

**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**SECONDARY SCHOOL CERTIFICATE**

**CLASS IX EXAMINATION**

**APRIL/ MAY 2017**

**General Mathematics Paper II**

**Time: 2 hours 20 minutes    Marks: 45**

**INSTRUCTIONS**

**Please read the following instructions carefully.**

1. Check your name and school information. Sign if it is accurate.

**I agree that this is my name and school.  
Candidate's signature**

2. RUBRIC. There are TEN questions. Answer ALL questions. Choices are specified inside the paper
3. When answering the questions:  
  
Read each question carefully.  
Use a black pointer to write your answers. DO NOT write your answers in pencil.  
Use a black pencil for diagrams. DO NOT use colour pencils.  
DO NOT use staples, paper clips, glue or correcting fluid.  
Complete your answer in the allocated space only. DO NOT write outside the answer box.
4. The marks for the questions are shown in brackets ( ).
5. You may use a simple calculator if you wish.

Q.1.

(Total 3 Marks)

y is inversely proportional to  $(x + 3)$ .

i. Write down an expression for y in terms of x and a constant k.

(1 Mark)

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ii. Given that  $y = 4$  when  $x = 3$ , find y when  $x = 45$ .

(2 Marks)

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**(ATTEMPT EITHER PART a OR PART b OF Q.2.)**

Q.2.

(Total 4 Marks)

- a. The total amount of zakat paid by two brothers Ahmar and Bilal is Rs 50,000. If Ahmar paid zakat of Rs 23,000 on his yearly savings, find the

i. amount of zakat paid by Bilal.

(1 Mark)

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ii. yearly savings of Ahmar and Bilal separately.

(2 Marks)

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iii. ratio of zakat paid by Ahmar and Bilal.

(1 Mark)

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- b. Shahid possesses a property worth Rs 500,000 and wishes to distribute his property among his legal heirs that include 1 son and 3 daughters. The son gets two times as much as a daughter gets. Find the amount distributed to each legal heir. (4 Marks)

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**(ATTEMPT EITHER PART a OR PART b OF Q.3.)**

Q.3. (Total 5 Marks)

a. Rabia bought three cars X, Y and Z for a total of Rs 15,000,000. The prices for X, Y and Z are Rs 5,000,000, Rs 7,500,000 and Rs 2,500,000 respectively.

i. She sold all three cars at an overall profit of 15%. Find the profit she made. (2 Marks)

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ii. In the above deal, she made a profit of 12% on car X and a profit of 10% on car Y. Calculate the profit she made on car Z. (3 Marks)

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**(ATTEMPT EITHER PART a OR PART b OF Q.3.)**

- b. The price of each scoop at an ice cream parlour is Rs 85. They offer the following discounts.

DISCOUNT OFFER 1:  
BUY A CUP OF TWO SCOOPS, GET 10% OFF  
DISCOUNT OFFER 2:  
BUY A CUP OF THREE SCOOPS, GET 20% OFF

If Ahad, Waqar and Nasir buy a cup of 3 scoops, 2 scoops, 1 scoop respectively from this parlour, then find the

- i. total amount of their bill. (3 Marks)

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- ii. bill if there was no discount offered. (1 Mark)

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- iii. total discount availed due to the offers. (1 Mark)

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Q.4.

(Total 3 Marks)

Zeeshan wants to buy a microwave oven that costs Rs 16,000. He would make a down payment of 30% followed by 5 equal monthly instalments. Calculate the instalment of each month.

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Q.5.

(Total 5 Marks)

- i. Saad uses a telecommunication service to make an international call. The charge for the first 15 minutes is Rs 2.5 per minute. The charge for each additional minute is Rs 1. Calculate the cost if he makes a 1 hour-long call. (2 Marks)

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- ii. For a certain week, the number of hours worked by Maaz each day is shown in the table.

| Day                    | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|------------------------|--------|---------|-----------|----------|--------|----------|
| Number of Hours Worked | 8      | 7       | 9         | 10       | 8      | 8        |

The rate of wage is Rs 215 per hour and is applicable as follows.

