereas five medium cartridges can print as many pages as three large cartridges.

How many pages can be printed by a large cartridge?

   A   1000

   B   1350

   C   1500

   D   3000

9 The figure below shows Osama's local skateboard track. On one occasion, just before setting off from the starting point, Osama dropped his skateboard and it went down the track without him. The points W, X, Y and Z represent the skateboard at different heights on the track.
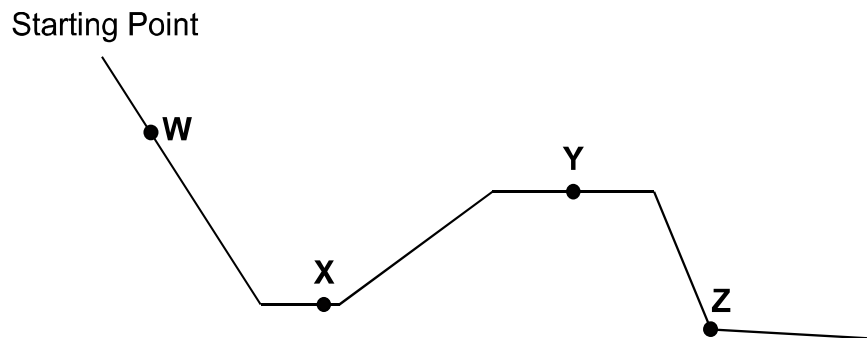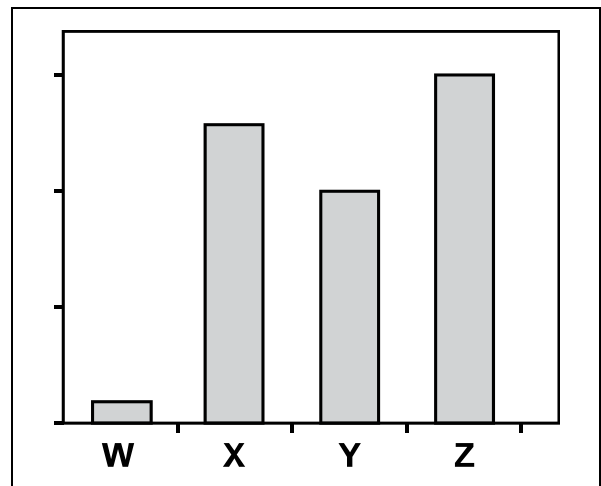

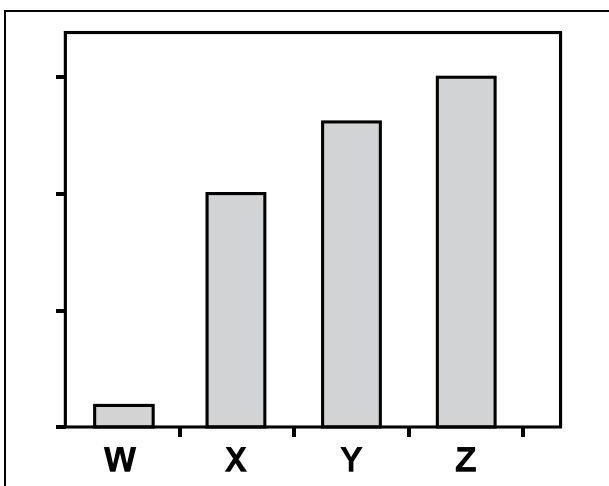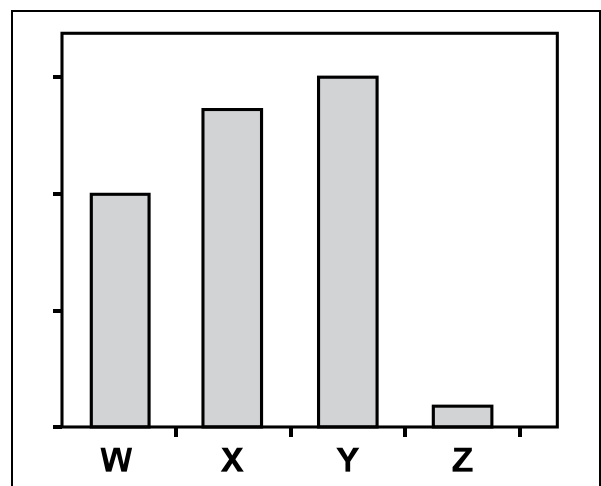Which of the following graphs represents the skateboard's speed at the different heights?

