

2024 SHS2 END OF SEMESTER EXAMS – MATHEMATICS [ELECTIVE] 2
MATHEMATICS [ELECTIVE]
PAPER 2

Answer **all** questions in Section **A** and **three** questions in Section **B**
In each question, all necessary details of workings, including rough work **must** be shown with the answer. Give answers as accurately as data and tables allow.

SECTION A

[30 Marks]

Answer **all** the questions in this section. All questions carry **equal marks**

1. Simplify $(\sqrt{2} + \sqrt{3})^2 - (\sqrt{2} - \sqrt{3})^2$, leaving your answer in surd form
2. a. Find the equation of the perpendicular bisector of line joining two points $A(3,1)$ and $B(5, -1)$
b. Find the radius and the centre of $x^2 + y^2 - 4x + 6y - 12 = 0$
3. Two functions f and g are defined on the set R , of real numbers by $f: x \rightarrow x^2 + 1$ and $g: x \rightarrow x - 2$. Find
a) fog ;
b) The values of x such that $fog(x) = 5$
4. If $x^2 + 2x - 8$ is a factor of the polynomial $f(x) = ax^3 - 4x^2 + 28x - 16$, find the value of a .
5. Find and state the domain of the rational function $f(x) = \frac{2x}{x+2}$.

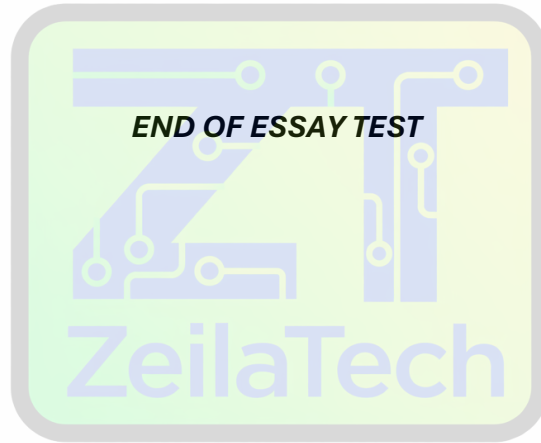
SECTION B

[30 marks]

Answer **THREE** questions only from this section.

6. (a) Expand $(x + 2y)^6$, using the pascal triangle.
(b) From (a), find the value of the coefficient of y^4 .
7. i) The points $(3,-2)$ and $(-5, 6)$ are the end points of a circle. Find the equation of the circle
ii) Express $\frac{x^2+1}{(x^2+2)(x-1)}$ in partial fraction
8. The line $3x + 2y - 1 = 0$, $4x + 5y + 3 = 0$ intersect at M . Find the
a) coordinates of M
b) equation of the line through M parallel to the line $3x - 4y + 7 = 0$

9. a) Calculate the distance and midpoint between the point $(-2,5)$ and $(-1,3)$
b) Use the information of (a) above to find the equation of a circle
10. Shade the region P in the x-y plane which satisfies simultaneously the inequalities
 $y - x \geq 2, 3y + 4x \leq 48, y + x \geq 6, x \geq 0, y \geq 0$
11. i. Find the equation of the circle given the radius $\sqrt{10}$ and the centre $(-2,3)$
ii. Find the equation of the circle given the end point of its diameter as $(2,-3)$ and $(-1,4)$



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