From Monday to Friday: the rate of wage applied will be doubled after 8 working hours.

On Saturday: the rate of wage will be three times for each working hour.

Calculate how much Maaz will earn at the end of this week.

(3 Marks)

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plify  $\log_5 5 + \log_5 1$ , giving your answer as an integer.

(Total 5 Marks)

a.

i.

Express  $\sqrt{\frac{125m^3}{5m^{-7}}}$  in its simplest form.

(3 Marks)

ii.

Simplify  $\log_5 5 + \log_5 1$ , giving your answer as an integer.

(2 Marks)



**(ATTEMPT EITHER PART a OR PART b OF Q.6.)**

b.

- i. Without using a calculator, show that  $\frac{1}{\sqrt{128}}$  is equal to  $2^{-\frac{7}{2}}$ . (2 Marks)

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- ii. Simplify and express each of the following as a single logarithmic term.

I.  $\log 3 - \log 2$  (1 Mark)

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II.  $\log 8 + 2 \log 5$  (2 Marks)

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Q.7.

(Total 4 Marks)

An arithmetic sequence has a common difference of 10 and its 6<sup>th</sup> term is 52. Find its 30<sup>th</sup> term.

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**(ATTEMPT EITHER PART a OR PART b OF Q.8.)**

Q.8.

(Total 5 Marks)

- a. A binary relation from  $A = \{0, 1, 2, 3, 4, 5, 6\}$  to  $B = \{6, 7, 8, 9, 10, 11, 12\}$  is defined as  $r = \{(0, 6), (1, 7), (2, 8), (3, 9), (4, 10), (5, 11)\}$ .

- i. Find the range of  $r$ . (1 Mark)

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- ii. Other than  $r$ , write down any TWO binary relations from  $A$  to  $B$ . (2 Marks)

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- iii. Is  $r$  a function? Justify your answer. (2 Marks)

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- b. If  $U = \{1, 2, 3, 4, 5\}$ ,  $A = \{1, 2, 5\}$  and  $B = \{3, 5\}$ , then show that  $(A \cup B)' = A' \cap B'$ . (5 Marks)

