basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

# NATIONAL SENIOR CERTIFICATE

## GRADE 12

## MATHEMATICAL LITERACY P2

## NOVEMBER 2022

**MARKS: 150**

**TIME: 3 hours**

**This question paper consists of 14 pages and an addendum with 5 annexures.**

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## INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.

2. Use the ANNEXURES in the ADDENDUM to answer the following questions:

   ANNEXURE A for QUESTION 2.1
   ANNEXURE B for QUESTION 2.2
   ANNEXURE C for QUESTION 4.1
   ANNEXURE D for QUESTION 4.3
   ANNEXURE E for QUESTION 5.1

3. Number the answers correctly according to the numbering system used in this question paper.

4. Start EACH question on a NEW page.

5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.

6. Show ALL calculations clearly.

7. Round off ALL final answers appropriately according to the given context, unless stated otherwise.

8. Indicate units of measurement, where applicable.

9. Maps and diagrams are NOT drawn to scale, unless stated otherwise.

10. Write neatly and legibly.

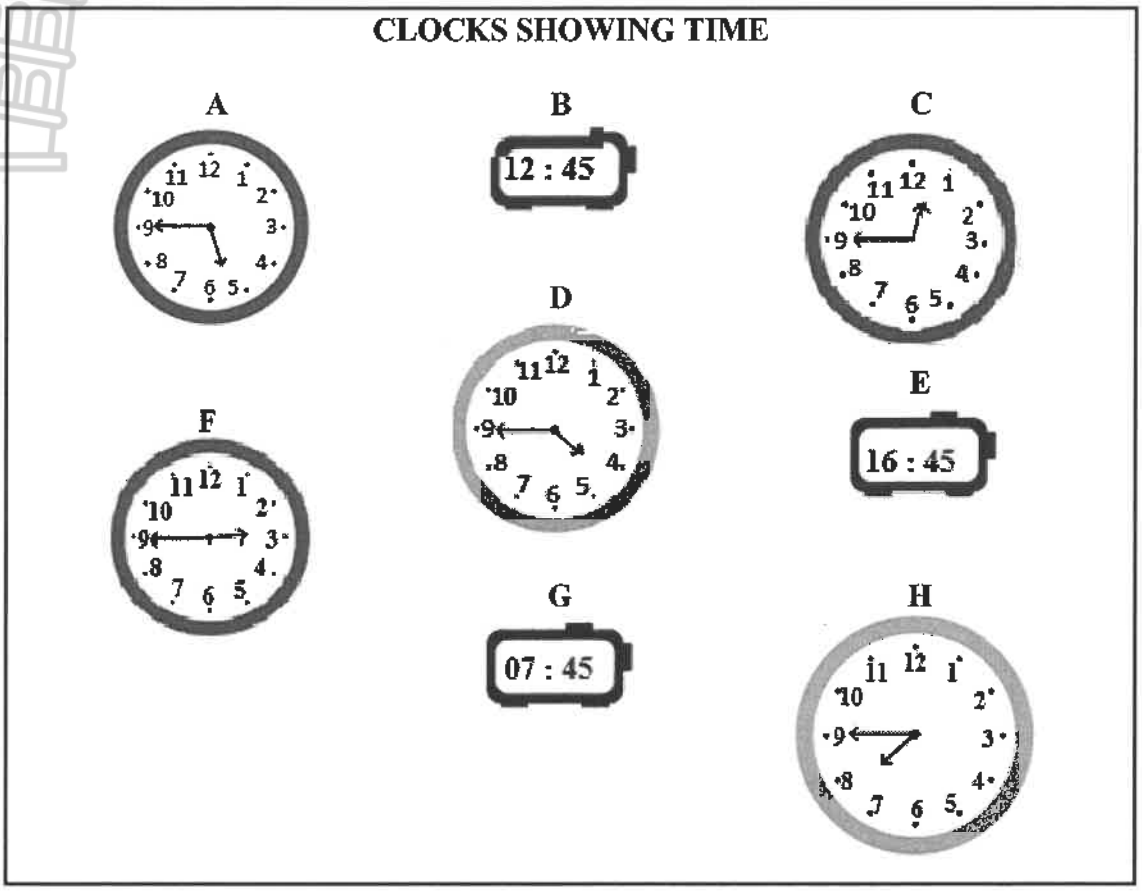


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## QUESTION 1

1.1 Various clocks indicating time are shown below.

**CLOCKS SHOWING TIME**




Use the information above to answer the questions that follow.

1.1.1 Which ONE of the following (X, Y or Z) best describes the time displayed on EACH clock?

X Nine minutes to the next hour

Y Forty-five minutes to the next hour

Z A quarter to the next hour (2)

1.1.2 Name the TWO time formats used to display time on the clocks. (3)

1.1.3 Write down, in words, the time displayed on clock **B**. (2)

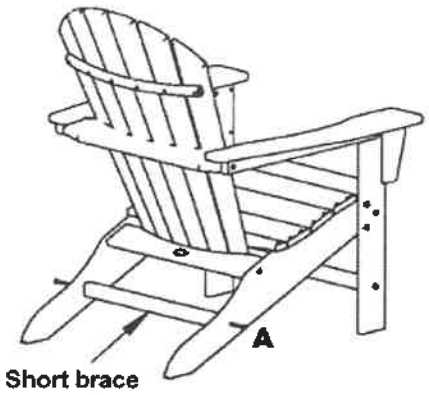
1.1.4 Write down the number of clocks that clearly indicates a time in the afternoon. (2)

1.1.5 Convert 16 hours and 45 minutes to minutes. (2)

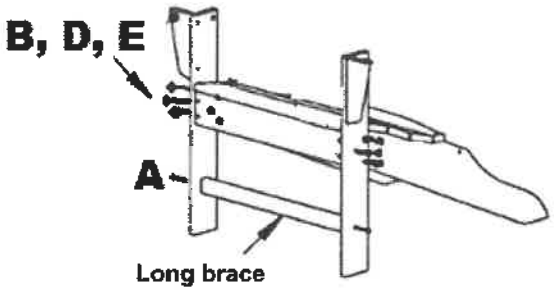
1.2 Illustrated below are steps and some instructions to assemble a deck chair. To assemble the deck chair, the wooden pieces are joined together using fasteners (screws, bolts, washers and nuts). There are 32 pieces in the packet of fasteners. Each bolt is secured by a nut and a washer.

