AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

MODEL EXAMINATION PAPER 2020

General Mathematics Paper II

Time: 2 hours 15 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**

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2.   There are NINE 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.

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

Q.1 (Total 6 Marks)

a.
   i. Salman pays a total of Rs 21,000 as school fees of his two children. The fee of the elder child is 10% more than the fee of the younger child. Find the fee of both the children separately. (3 Marks)

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   ii. Saima has annual savings of Rs 600,000 and jewellery of worth Rs 350,000. She paid her *zakat* at the rate of 2.5%.

      I. Calculate the amount of *zakat* she paid. (2 Marks)

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      II. She paid *zakat* of Rs 13,000 to her needy relative. What percentage of *zakat* did she pay to her relative? (1 Mark)

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

b

i. Mr Hashim left a property of Rs 7,800,000 as his inheritance. His legal heirs consist of a widow, three daughters and two sons. The share of widow is $\frac{1}{8}th$ of the total property. The remaining property will be divided among his children. A son received twice as much as a daughter. Find the share of each legal heir. (4 Marks)

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ii. Find the value of x if $5 : 2x = 3 : 2x - 4$. (2 Marks)

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Q.2. (Total 5 Marks)

A fruit vendor bought 100 kg apples for Rs 9,000, 30 dozen bananas for Rs 1,800 and 50 kg grapes for Rs 6,000. He spent Rs 900 on transportation and sold all the fruits as per the given rates.

- Apples at Rs 140 per kg
- Bananas at Rs 75 per dozen
- Grapes at Rs 150 per kg

i.   Find his net profit on the sale of these fruits. (3 Marks)

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ii.   If 3 dozen bananas were rotten, then find his profit or loss on the sale of bananas. (2 Marks)

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Q.3. (Total 5 Marks)

Two sets are defined as $S = \{1, 2, 3, 4\}$ and $T = \{2, 6, 8\}$.

i.   From S to T, state a/ an

    I.   binary relation which is NOT a function. (1 Mark)

    II.   into function. (1 Mark)

    III. onto function. (1 Mark)

ii.   Is it possible to find a one-one and onto function (bijective function) from S to $T?$ Justify your answer. (2 Marks)

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Q.4 (Total 5 Marks)

Apply the laws of exponents to reduce $\sqrt[3]{125 \times \dfrac{x^{-4}}{x^2}} \times \sqrt{\dfrac{x^4}{25}}$ in its simplest form.

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Q.5. (Total 5 Marks)

Simplify the following expression into the lowest term.

$$\frac{a^2 x^2 + 2abx + b^2}{(ax)^2 - b^2} \div \frac{ax + b}{ax - b}$$

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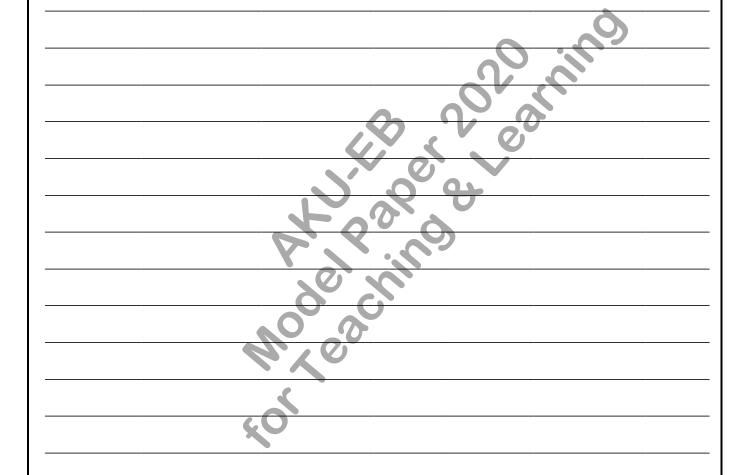**(ATTEMPT EITHER PART a OR PART b OF Q.6.)**

Q.6.   (Total 5 Marks)

a.   The algebraic expression $x^3 + 3x^2 + ax - b$ is divided by $x - 1$ and $x + 2$. The remainders are 3 and -12 respectively. Find the value of a.   (5 Marks)

b.   Factorise the following expressions completely.

   i. $ax + 2y + 2x + ay$ (3 Marks)

   ii. $x^2 + 2bx + b^2 - y^2$ (2 Marks)
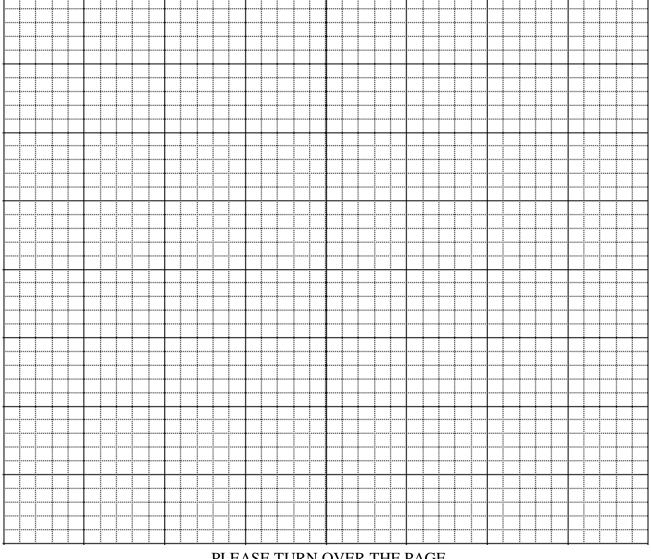
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Q.7. (Total 4 Marks)

For the linear equation $2x + 3y = 12$,

i. find the missing values of x and y in the given table. (2 Marks)

X	– 3	0	?
Y	?	4	8

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ii. Use any two points of the table to draw the line $2x + 3y = 12$ on the given graph. (2 Marks)

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

Q.8. (Total 6 Marks)

a.

i. Find the matrix X from the following equation. (5 Marks)

$$\frac{1}{3}X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 10 & 8 \\ 6 & 4 \end{bmatrix} + \begin{bmatrix} 10 & 8 \\ 6 & 4 \end{bmatrix}$$

ii. Is X a diagonal matrix? (1 Mark)

b. For the matrices $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 2 \\ 6 & 4 \end{bmatrix}$, find

i. $A \times B^{-1}$. (5 Marks)

ii. $\left| A \times B^{-1} \right|$. (1 Mark)

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Q.9. (Total 4 Marks)

Draw a triangle whose sides are of measurements 9 cm, 6 cm and 7 cm. Also construct any two of its altitudes.

Space for diagram

END OF PAPER

General Mathematics Model Paper IX

Please use this page for rough work