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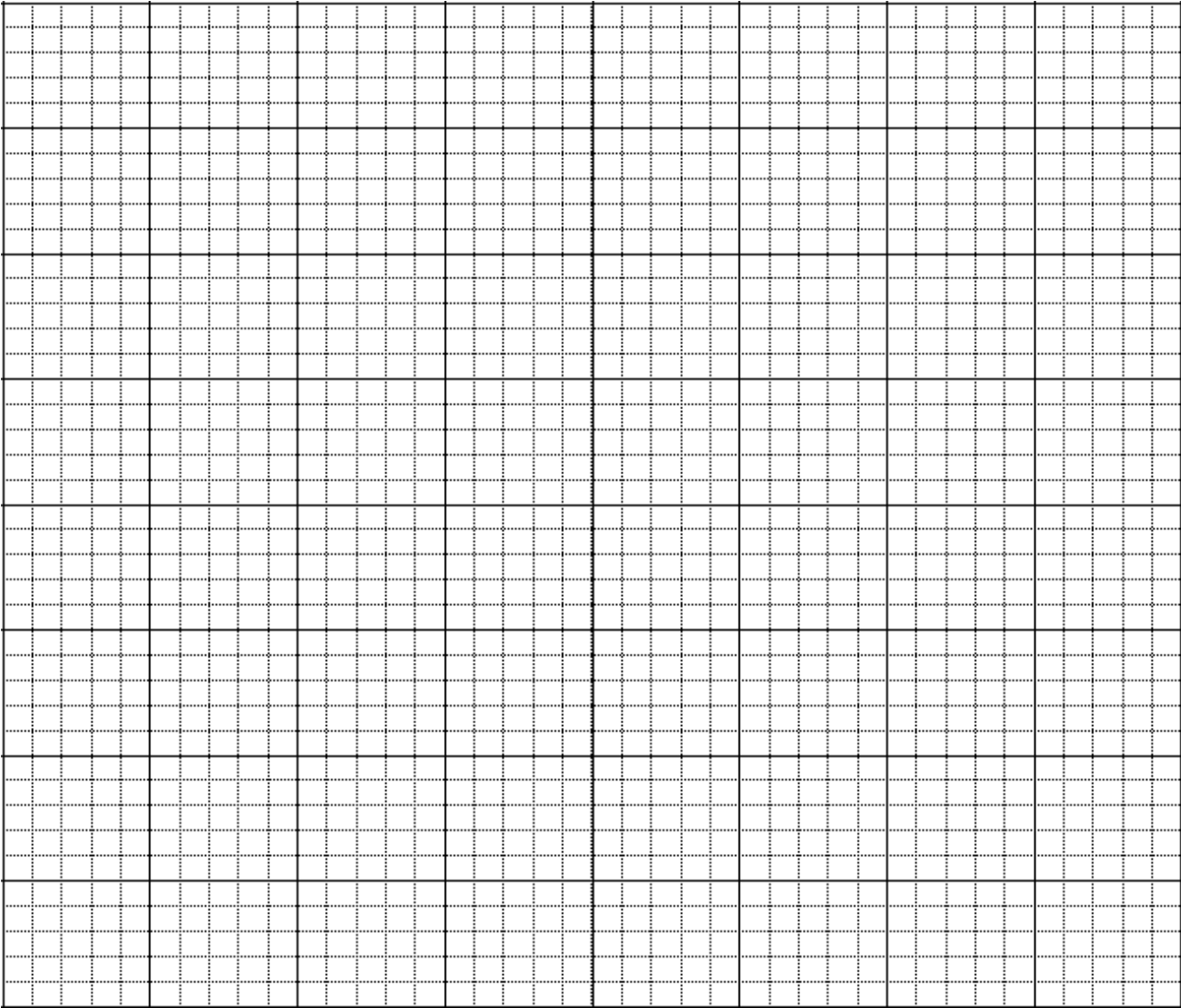
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Q.9.

(Total 5 Marks)

Show graphically that the points  $(1, -1)$ ,  $(2, 1)$ ,  $(4, -1)$  and  $(5, 1)$  are the vertices of a parallelogram. Also, find the coordinates of point of intersection of the diagonals.



Coordinates of point of intersection of the diagonals of parallelogram are: \_\_\_\_\_

## (ATTEMPT EITHER PART a OR PART b OF Q.10.)

Q.10.

(Total 6 Marks)

a.

- i. A small office has a staff of 20 employees. The distance (in kilometres) of the office from their homes is shown in the given table. Complete the table and find arithmetic mean for this data. (4 Marks)

| Distance (km) | Number of Employees |   |  |
|---------------|---------------------|---|--|
| 1 – 4         | 2                   |   |  |
| 5 – 8         | 1                   |   |  |
| 9 – 12        | 6                   |   |  |
| 13 – 16       | 10                  |   |  |
| 17 – 20       | 1                   |   |  |
| <b>Total</b>  | $\sum f = 20$       | – |  |

- ii. On a certain day, 9 friends spend the following amount (in Rupees) on a shopping trip.  
3800, 2500, 1200, 1500, 1700, 2000, 1500, 3200, 3500

Find the median amount that was spent.

