AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

MODEL EXAMINATION PAPER 2023 AND ONWARDS

General Mathematics Paper II

Time: 1 hour 40 minutes   Marks: 30

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**

RUBRIC

2. There are EIGHT questions. Answer ALL the 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 coloured 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. A formulae list is provided on page 2. You may refer to it during the paper, if you wish.

6. You may use a simple calculator if you wish.

Aga Khan University Examination Board
List of Formulae
General Mathematics X

NOTE:

- The symbols have their usual meanings.

- The same formulae list will be provided in annual and re-sit examinations.

Financial Mathematics

$$I = PT \times \frac{R}{100}$$

Basic Statistics

$$\overline{X} = \frac{\sum x}{n} \qquad\qquad \overline{X} = \frac{\sum fx}{n} \quad \text{or} \quad \overline{X} = \frac{\sum fx}{\sum f}$$

$$\text{Median} = l + \frac{1}{f}\left(\frac{n}{2} - c\right) \times h \qquad\qquad \text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

$$\sigma^2 = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2 \qquad\qquad \sigma = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

Quadratic Equation

$$ax^2 + bx + c = 0, \, a \neq 0 \qquad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad \text{Disc} = b^2 - 4ac$$

Sequence and Series

$$a_n = a + (n-1)d \qquad AM = \frac{a+b}{2} \qquad a_n = ar^{n-1} \qquad GM = \pm\sqrt{ab}$$

Area and Volumes

$$\text{Area of a circle} = \pi r^2 \qquad \text{Area of a triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{Volume of a cube} = l^3 \qquad \text{Volume of a cuboid} = l \times b \times h \qquad \text{Volume of a sphere} = \frac{4}{3} \times \pi r^3$$

$$\text{Volume of a cone} = \frac{1}{3} \times \pi r^2 \times h \qquad \text{Volume of a cylinder} = \pi r^2 \times h$$

Introduction to Coordinate Geometry

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad\qquad \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Algebraic Formulae

$$(a - b)^2 = a^2 - 2ab + b^2 \qquad (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \qquad a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$a^2 - b^2 = (a + b)(a - b) \qquad (a + b)^2 = a^2 + 2ab + b^2 \qquad a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca \qquad\qquad (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

(ATTEMPT EITHER PART a OR PART b OF Q.1.)

Q.1.   (Total 3 Marks)

a.

    i.   Saif leased a car worth Rs 800,000 from a leasing company with a down payment of Rs 350,000.

        If the rate of simple interest is 7.5% for a period of 3 years, then calculate the interest Saif will have to pay on the remaining amount.   (2 Marks)

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    ii.   Zafar borrowed a loan of Rs 800,000 from a cooperative society at a simple annual interest rate of $q\%$. After one year, he paid an interest of Rs 64,000. Find the value of q.   (1 Mark)

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b.   Hira earns Rs 2,000 per hour for working 40 hours per week. She earns two times for every hour she worked over 40 hours during a week. If Hira earns Rs 92,000 in a certain week (ignoring all taxes and deductions), then find the number of overtime hours she worked during the week.

                                                                                                         (3 Marks)

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Q.2.   (Total 4 Marks)

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

Height (cm)	0 – 2	2 – 4	4 – 6	6 – 8	8 – 10
Frequency	2	5	10	8	2
Cumulative Frequency					
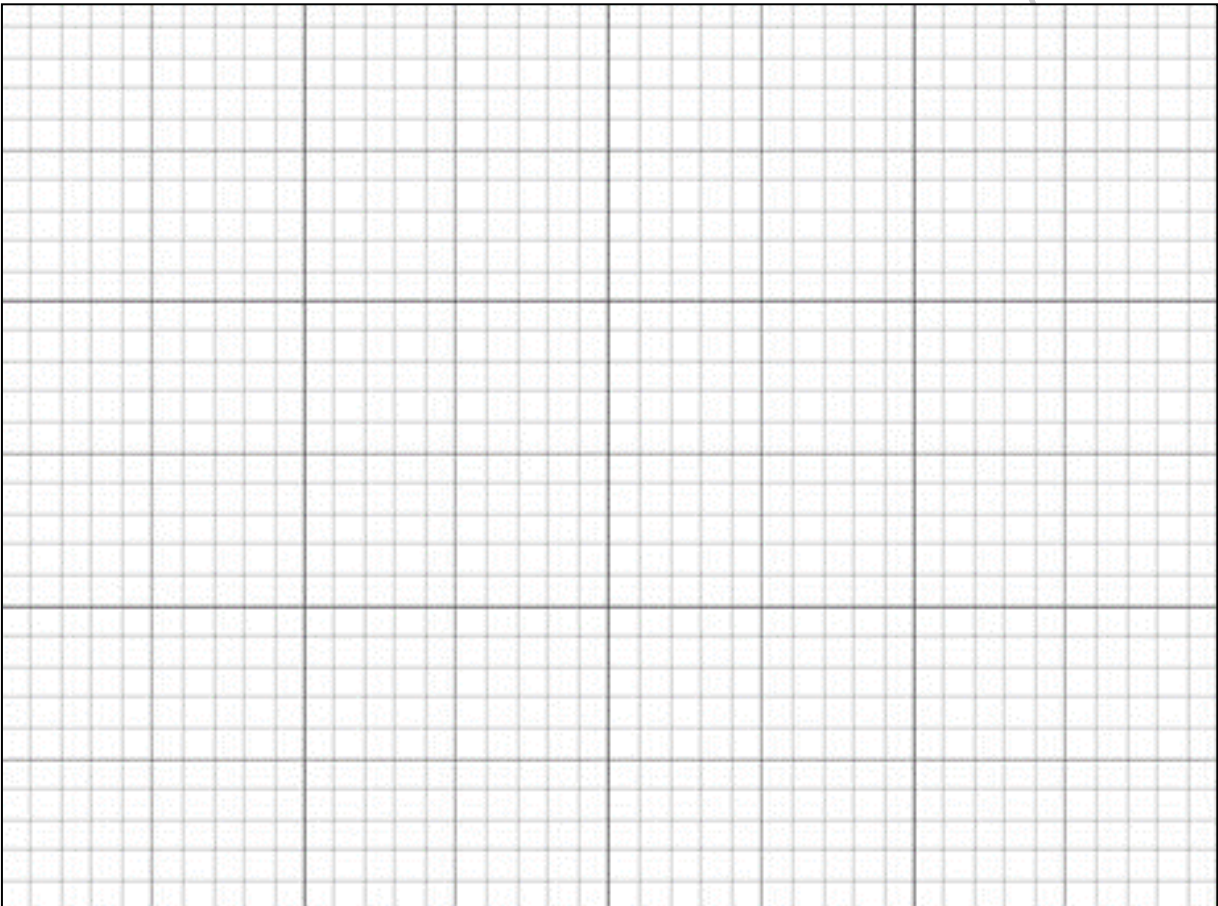
(ATTEMPT EITHER PART a OR PART b OF Q.3.)