A
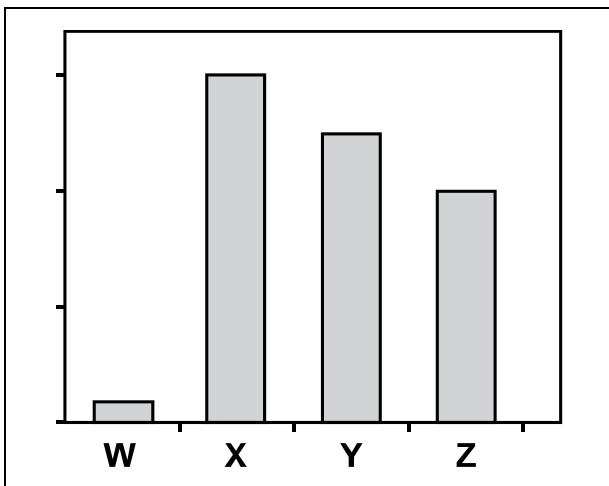
B

C

D

10 Mohammed visited four different banks: Glory, Elite, Port and Forefront to check the bank's annual interest on the amounts deposited by customers in deposit accounts. So, he obtained the following table:

Bank Name	Less than BD 2000	More than BD 2000
Glory	1.0 %	1.6 %
Elite	1.1 %	1.3 %
Port	1.2 %	1.5 %
Forefront	1.3 %	1.4 %

At the beginning of the first year, Mohammed decided to deposit an amount of BD 1500 in a deposit account with a specific bank, and to annually renew this deposit. He knows that he will be able to deposit an amount ranging between BD 2000 and BD 2200 at the beginning of the second year, which he will deposit in another account at the same bank.

At which bank will Mohammed deposit his money to get the highest interest after the end of the second year?

A Glory

B Elite

C Port

D Forefront

11   Sami works in a motor car showroom as a part time job, where he gets an incentive of BD 7 for a two-hour period of work per day. On days when he does not work, he goes out with his friends and spends out of his earnings from his work in the showroom an amount of BD 5.

What is the minimum number of hours that Sami worked to save exactly BD 50?

    A   10

    B   20

    C   25

    D   30

12 Manar plans to make sandwiches for a picnic. She has three types of bread (brown, multigrain, white), four types of meat (salami, bologna, turkey, pastrami) and three types of cheese (swiss, cheddar, mozzarella).

Manar will make each sandwich with one of the types of bread and one type of meat **or** one type of cheese **or** one type of meat and one type of cheese.

How many different kinds of sandwiches can Manar make?

   A   19

   B   22

   C   36

   D   57

13 A father asked his son to go to the fruit shop and gave him the following instructions:

- Buy 1 kg of apples – do not pay more than BD 1.000
- Buy 1 kg of oranges – get the best available
- Buy 1 kg of bananas – get the best available
- Buy 2 other fruits – 1 kg of each, but do not pay more than BD 1.000 combined

These are the prices offered by the fruit shop:

Fruit type	Price per Kilogram	
	The best brand (BD)	The normal brand (BD)
Banana	0.600	0.400
Grapes	2.400	2.000
Melon	1.800	1.400
Orange	0.650	0.450
Mango	0.500	-
Apricot	1.150	0.750
Tomato	0.750	0.400
Apple	1.200	0.800

What was the total price of the fruits that the son bought bearing in mind that he followed his fathers' instructions?

A BD 2.950

B BD 3.050

C BD 3.150

D BD 3.250

14 In a language institute, there were 130 adults. The institute provides courses of the languages French, Spanish and German for both genders; men and women. All adults can only study one language course.

The administration found that 96 of the adults were women. In terms to the languages studied, 73 of the adults studied Spanish, 12 of the women studied French and 55 of the women studied Spanish. Only 9 of the men studied German

How many of the 130 adults studied French in the institute?

A 7

B 19

C 29

D 38

15 Zainab prefers to get her pizza from Miami Pizza that sells pizza at the following prices: BD 4.200 for a large pizza, BD 3.200 for a medium pizza, and BD 2.200 for a small pizza.

Last week, Miami Pizza had an offer as follows:
- Buy one large pizza and get one medium pizza for free.
- Buy one medium pizza and get one small pizza for free.

Zainab arranged for a pizza party on the same week and decided to benefit from the offer available at Miami Pizza.

Zainab paid BD 30 and received change of 200 fils. She paid full price for at least one of each size of pizza.

What was the largest possible number of pizzas that she could have received?

A 15

B 16

C 17

D 18

16 Last August, 360 tourists from five different countries visited the Old Castle Museum. The table below shows the number of visitors from each country.

Country	Number of Visitors
Kingdom of Saudi Arabia (KSA)	120
United Arab Emirates (UAE)	40
Qatar	70
Kuwait	100
Bahrain	30

Which one of the following charts best represents the above information?