**STEPS TO ASSEMBLE A DECK CHAIR**

**STEP 4**
**COMPLETED CHAIR**




**STEP 1**



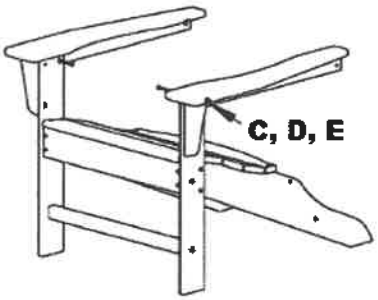

Attach the seat using bolts (**B**), nuts (**E**) and washers (**D**) to the two front legs.
Attach the long brace using the screws (**A**).

**STEP 3**




Attach the back to the seat and arms using the screws (**A**).

**STEP 2**




Attach the arms to the two front legs using the bolts (**C**), nuts (**E**) and washers (**D**).

| | TYPE OF FASTENER | | | | |
|---|---|---|---|---|---|
| | **A Screw** | **B Bolt** | **C Bolt** | **D Washer** | **E Nut** |
| |  |  |  |  |  |
| **Quantity** | 8 | 6 | ... | 8 | 8 |

[Adapted from www.bin.com]

Use the information above to answer the questions that follow.

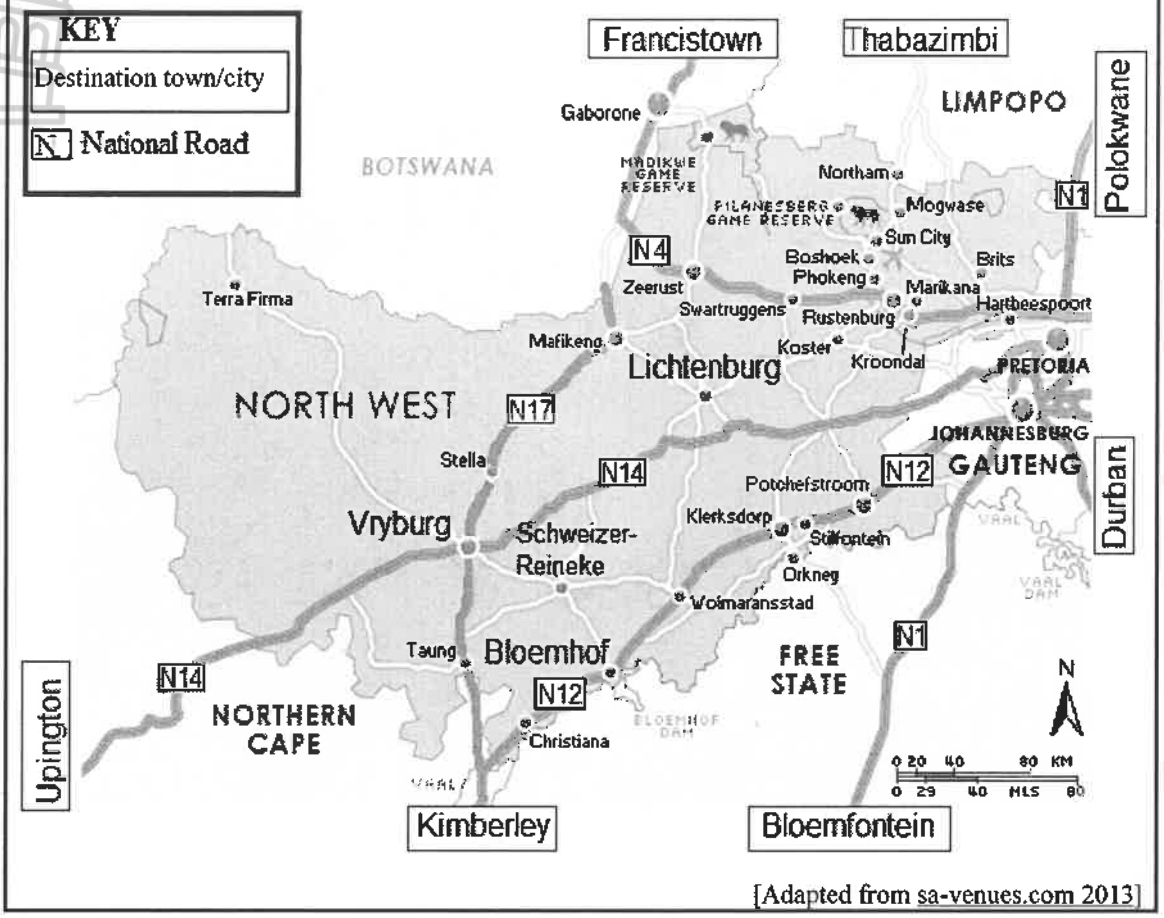
1.2.1 Determine the number of type **C** bolts used to assemble the deck chair. (2)

1.2.2 State the number of nuts left over after step **1** is completed. (2)

1.2.3 Name the last piece required to complete the assembly of the deck chair. (2)

1.3 Below is a map of North West showing destination towns/cities and interleading roads.

**MAP OF NORTH WEST SHOWING NATIONAL ROADS LEADING TO TOWNS/CITIES**




[Adapted from sa-venues.com 2013]

Use the map above to answer the questions that follow.