Q.3. (Total 4 Marks)

a.   Find the highest common factor (H.C.F) and least common multiple (L.C.M) of $x^2 + 2x$ and $x^2 - 4$.

b.   Find the positive square root of $\left(16^2 + \dfrac{256b^2}{a^2 + 2ab}\right) \div \dfrac{16b^2}{a^2 + 2ab}$ by factorisation.

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Q.4. (Total 3 Marks)

Find the solution set of the linear equation $x - \dfrac{2}{3} = \dfrac{2x}{3} + \dfrac{7}{3}$.

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General Mathematics Model Paper X

Q.5. (Total 4 Marks)

Given that the half of a negative number x and its square add up to 18. Show that $2x^2 + x - 36 = 0$, hence solve the equation and find the number.

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Q.6. (Total 4 Marks)

The sum of first three terms a, $a+d$, $a+2d$ of an arithmetic progression is 54. If the 9th term of the progression is 39, then find the common difference (d) of the given progression.

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(ATTEMPT EITHER PART a OR PART b OF Q.7.)
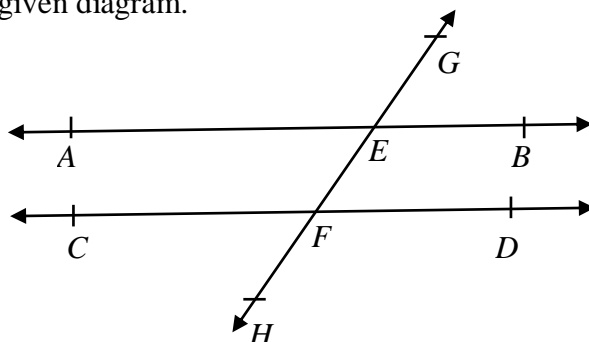
Q.7.   (Total 4 Marks)

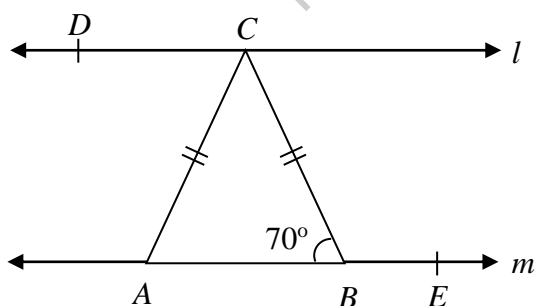a.   Consider the given diagram.   (4 Marks)

Use the given information in the diagram to fill the given table.

	Description	Pair of Angles
i	One pair of vertically opposite angles	
ii	One pair of adjacent angles	
iii	One pair of corresponding angles	
iv	One pair of alternate angles is	

b.   In the given diagram, the lines l and m are parallel to each other and $\overline{AC} = \overline{BC}$.   (4 Marks)

NOT TO SCALE

Using the given information in the diagram, write the values of angles in column 2 against each angle listed in column 1.

	Column 1: Name of Angles	Column 2: Value of the Angle (In Degrees)
i	$\angle CBE$	
ii	$\angle BAC$	
iii	$\angle ACB$	
iv	$\angle ACD$	

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General Mathematics Model Paper X

Q.8.   (Total 4 Marks)

It is given that the volume of a cone is 15 cubic units.

a.   Find the volume of the cylinder whose radius and height are same as of the cone.   (2 Marks)

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b.   Hence, show that the square of radius of cone is $\dfrac{45}{11}$ units, when its height is $\dfrac{7}{2}$ units.   (2 Marks)

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END OF PAPER

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