AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

ANNUAL EXAMINATIONS (THEORY) 2023

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.

List of Formulae

NOTE:

- The symbols have their usual meanings.

- **Financial Mathematics**

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

Basic Statistics

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

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

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

Quadratic Equations

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

Algebraic Manipulation

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

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

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

Arithmetic and Geometric Sequence

$$a_n = a_1 + (n-1)d \qquad AM = \frac{a+b}{2} \qquad a_n = a_1 r^{n-1} \qquad GM = \pm\sqrt{ab}$$

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

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

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

Q.1. (Total 3 Marks)

a. Akhtar intends to deposit some money in his bank account. The bank offers 10% simple interest rate annually.

Assuming that the interest is drawn on yearly basis, calculate the

i. amount of money he needs to deposit if he aims to produce Rs 100,000 annual interest. (2 Marks)

ii. number of years required to collect interest of Rs 400,000. (1 Mark)

b. Ayesha works in a private company where she is paid a monthly salary of Rs 50,000. For working overtime, she is paid Rs 500 per hour.

In a certain month, she was paid Rs 60,000. Calculate the

i. amount paid as overtime. (1 Mark)

ii. number of hours worked as overtime. (2 Marks)

Q.2. (Total 4 Marks)

The given table shows the number of daily mails received during a particular week in an office.

Complete the table and calculate the arithmetic mean.

Number of mails	**Number of occurrences (*f*)**	**Class Mark (*x*)**	***fx***
11-15	12		
16-20	10		
21-25	25		
26-30	19		
31-35	9		
Total	75		

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

Q.3. (Total 4 Marks)

a. Find the square root of $x^4 + 4x^3 - 2x^2 - 12x + 9$ by division method.

b. Find the HCF of $x^3 - 3x + 2$ and $x^3 - 4x^2 + 5x - 2$ by division method.

Q.4. (Total 3 Marks)

Solve the equation $\frac{2x+1}{3}=\frac{2x}{5}$.

Q.5. (Total 4 Marks)

Solve the equation $x^2-x-1=0$ by completing square method.

Q.6. (Total 4 Marks)

The 5^{th} term and 6^{th} term of an arithmetic sequence is 30 and 35 respectively. Calculate the

i. common difference. (1 Mark)

ii. 1^{st} term of the sequence. (1 Mark)

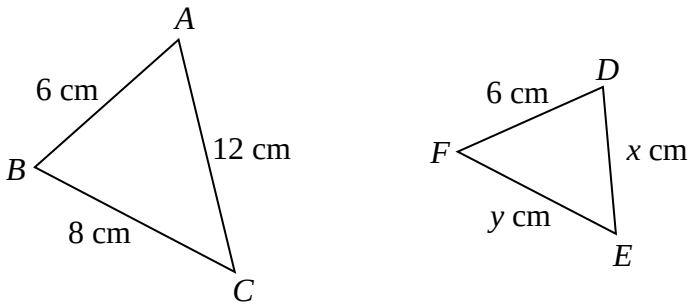
iii. value of n, if the n^{th} term is 55. (2 Marks)

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

Q.7. (Total 4 Marks)

a. In the correspondence $\Delta ABC \leftrightarrow \Delta DEF$, ABC and DEF are similar.

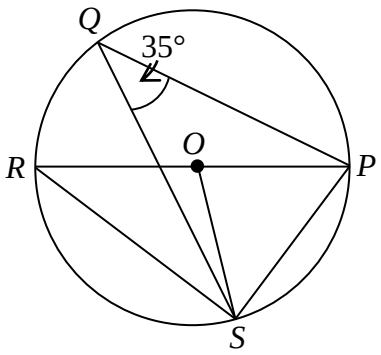
NOT TO SCALE



Find the values of x and y.

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

b. In the given diagram, a circle with centre *O* is given.



NOT TO SCALE

If the measure of the angle *SQP* is 35°, find the angle

i. *SOP*. (1 Mark)

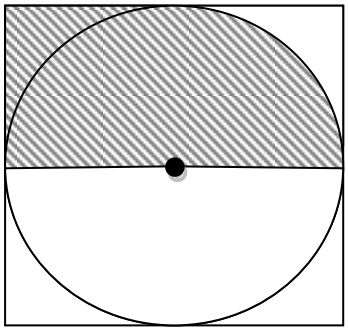
ii. *SRP*. (1 Mark)

iii. *SOR*. (1 Mark)

iv. *RPS*. (1 Mark)

Q.8. (Total 4 Marks)

In the given diagram, the area of the square is *s* square units and the area of the circle is *c* square units.



NOT TO SCALE

In the given diagram, find the area of the shaded region in terms of *s* square units and *c* square units.

END OF PAPER

Please use this page for rough work

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