1.3.1 Identify the type of scale used in the map. (2)

1.3.2 Name the province that lies east of North West. (2)

1.3.3 Identify the national roads passing through Vryburg. (2)

1.3.4 Write down the number of destination towns/cities shown on the map. (2)

1.3.5 Measure, in mm, the direct distance (as the crow flies) from Bloemhof to Lichtenburg. (2)

**[27]**

## QUESTION 2

2.1 ANNEXURE A shows a restaurant's seating plan for customers.

Use the information on ANNEXURE A to answer the questions that follow.

2.1.1 Give ONE possible reason why this restaurant has so many windows. (2)

2.1.2 Calculate the maximum number of chairs available for customers. (3)

2.1.3 Determine the number of seats directly facing the wall on the south side. (2)

2.1.4 Give ONE reason why the restaurant has couches at the entrance. (2)

2.1.5 A person at table 18 leaves her seat and walks towards her friend at table 4. She uses the arrow path shown on the seating plan.

Use compass directions to describe her path from table 18 to table 4. (3)

2.1.6 Norma claims that there are less than 21 tables for customers in this restaurant.

State, with a reason, whether her claim is valid. (3)

2.2 ANNEXURE B shows the choices on the set menu for a function at the restaurant.

Customers can choose:

- One protein: chicken (C), beef (B) or fish (F)
- One side order: vegetables (V) or a salad (S)
- One dessert: ice cream (I) or malva pudding(M)

Use the information on ANNEXURE B to answer the questions that follow.

2.2.1 Name the type of diagram illustrated on ANNEXURE B. (2)

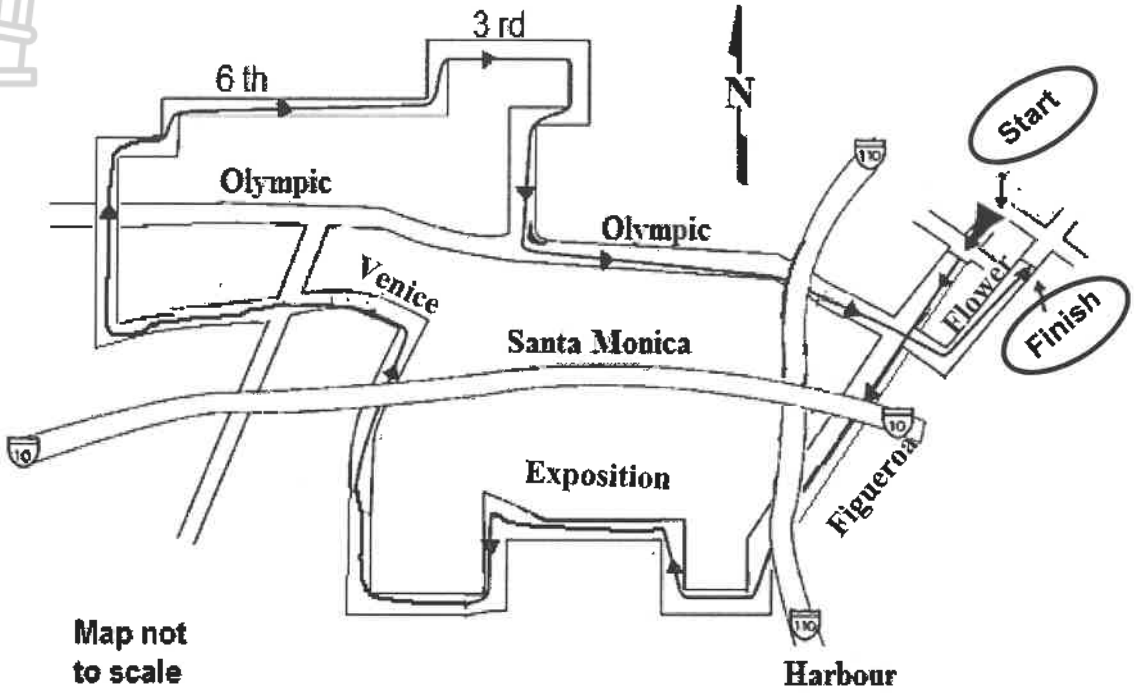
2.2.2 Write down the missing outcome at 2.2.2(a) and the protein choice at 2.2.2(b). (4)

2.2.3 State the number of combinations with beef as the protein. (2)

2.2.4 Determine, as a percentage, the probability of randomly selecting a meal with malva pudding as the dessert. (3)

2.3 Below is a simplified route map of the Los Angeles Marathon (LAM) in the United States of America. The LAM route is 26,2 miles.

**ROUTE MAP OF LOS ANGELES MARATHON (LAM)**




[Source: www.bing.com]

Use the information above to answer the questions that follow.

2.3.1 Explain the meaning of *route map*. (2)

2.3.2 Describe what is meant by 'Map not to scale'. (2)

2.3.3 The runners in the Los Angeles Marathon have to pass underneath a bridge at certain points during the marathon.

(a) Explain how this is indicated on the route map. (2)

(b) Write down the number of times that a runner who completes the marathon will pass underneath a bridge. (2)

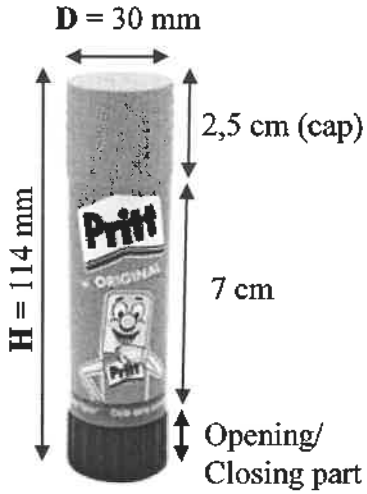
2.3.4 Write down the general direction in which the runners will face when they start in Flower Street. (2)

**[36]**

## QUESTION 3

3.1 Every learner in a Technology class is expected to have Prestik and Pritt (glue stick). The Prestik is packed in a rectangular-shaped sleeve and the Pritt in a cylindrical container.

