ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

EXAMINATION MATERIAL ZUEB - 2022

MATHEMATICS XII

SECTION "C" EXTENDED RESPONSE QUESTION (ERQ'S)

i. $\int_0^2 \frac{dx}{\sqrt{1+x}+\sqrt{x}}$

ii. $\int \frac{x+8}{\sqrt{x}}\, dx$

iii. $\int 4x^3\,(x^4+1)^{\frac{3}{2}}\, dx$

iv. $\int \frac{x^2\, dx}{(1-2x^3)^{\frac{2}{3}}}$

v. $\int sin\,(3x+2)dx$

vi. $\int \frac{sec\,x\,tanx}{a+b\,sec\,x}\, dx$

vii. $\int (sec\,4x-1)^2 dx$

viii. $\int e^{3cos\,2x}\, sin\,2x\, dx$

Q2) Prove that the points whose coordinates are respectively (5, 1), (1, -1) and (11, 4) lie on a straight line. Find the intercepts made by this line on the axes.

Q3) A is the mid-point of the segment bounded by (-2, 3) and (6, -1). B is a point at $\frac{3}{4}$ of the distance from (4, 3) to (0, -3). Find the equation of AB.

Q4) For the triangle with vertices A (5, 1), B (3, -5) and C (-3, 7); find the equation of the altitude from B.

Q5) Determine the equation of the line which passes through the point (-2, -4) and has the sum of its intercepts equal to 3.

Q6) Find the equation of a line through the intersection of the lines $2x + 3y + 1 = 0, 3x - 4y = 5$ and passing through the point (2, 1)

Q7) Determine the values of λ and μ for which the line $(\lambda + 2\mu - 3)x + (2\lambda - \mu + 1)y + 6\lambda + 9 = 0$ is parallel to the axis of x and has a y-intercept -3. Write the equation of this line.

Q8) The coordinates of two points A and B are (3, 4) and (5, -2) respectively. Find the coordinates of any point P if |PA| = |PB| and the area of triangle PAB is 10 square units.

Q9) Prove that the points whose coordinates are respectively (5, 1), (1, -1) and (11, 4) lie on a straight line. Find the intercepts made by this line on the axes.

Q10) A is the mid-point of the segment bounded by (-2, 3) and (6, -1). B is a point at $\frac{3}{4}$ of the distance from (4, 3) to (0, -3). Find the equation of AB.

Q11) For the triangle with vertices A (5, 1), B (3, -5) and C (-3, 7); find the equation of altitude from B.

Q12) Determine the equation of the line which passes through the point (-2, -4) and has the sum of its intercepts equal to 3.

Q13) Find the equation of a line through the intersection of the lines $2x + 3y + 1 = 0, 3x - 4y = 5$ and passing through the point (2, 1)

Q14) Determine the values of λ and μ for which the line $(\lambda + 2\mu - 3)x + (2\lambda - \mu + 1)y + 6\lambda + 9 = 0$ is parallel to the axis of x and has a y-intercept -3. Write the equation of this line.

Q15) The coordinates of two points A and B are (3, 4) and (5, -2) respectively. Find the coordinates of any point P if |PA| = |PB| and the area of triangle PAB is 10 square units.

Q16) Prove that the two circles $x^2 + y^2 + 2gx + c = 0$ and $x^2 + y^2 + 2fy + c = 0$, touch each other if $\frac{1}{f^2} + \frac{1}{g^2} = \frac{1}{c}$.

Q17) Show that the line $\frac{x}{\alpha} + \frac{b}{\beta} = 1$ touches the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, if\ \frac{a^2}{\alpha^2} + \frac{b^2}{\beta^2} = 1$

Q18) Prove that the line $lx + my + n = 0$ and the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ have just one point in common if: $a^2l^2 + b^2m^2 - n^2 = 0$