

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

MAY 2016

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 ELEVEN 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.

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

Q.1. (Total 4 Marks)

a. Verify that $\left(\frac{8a^8b^2}{a^2b^5}\right)^{\frac{1}{3}} = \frac{2a^2}{b}$.

b. Simplify $\frac{3+3i+5-2i-6}{2-i}$ to the form $a+ib$.

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

Q.2.

(Total 4 Marks)

- a. For the sets $U = \{1, 2, 3, 4, 5\}$, $A = \{1, 2, 3\}$ and $B = \{2, 4, 5\}$, find the value of $(A \cup B) \cap (A \cap B)^C$.

(4 Marks)

- b. If $A = \{2, 4, 6\}$ and $B = \{5, 10, 15\}$ are the given sets, then

- i. decide whether the relation $r = \{(2, 5), (4, 10), (4, 15)\}$ is a function from A to B or not?
Justify your answer.

(2 Marks)

- ii. find the domain and range of r .

(2 Marks)

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Q.3.

(Total 3 Marks)

By applying laws of logarithm, express $\log m - \log n + \frac{1}{2} \log p$ as a single logarithmic term.

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

Q.4.

(Total 4 Marks)

- a. Reduce $\frac{xy(x-y)}{2(x+y)} \div \frac{x^2y-xy^2}{2(x^2+2xy+y^2)}$ to its simplest form.
- b. Apply continued product to verify that $(2x+1)(2x-1)(4x^2+2x+1)(4x^2-2x+1) = 64x^6 - 1$.

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

Q.5.

(Total 5 Marks)

- Factorise $(z^2 - z - 3)(z^2 - z + 1) + 4$ completely.
- Find the zeros of the polynomial $y^2 - 5y + 6$. Hence, find the remainder when $y^2 - 5y + 6$ is divisible by $y - 3$.

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

Q.6.

(Total 4 Marks)

- a. x varies jointly as the values of y and z . If the value of x is 45 when $y = 72$ and $z = 0.5$, then find the value of y when $x = 18$ and $z = 2$.
- b. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = k$, then verify that $k^2 = \frac{a^2 + c^2 + e^2}{b^2 + d^2 + f^2}$.

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Q.7.

(Total 5 Marks)

The determinant of a matrix $A = \begin{bmatrix} 5 & x \\ 3 & 10 \end{bmatrix}$ is -4 . Find the value of x and also find the multiplicative inverse of the matrix A .

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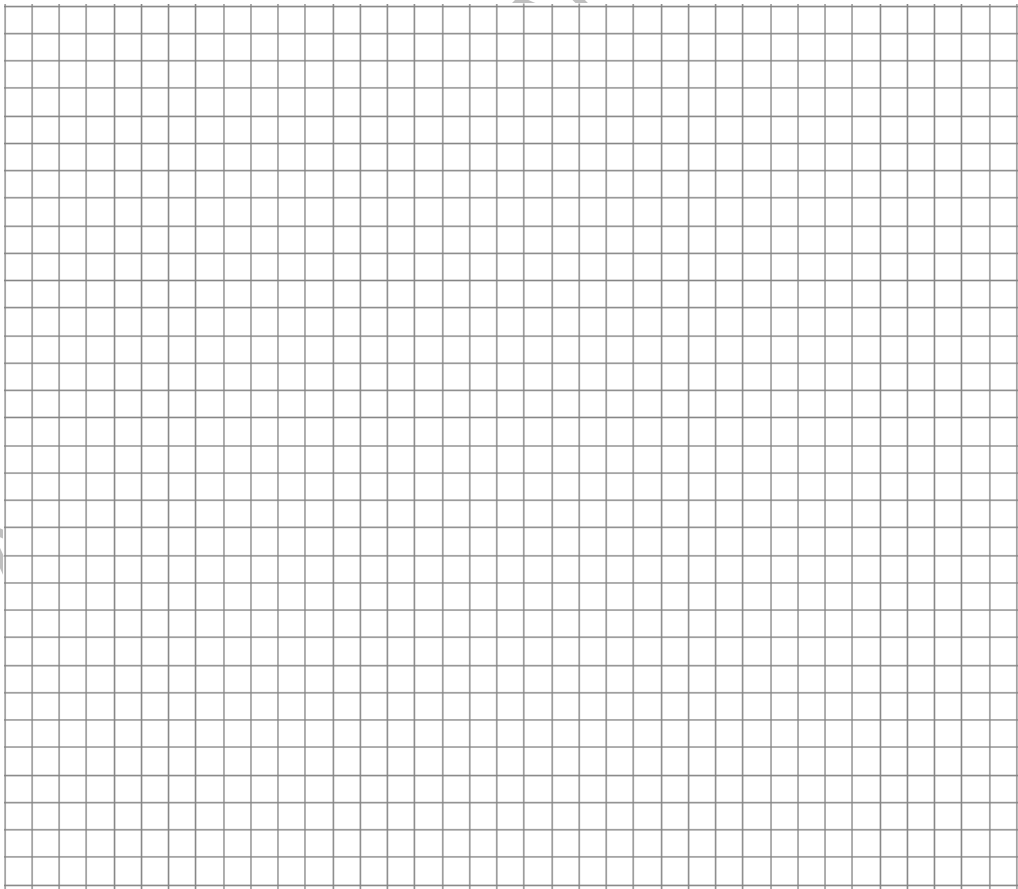
Q.8.