The dimensions of the rectangular face of the Prestik sleeve and the cylindrical Pritt container are given below.

| FRONT DIMENSIONS OF THE PRESTIK SLEEVE | DIMENSIONS OF A CYLINDRICAL PRITT CONTAINER |
|---|---|
|  |  |
| Where **L** = length and **W** = width | Where **D** = diameter and **H** = height |

[Source: plastilon.co.za and mcsofficesupplies.co.za]

Use the information above to answer the questions that follow.

3.1.1 Calculate the perimeter of the front of the Prestik sleeve.

You may use the formula: **Perimeter = 2 × (length + width)** (3)

3.1.2 Calculate, in cm, the height of the opening/closing part of the Pritt container. (3)

3.1.3 The actual height of the glue in the Pritt container is 8,5 cm and the volume of the glue, rounded to THREE decimal places, is 52,346 $cm^3$.

(a) Show how the volume of the glue was calculated if the diameter of the glue is 28 mm.

You may use the formula: **Volume = 3,142 × radius$^2$ × height** (4)

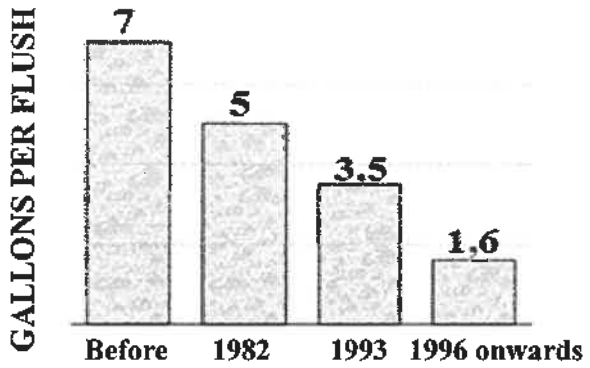
(b) Determine (rounded to the nearest gram) the mass of the glue in the Pritt container, if the density of the glue is 0,82 g/$cm^3$.

You may use the formula: **Density = Mass ÷ Volume** (4)

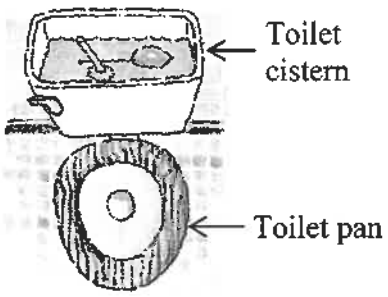
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3.2 Water is a scarce resource in South Africa. The graph below shows how the volume of water in a toilet cistern has been reduced over the years. The picture next to the graph shows a toilet pan with a toilet cistern.

**BAR GRAPH: TOILET FLUSH VOLUME OVER THE YEARS**




**TOILET PAN WITH A TOILET CISTERN**




**NOTE:** 1 gallon = 3,785 litres

Use the information above to answer the questions that follow.

3.2.1 Calculate (in litres) the volume of water used during February 2022 by a family of five, if each person flushed the toilet an average FOUR times a day during the month. (3)

3.2.2 State ONE way in which a person can save water in this context. (2)

3.3 Ouma intends baking two milk tarts for her friends who will be arriving at 17:30. She uses the ingredients and information below. She can only bake one milk tart at a time. While the first milk tart is in the oven, she prepares the second milk tart in order to put it in the oven the moment the first one is taken out.

**INGREDIENTS AND INFORMATION FOR ONE MILK TART**

| **Preparation time** | **Cooking time** | **Temperature** |
|---|---|---|
| 30 minutes | 40 minutes | 325 °F |

**Serves 8 people**

3 tablespoons butter, melted
1 cup white sugar
3 egg yolks
1 cup cake flour
$\frac{1}{4}$ teaspoon salt
1 teaspoon vanilla extract
$4\frac{1}{4}$ cups of milk

[Adapted from allrecipes.com]

**NOTE:** 1 cup = 250 ml

Use the information above to answer the questions that follow.

3.3.1 Ouma would like the second milk tart to be taken out of the oven 15 minutes before her friends arrive.

Determine the time Ouma must place the first milk tart in the oven. (3)

3.3.2 Convert the baking temperature to degrees Celsius (°C), rounded to the nearest 10 degrees.

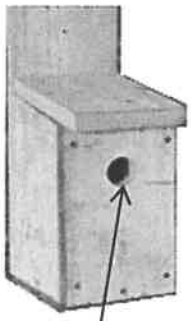
You may use the following formula: $^{\circ}C = (^{\circ}F - 32^{\circ}) \times \frac{5}{9}$ (3)

3.3.3 Determine how many litres of milk Ouma needs to bake the two milk tarts. (4)

**[29]**

## QUESTION 4

4.1

| | |
|---|---|
| Itumeleng makes and sells birdhouses at a local flea market.<br><br>ANNEXURE C shows the diagram of the parts of the birdhouse and the assembly instructions.<br><br>He uses a single board that is 14 cm wide and 20 mm thick to make one birdhouse. | **Picture of a completed birdhouse**<br><br><br>Front exposed (part with hole) |

Use the information above and ANNEXURE C to answer the questions that follow.

4.1.1 Show (rounded to the nearest hundred) that the length of the board needed for a single birdhouse is 1 500 mm. (3)

4.1.2 Itumeleng stated that in Step 2, the 10 cm side of the floor will go against the back.

Verify, showing all calculations, whether his statement is CORRECT. (4)

4.1.3 The front part of the birdhouse has a circular hole with a diameter of 4,2 cm drilled into it.

Calculate (in $cm^2$) the exposed surface area of the front part of the birdhouse.

You may use the following formulae:

**Area of a rectangle = length × width**

**Area of a circle = 3,142 × (radius)$^2$** (6)

4.2 Itumeleng paints the exposed exterior surface area of the birdhouse.

The total surface area of the birdhouse that will be painted is 0,2888 $m^2$.