A

**B**

Kuwait
Bahrain
KSA
UAE
Qatar

C

D
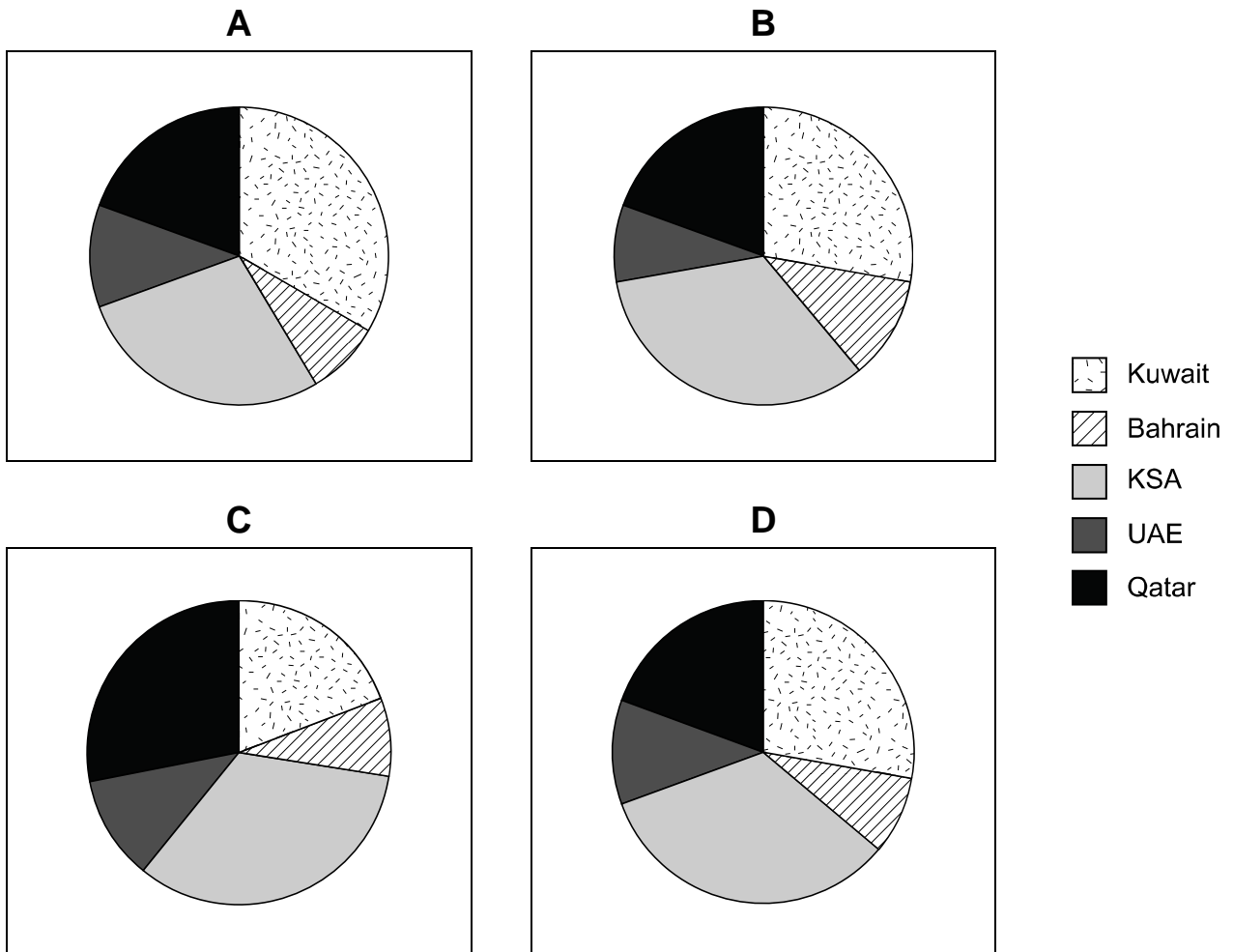
17 In a sub-polling station of a specific electoral district in one of the Arab countries, the vote counting of the primary election received by five candidates in the parliament resulted in the following chart:
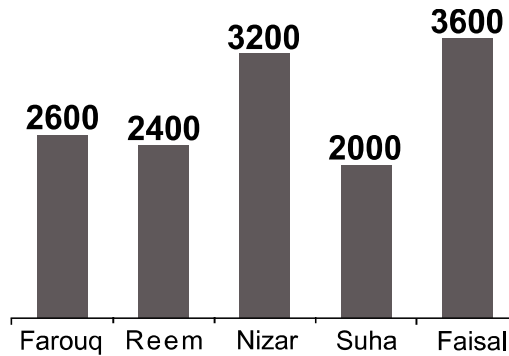
After vote counting in the public polling stations, the total number of votes for each candidate changed as follows:

- Total votes received by Farouq were twice the votes received by Reem in the primary election results.
- Number of voters for Reem increased by 25%.
- Total votes received by Nizar were equal to the votes received by Faisal and Suha together in the primary election results.
- Suha received additional votes by 50% of those received by Nizar in the primary election results.
- Faisal received additional votes by one-third of those received by Reem in the primary election results.

Which of the following charts represents the final number of votes for each candidate?