(2 Marks)

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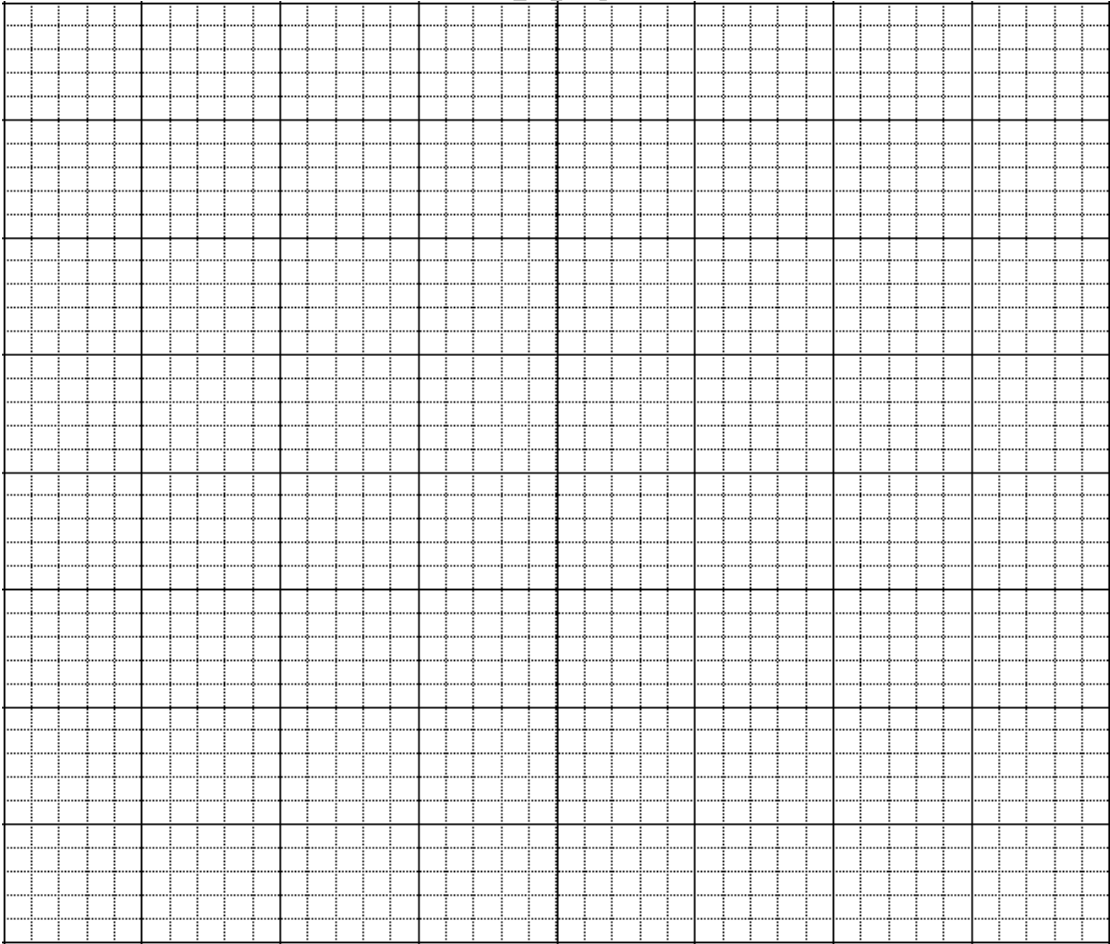
(ATTEMPT EITHER PART a OR PART b OF Q.10.)

b.

- i.
 If the mean of 5 numbers 18,  $k$ , 45, 30 and 8 is 25, then find the value of  $k$ .
 (2 Marks)

- ii.
 The given data shows the height (in centimetres) of 27 plants. Complete the given table and use it to construct a cumulative frequency curve.
 (4 Marks)

|                      |       |       |       |       |        |
|----------------------|-------|-------|-------|-------|--------|
| Height (cm)          | 0 – 2 | 2 – 4 | 4 – 6 | 6 – 8 | 8 – 10 |
| Frequency            | 2     | 5     | 10    | 8     | 2      |
| Cumulative Frequency |       |       |       |       |        |



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