He applies three coats of paint according to the spread rate instructions on the paint tin, as follows:

- First coat: 10 $m^2$/litre
- Subsequent coats: 14 $m^2$/litre

Itumeleng stated that he will be able to paint seven birdhouses with 500 mℓ of paint.

Verify, showing ALL calculations, whether his statement is CORRECT. (8)

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4.3 Itumeleng has the following expenses for his birdhouse business:

- Rental of the stall at the flea market, R250 per week
- Transport, R100 per week
- Wooden boards, R287,40 for a bundle of six boards
- Paint, R21,40 per birdhouse
- Sundries, R10,70 per birdhouse

ANNEXURE D shows the graph representing Itumeleng's weekly income and expenses for his birdhouse business.

Use ANNEXURE D and the information above to answer the questions that follow.

4.3.1 The equation to calculate his weekly expenses can be written as follows:

**Expenses = R350 + $p$ × number of birdhouses made,**
where $p$ = variable cost for each birdhouse made

(a) Show how the value of R350 (his fixed weekly cost) was calculated. (2)

(b) Calculate the value of $p$, the variable cost of making one birdhouse. (3)

4.3.2 Explain *break-even point* in this context. (2)

4.3.3 During one of the weeks, Itumeleng made 15 birdhouses, but only sold 12.

Show, by means of calculations, if he made a profit or a loss for that week. (4)
**[32]**

## QUESTION 5

Danny and Susan are on their way to visit some of the tourist locations in Japan.

ANNEXURE E shows a road infographic of their planned tour with the various tourist locations that would be visited.

Use the information above and ANNEXURE E to answer the questions that follow.

5.1 The tourist location details (in random order) for the tour are given below.

(a) Start in Tokyo
(b) Visit Mount Fuji
(c) Visit the world's largest aquarium to see the different types of fish in Osaka
(d) At Nara they plan to visit the large wooden temple and the deer park.
(e) The trip will end at Itsukushima which is known for the Great Torii Gate that is standing in water at high tide.
(f) Drive though Kamakura at a speed not exceeding 40 km/h

Complete the table below by inserting the tourist location details in the correct order.

**NOTE:** Location details for 01 and 06 have been given in the table.

| Location | Tourist location details |
|---|---|
| 01 | a |
| 02 | ... |
| 03 | ... |
| 04 | ... |
| 05 | ... |
| 06 | e |

(4)

5.2 Mount Fuji is an active volcano. The last volcanic eruption was on 16 December 1707 and it followed several weeks after an earthquake on 11 November 1707.

5.2.1 Calculate how many decades ago Mount Fuji erupted. (3)

5.2.2 Write down the total number of days between the earthquake and the last volcanic eruption. (3)

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5.3 In Tokyo they will visit the Tokyo tower which is a communication and observation tower. The tower is 1 092,1916 feet tall and has two viewing decks. The main deck is 150 m above the ground and the top deck is 250 m above the ground.

Some of the ticket prices per person are as follows:

| TOKYO TOWER VIEWING DECKS | | |
|---|---|---|
| | **MAIN DECK** | **TOP DECK** |
| Adult (19 years and older) | 1 200 yen | 3 000 yen |
| High school (16 to 18 years old) | 1 000 yen | 2 800 yen |
| **Group reservation for main deck** (group of 20 people or more, but less than 50) | | |
| Adult | 1 080 yen | |
| High school | 900 yen | |
| **Group reservation for main deck** (group of 50 people or more) | | |
| Adult | 960 yen | |
| High school | 800 yen | |

Use the information above to answer the questions that follow.

5.3.1 Write, in simplified form, the ratio of the height above the ground of the main deck to the top deck. (2)

5.3.2 Convert, in metres, the height of the tower if 1 m = 3,281 feet. (2)

5.3.3 Danny stated that if they had been in a group of 60 people observing from the main deck, they could have received 30% discount on an adult ticket.

Verify whether his statement is CORRECT showing ALL calculations. (6)

5.4 On their return journey Danny and Susan took a train from Hiroshima to Tokyo.

- The train left Hiroshima station at 08:06.
- It stopped at eight stations en route for 4 minutes at a time.
- It reached Tokyo at 12:03.
- The distance the train travelled is 816 km.

Calculate the average speed at which this train travelled.

You may use the formula: **Distance = speed × time** (6)

**[26]**

**TOTAL: 150**

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# NATIONAL SENIOR CERTIFICATE