A

B

C

D
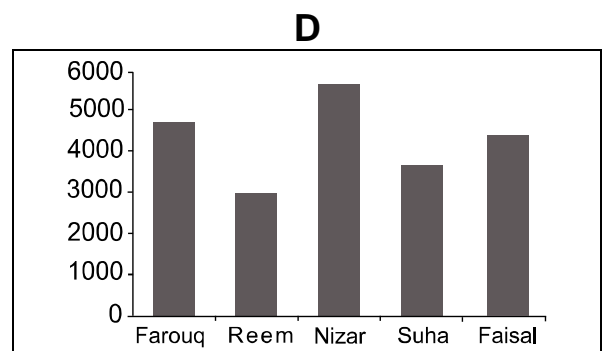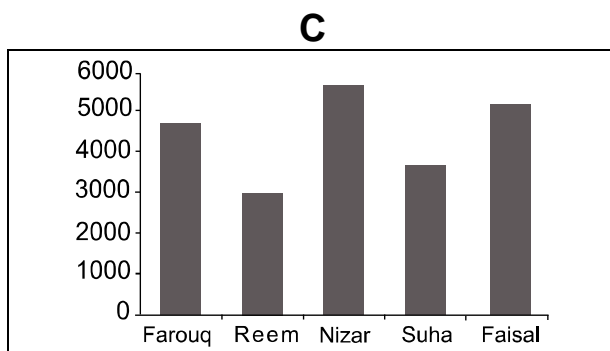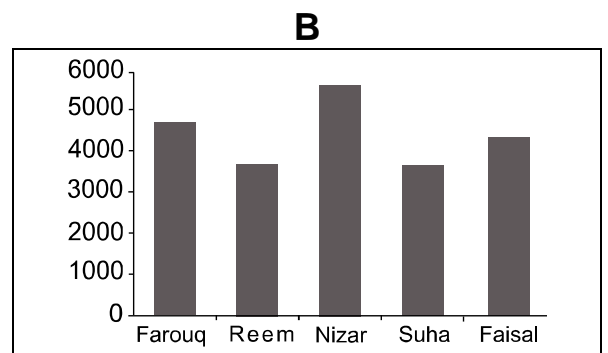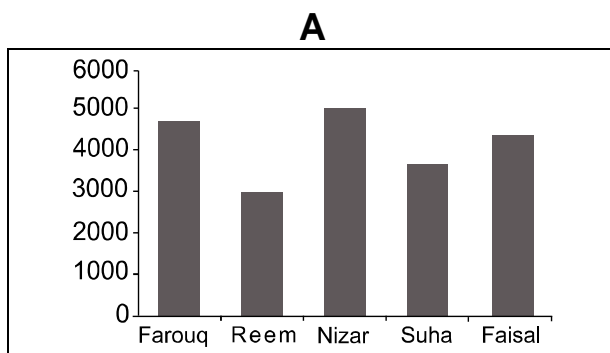
18 An architect designed a building with the following specifications:

- The building consists of a basement, a ground floor, and 10 higher storeys.
- The height of the basement is 10 m.
- Starting from the ground floor, every 3 consecutive storeys have the same height as each other.
- The height of each subsequent group of 3 storeys is 0.4 m less than the group beneath.
- The height of the tenth storey is 3.2 m.

How high above the basement floor is the floor of the sixth storey?

A 23.2

B 25.2

C 34.4

D 35.2

19 Mohammed goes once a day to Manama Market during some days of the week, but never on Friday or Saturday, to distribute some European merchandise to the local shops. He uses Manama Centre parking area for a period of not more than two hours to park his car while he is in the market. The parking area working hours are from 7 am to 9 pm. The table below gives the tariffs for parking a car in this area.

	Per hour or fraction of an hour	Ticket lost (while the car is parked)	Car picked up after 9 pm
Rate	500 fils	BD 7	BD 10

Mohammed paid a total of BD 32.500 for parking in this area during a month containing 30 days.

What was the largest possible number of days in which Mohammed paid BD 1 for the car park?

A   15

B   18

C   21

D   22

20 In the second semester of the academic year 2014/2015, students of Al-Amel Primary School achieved the percentages represented in the chart below in mathematics.

■ Outstanding

▢ Good

☐ Satisfactory

▨ Fail
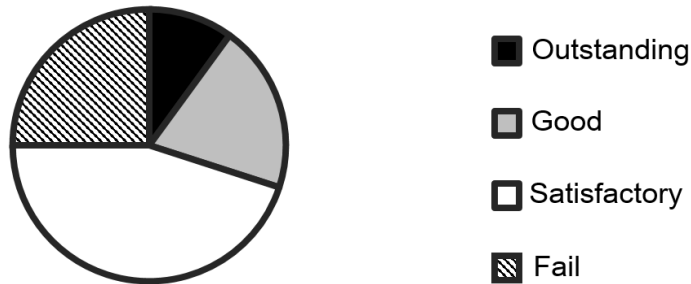
In the second semester of the academic year 2015/2016, pass rates in mathematics increased from 2014/2015 and the percentage of students who achieved good was 25%.

