AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

MODEL EXAMINATION PAPER 2018

Mathematics Paper II

Time: 2 hours 10 minutes   Marks: 40

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 coloured pencils.
DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.
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 4 Marks)

In a class of 50 students, 25 students use X - mobile network; whereas 38 students use Y - mobile network. Hence, each student uses at least one of the two mobile networks.

a.   Draw a Venn diagram to illustrate the given situation. (1 Mark)

b.   Calculate the number of students who use both X and Y - mobile networks? (3 Marks)

Space for diagram

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Q.2.   (Total 4 Marks)

Separate the real and imaginary parts of $\dfrac{(2-i)^2}{1+i}$.

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Q.3. (Total 4 Marks)

Find the value of $\frac{1}{2}x$ for $\log_6 1 + \dfrac{\log_6 216}{\log_6 36} = x$.

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

Q.4. (Total 5 Marks)

a. If $x + \dfrac{1}{x} = 5,$ then find the value of $3x^3 + \dfrac{3}{x^3}$.

b. For three quantities a, b and c, if $\dfrac{a+b+c}{2} = 40$ and $a^2 + b^2 + c^2 = 3000,$ then find the value of $ab + bc + ca$.

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(ATTEMPT EITHER PART a OR PART b OF Q.5.)

Q.5. (Total 5 Marks)

a. Two factors of the polynomial $p(x) = x^3 + mx^2 + nx - 2$ are $x - 1$ and $x + 1$. Find the values of m and n. (5 Marks)

b. Factorise the following completely.

    i. $36a^4 + 12a^2b + b^2 - 9$ (3 Marks)

    ii. $a^{15} - 216b^{15}$ (2 Marks)

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Q.6. (Total 4 Marks)

The width *w* units of a rectangular solid with a fixed volume, is inversely proportional to its length *l* units and breadth *b* units.

Width (*w* units)	Length (*l* units)	Breadth (*b* units)
3	4	2
?	6	2.5

Using the table, find the missing width of the rectangular solid.

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Q.7. (Total 5 Marks)

a. Find the value of *p* and *q* for the given matrix equation.

$$2\begin{bmatrix} 2 & p \\ 1 & 5 \end{bmatrix} + \begin{bmatrix} 1 & 2 \\ 3 & 0 \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ q & 10 \end{bmatrix}$$ (3 Marks)

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b. Find $\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} \times \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ and state the reason why these two matrices are conformable for

multiplication. (2 Marks)

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Q.8. (Total 3 Marks)

Construct a triangle *ABC* with *AB* = 10 cm, $\angle A = 30°$ and *BC* = 6 cm. Also draw a median of the triangle.
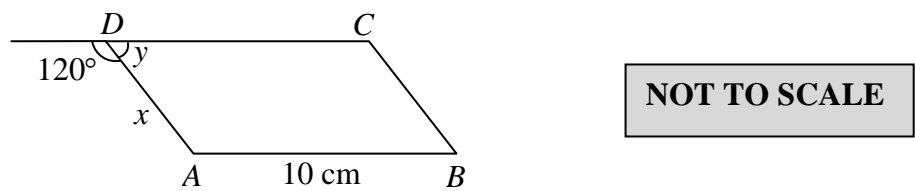
Space for diagram

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(ATTEMPT ANY TWO PARTS FROM a, b AND c OF Q.9.)
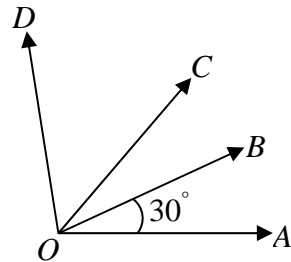
Q.9.   (Total 6 Marks)

a.   The perimeter of the given parallelogram *ABCD* is 38 cm. Find *x* and *y*.   (3 Marks)

NOT TO SCALE

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(ATTEMPT ANY TWO PARTS FROM a, b AND c OF Q.9.)

b.   In the following figure, *OB* and *OC* are angle bisectors of $\angle COA$ and $\angle DOA$ respectively.

(3 Marks)

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Find
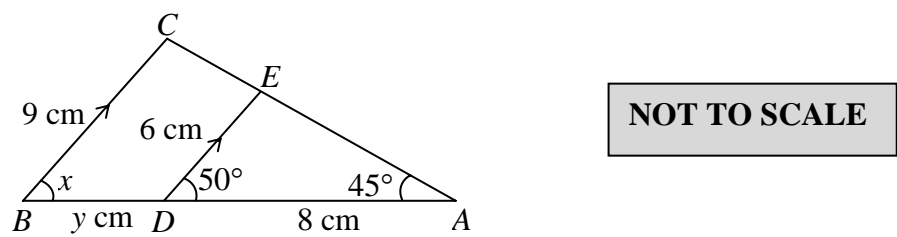
i. $\angle BOC$ (1 Marks)

ii. $\angle DOA$ (2 Marks)

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(ATTEMPT ANY TWO PARTS FROM a, b AND c OF Q.9.)

c.   In the following diagram, *BC* is parallel to *DE*. Find the values of *x* and *y*.   (3 Marks)

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END OF PAPER

Mathematics Model Paper IX

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