## GRADE 12

## MATHEMATICAL LITERACY P2

## ADDENDUM

## NOVEMBER 2022

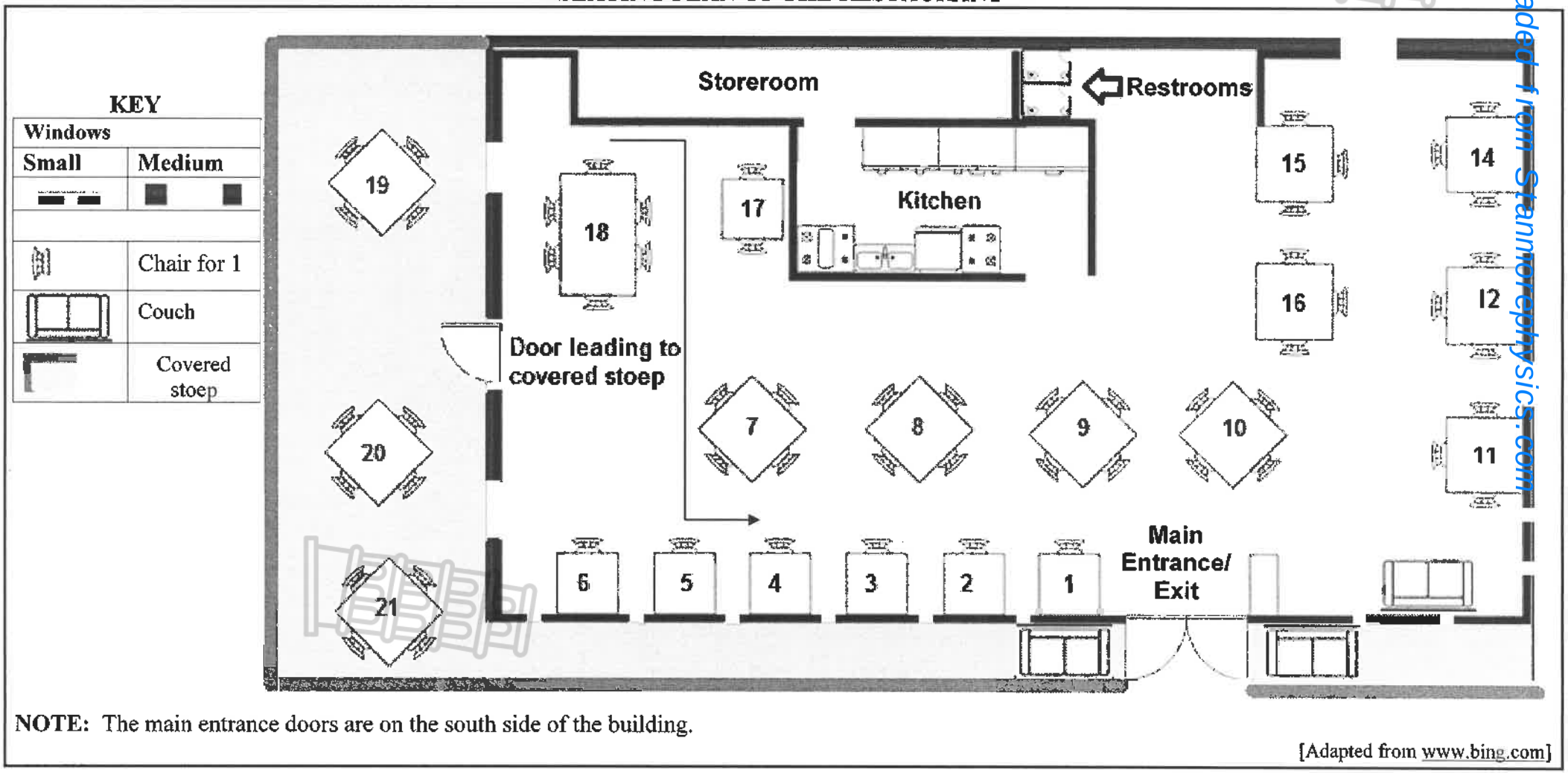
**This addendum consists of 6 pages with 5 annexures.**

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**ANNEXURE A**

**QUESTION 2.1**

**SEATING PLAN OF THE RESTAURANT**




**NOTE:** The main entrance doors are on the south side of the building.

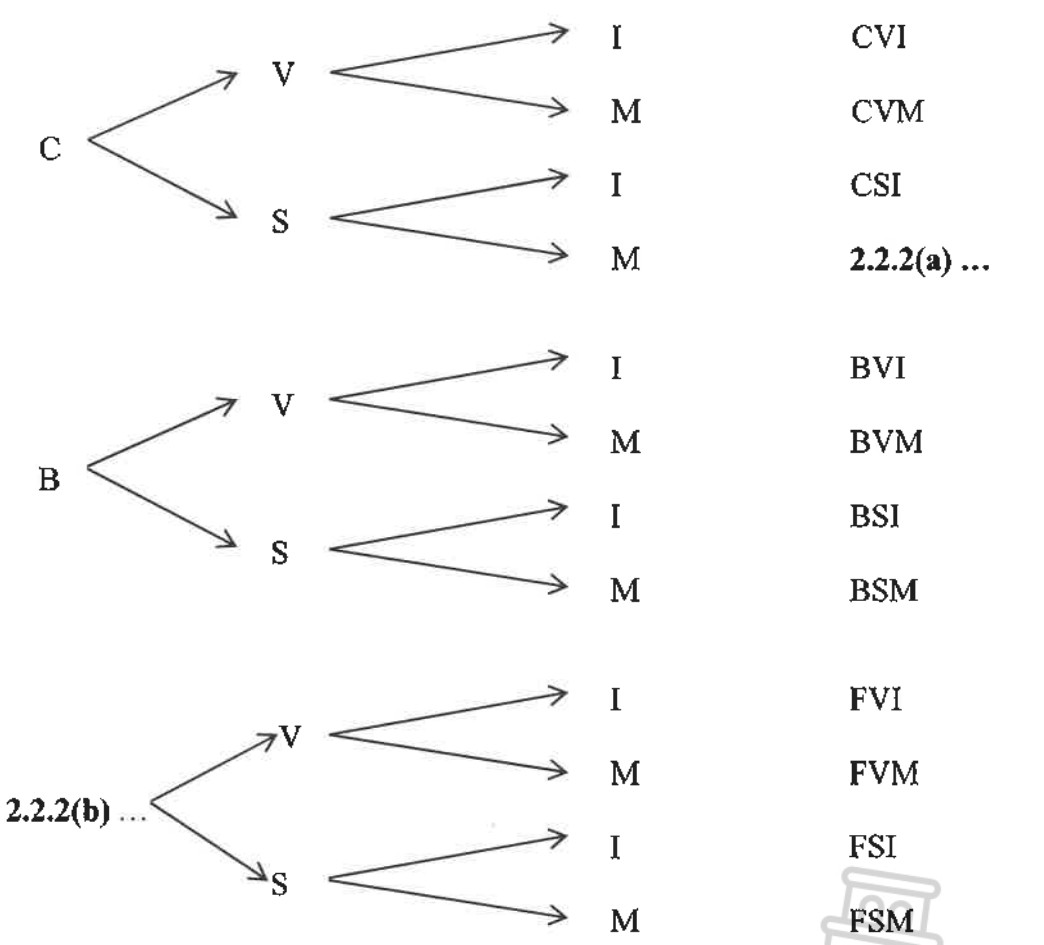
[Adapted from www.bing.com]