Which one of the following charts could represent the percentages achieved by students in mathematics in the second semester of the academic year 2015/2016?

A

B

C

D

[Turn over]
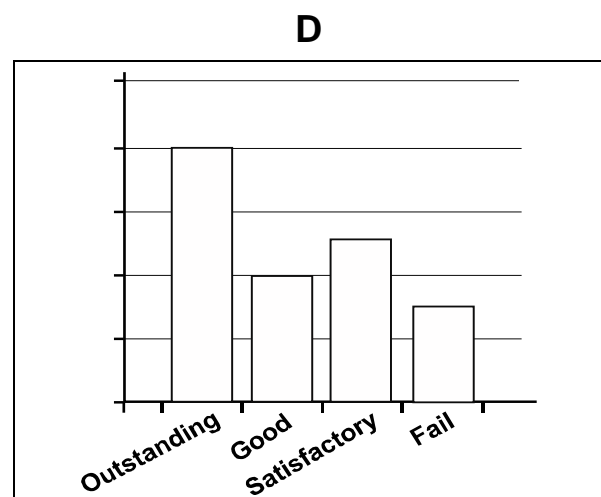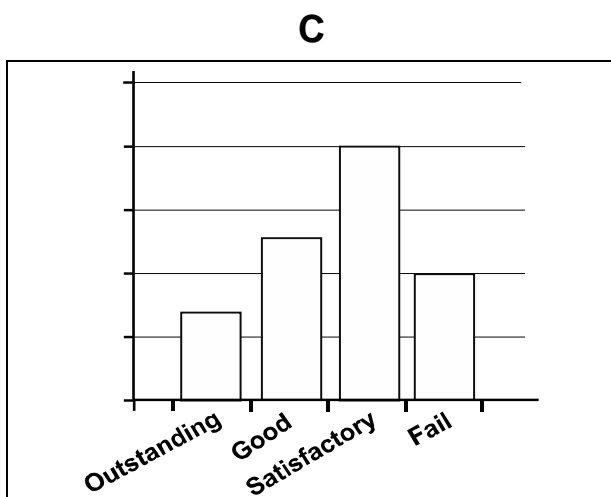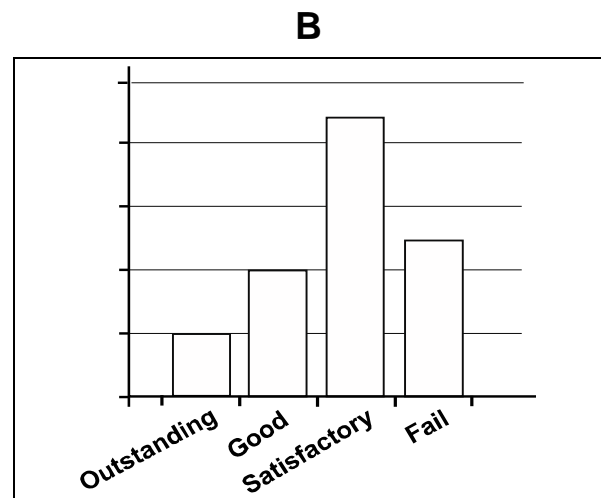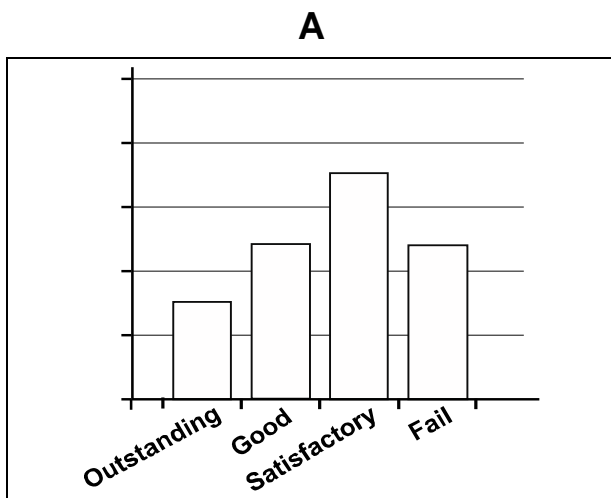
21 The table below shows the pass rates in five intermediate schools in one of Bahrain's governorates at the end of the year 2012/2013.

School	Al-Ethad	Al-Huda	Al-Abtal	Al-Amal	Al-Shurooq
Pass rate	75%	90%	80%	95%	85%

At the end of the year 2013/2014, the results of the same schools were recorded. It was found that Al-Abtal school had the lowest fail rate and Al-Shurooq school had the lowest pass rate. Al-Amal school maintained the same pass rate as in 2012/2013, and Al-Ethad school's pass rate was 5% higher than Al-Huda school, whose pass rate declined from the previous year by 10%.