(Total 4 Marks)

In the given space, draw the cumulative frequency curve to represent the given frequency distribution.

Life of Bulb (Days)	Frequency (f)	Cumulative Frequency	Upper Class Boundary
300 – 309	4	4	309.5
310 – 319	5	9	319.5
320 – 329	7	16	329.5
330 – 339	9	25	339.5
340 – 349	7	32	349.5
350 – 359	3	35	359.5
Total	35	-	-

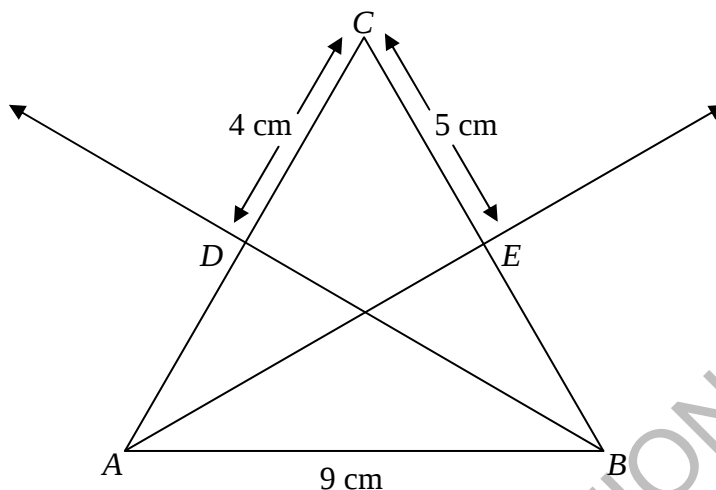
Space for diagram



Q.9.

(Total 4 Marks)

In the given triangle ABC , $\overrightarrow{BD}$ and $\overrightarrow{AE}$ are the medians of the triangle.



NOT TO SCALE

i. Find $m\overline{DE}$ and $m\overline{BC}$.

(2 Marks)

ii. Is $\overline{DE}$ parallel to $\overline{AB}$? Give a reason to justify your answer.

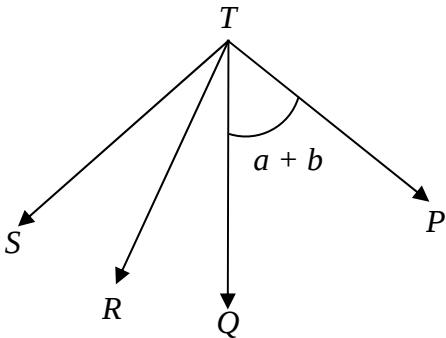
(2 Marks)

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

Q.10. (Total 4 Marks)

- a. Given that TQ and TR are the angle bisectors of $\angle STP$ and $\angle STQ$ respectively, as shown in the diagram, find the following.

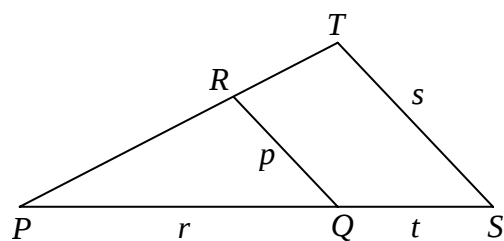


NOT TO SCALE

- i. $m \angle STR$ (2 Marks)

- ii. $m \angle STP$ (2 Marks)

- b. The given diagram shows $\triangle PRQ$ is similar to $\triangle PTS$.



Comprehend the diagram to complete the following statements.

- i. $m\angle PRQ$ is equal to _____
- ii. $\triangle RPQ$ is similar to _____
- iii. $\frac{PR}{PT}$ is equal to _____
- iv. In terms of r and t , $\frac{p}{s}$ is equal to _____

Q.11.

(Total 4 Marks)

Construct a triangle ABC with $m\overline{AB} = 7\text{ cm}$, $m\angle A = 45^\circ$ and $m\angle B = 70^\circ$. Draw any two altitudes of the triangle.

Space for diagram

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