adapted from Stanmorephysics.com

**ANNEXURE B**

**QUESTION 2.2**

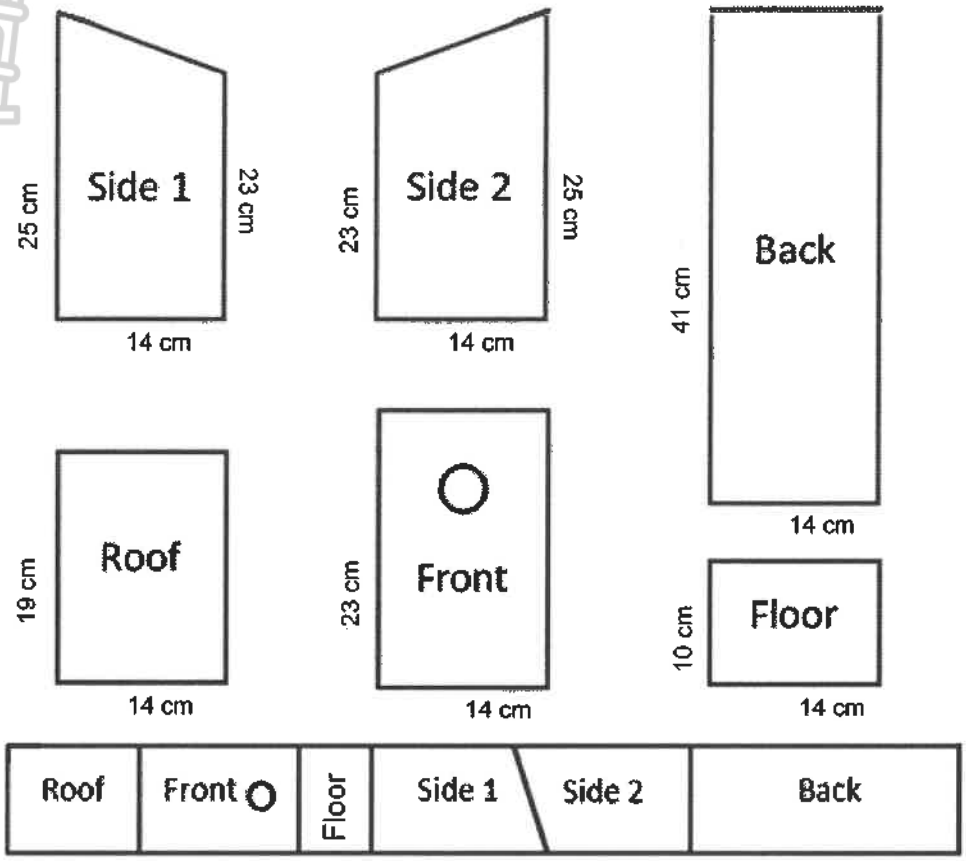
**CHOICES FROM A SET MENU AT THE RESTAURANT**



**ANNEXURE C**

**QUESTION 4.1**

## DIAGRAM OF THE PARTS OF A BIRDHOUSE




[Adapted from www.SunCatcherStudio.com]

## ASSEMBLY INSTRUCTIONS FOR THE BIRDHOUSE

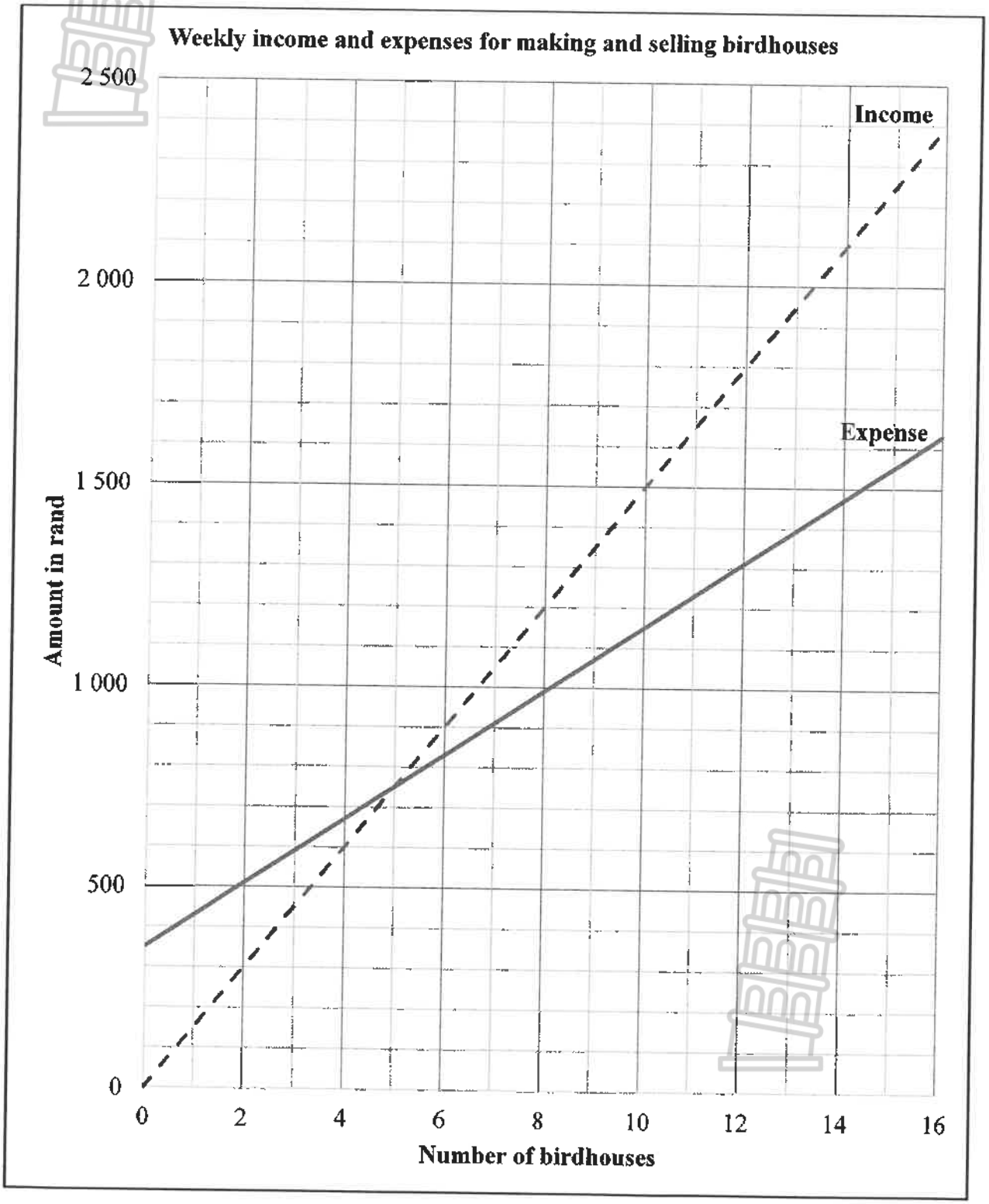
| STEP | WHAT TO DO |
|---|---|
| 1 | Nail the longest side of side 1 and side 2 to the back. |
| 2 | Position the floor between the two sides and the back and nail it in place. |
| 3 | Nail the front on the two sides and the floor. |
| 4 | Place the roof in position and nail it. |