Which one of the following charts could represent fail rates in both academic years 2012/2013 and 2013/2014?

A

B

C

D
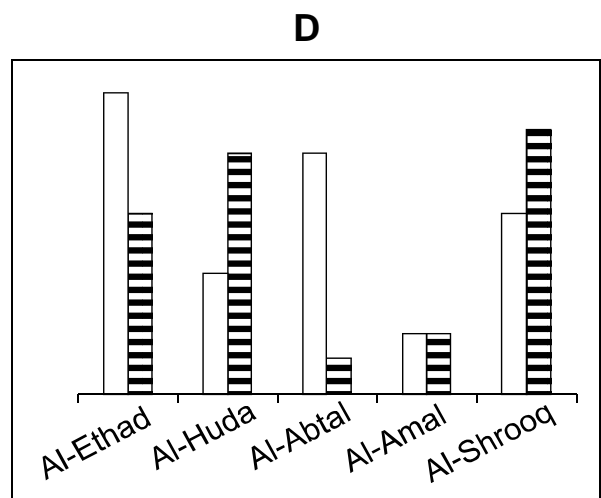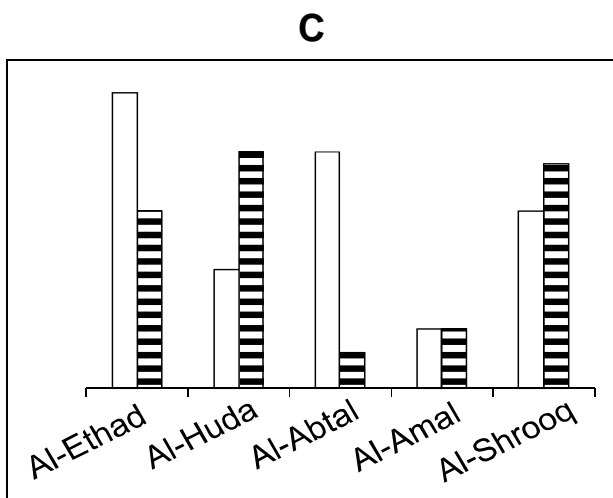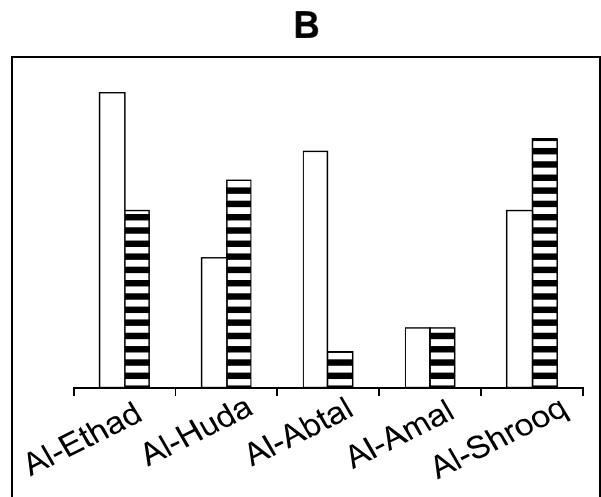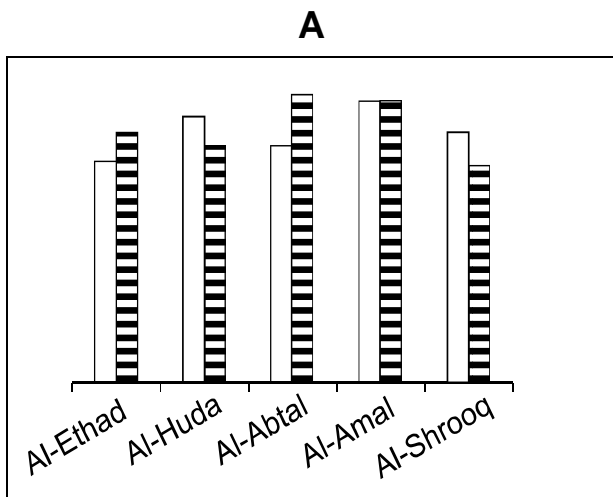
☐ 2012 / 2013   ▤ 2013 / 2014