**FINAL PRODUCT**



**ANNEXURE D**

**QUESTION 4.3**

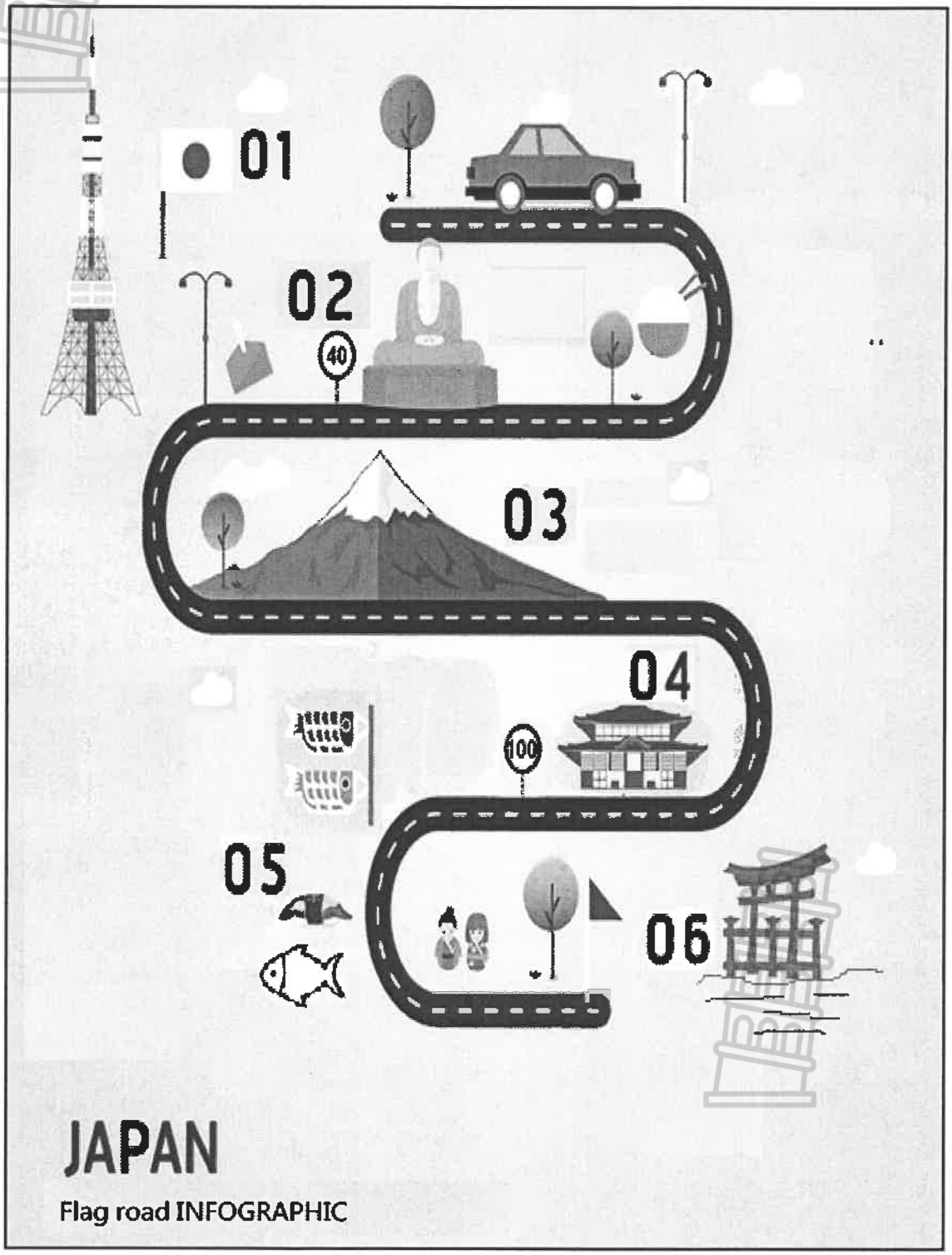



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**ANNEXURE E**

**QUESTION 5.1**

**ROAD INFOGRAPHIC OF JAPAN SHOWING TOURIST LOCATION DETAILS**




[Adapted from Vectorstock.com]

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