22 The students use buses to go to University of Bahrain. The buses depart from Muharraq every hour at 10 minutes past the hour and take Sheikh Khalifa bin Salman Street to the University of Bahrain. The buses leave the University of Bahrain every hour at 40 minutes past the hour, taking the same route back to Muharraq. In both directions, the trip takes between 60 and 70 minutes depending on the traffic.
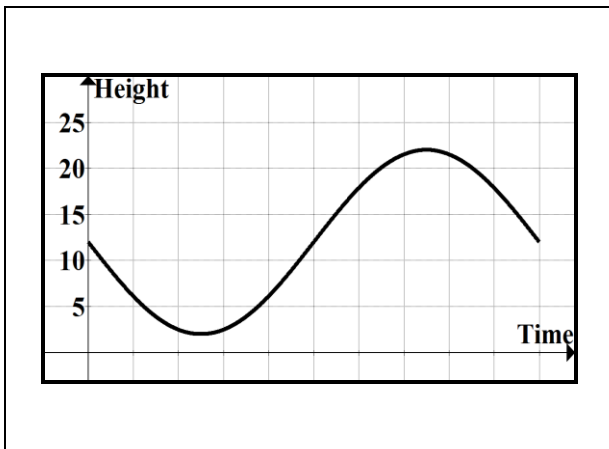
If you take the bus from the University to Muharraq, what is the maximum number of buses that will pass you in the other direction during your journey?

A   1
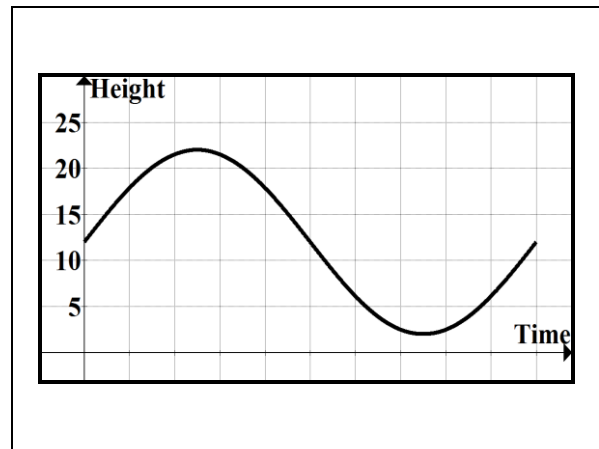
B   2

C   3

D   4

23 In a kids' amusement park, a rotating wheel with 10 m radius includes 24 numbered compartments (compartments are numbered counter-clockwise). The wheel spins clockwise. When the wheel began its rotation, compartment number 1 was the lowest one and was 2 m above the ground.

Which of the following graphs shows the height of compartment number 7 above the ground from the beginning of movement of compartment number 1 until the completion of its first rotation?
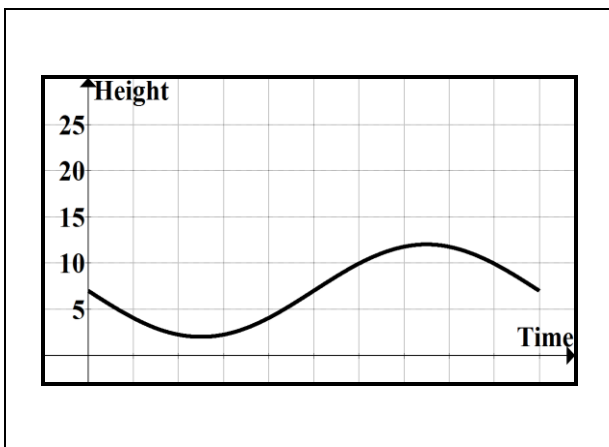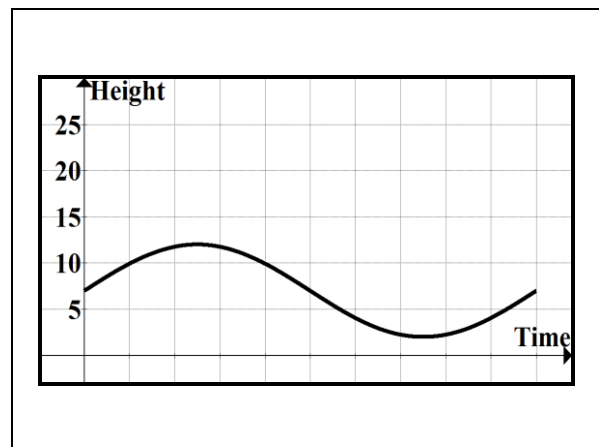
A

Height
25
20
15
10
5
Time

B

Height
25
20
15
10
5
Time

C

Height
25
20
15
10
5
Time

D

Height
25
20
15
10
5
Time

24 I need to produce 1000 leaflets to distribute. They must be on coloured paper and do not need to contain any pictures. I have been given quotations from three different companies as shown below (all prices are in BD).

Company	Price per 100 (white paper)	Price per 100 (coloured paper)	Extra charge for images (only counted once)
Company 1	2.000	3.000	5.000
Company 2	2.200	2.900	7.000
Company 3	2.100	2.700	8.000

Alternatively, I am prepared to produce the leaflets myself. I estimate that it will take me 3 hours to produce them and the cost for my time is BD 9 per hour. The resources will cost BD 5.

How does the price from the cheapest company compare with the total cost if I were to produce the leaflets myself?

A The company is cheaper by BD 12

B The company is cheaper by BD 5

C The company is more expensive by BD 3

D The company is more expensive by BD 13

25 In August 2016, Hasan drove his sister to the airport and returned to their home. He drove his car from their home to the airport along a route where the speed limit changes from 50 km/hr, to 80 km/hr, to 100 km/hr and then to 50 km/hr and returned home by the same route.

Regulations of the traffic directorate charges a fine of BD 50 when a car is driven at a speed exceeding 30% of the road's speed limit.

On September 1ˢᵗ, 2016, a change was made to the traffic regulations to ensure road safety. A fine of BD 100 is charged when a car is driven at a speed exceeding 10% of the road's speed limit.

In September, Hasan picked his sister up from the airport and took the same roads as before from home to the airport and then back home.

In October 2016, Hasan received a message from the traffic directorate informing him that he had to pay a speed penalty of BD 800 during his two trips to and from the airport. All his contraventions were recorded at one particular speed.

At which of the following speeds could the contraventions have occurred?

A 60 km/hr

B 80 km/hr

C 90 km/hr

D 105 km/hr

26 $\dfrac{3}{4}$ of the members of the Whiteknight chess club are boys. $\dfrac{2}{5}$ of the boys entered a tournament, of which $\dfrac{2}{3}$ of them won their first round matches.

If 48 of the boys from the Whiteknight club won their first round matches in the tournament, how many girls are there in the Whiteknight club?

A   45

B   60

C   180

D   240

  [Turn over]

27 A local furniture manufacturer is looking to increase his profit. For any item that he makes there is a cost for the materials, a cost to produce the pieces and a cost to assemble it. The following table shows the costs (in BD) for each stage of making an item of furniture for three proposed items:

Item of furniture	Materials	Production	Assembly
Sofa	460	60	80
Desk	305	50	45
Bookcase	140	40	20

When selling the products, he charges twice the cost of the materials. The available amount that he had and can spend on making the products is BD 2000 and wants to make as much profit as possible.

What is the maximum amount of profit that he can make?

A BD 1030

B BD 1040

C BD 1050

D BD 1060

28   A train started its journey at station W, travelling to station Z with stops at stations X and Y. At station X, half of the passengers got off and 210 new passengers got on. At station Y, one third of the passengers got off and 50 new passengers got on. When the train arrived at station Z there were 320 passengers on board.

How many passengers were on board as the train left station W?

A   225

B   390

C   650

D   1200

[Turn over]

29 Jasim wants to join a gym for 6 months. There are 4 gyms: Victory, Strength, Compete and Perfection. These gyms offer a discount on their monthly fees. The following table shows the discount offered by each gym:

Gym	Type of Discount
Victory	BD 4.5 discount off the monthly fees
Strength	20% discount off the monthly fees
Compete	Pay full price for 2 months and get 60% discount off a third month
Perfection	Pay full price for 1 month and get 50% discount off a second month

The full monthly fee for each of the four gyms is BD 20.

Which gym would be cheapest for Jasim to join for 6 months?

A Victory

B Strength

C Compete

D Perfection

30 Hani created a game for his nephew's birthday party. He wrote each of the digits 1, 2, 3, 4, 5, 6, 7, 8 and 9 on a different piece of card and placed the cards on the floor. He covered each piece of card with a block with a letter on it. The guests in the party saw the arrangement shown in the figure below
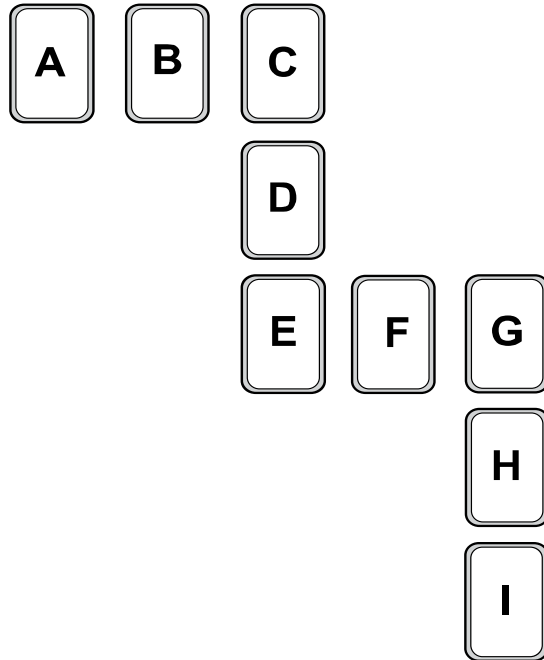
The nine children at the party were told that each line of three digits under the letters added up to 13, e.g. C + D + E. Each child took out a card with a different letter on it from a box, without looking. The winner of the game was the child who was first to guess correctly the number on the card under the block with his number on it.

Salman won the game, correctly guessing the number under block E.

What number was under block E?

A   1

B   2

C   3

D   4

MS12

Mathematical Skills

امتحان المهارات الرياضية