DAE/IA-2015/08 FIRST YEAR

MATH-123 APPLIED MATHEMATICS – I

COMMON WITH BIO MEDICAL, COMPUTER, COMPUTER INFORMATION, ELECTRICAL, ELECTRONICS, FOOD, FOOD PROCESSING & PRESERVATION, INFORMATION & COMMUNICATION, INSTRUMENT, INSTRUMENTATION, MECHATRONICS AND TELECOMMUNICATION TECHNOLOGIES.

PAPER 'B' (Subjective)

Time: 2:30 Hours **SECTION – I** **Marks:60**

Q.1: Write short answer to any Eighteen (18) questions: - $18 \times 2 = 36$

1. Write the conjugate and Modulus of $-2+i$

2. Simplify the complex numbers $\dfrac{-9+4i}{8-3i}$

3. Factorize: $36a^2+100b^2$

4. Show that $\left|\dfrac{1+2i}{2-i}\right|=1$

5. Find the additive inverse of $(3,\ -8)$.

6. Resolve $\dfrac{1}{x^2-1}$ into partial fractions.

7. Write an identity equation of $\dfrac{2x+5}{x^2+5x+6}$

8. From of partial fractions of $\dfrac{1}{(x+1)^2(x-2)}$ is:

9. Resolve into partial fractions $\dfrac{2x}{(x-2)(x+5)}$

10. Define octal number.

11. Convert the decimal number $(932)_{10}$ to octal number.

12. Prove by Boolean Algebra Rules $X+XZ=X$

13. In Boolean algebra, prove that $X(\overline{X}+Y)=XY$

14. Prove by truth table that $X(X+Y)=X$

15. Find the coordinates of the mid-point of the segment $P_1(3, 7)$, $P_2(-2, 3)$.

16. Write distance formula between two points and give one example.

17. Find the equation of a line through the points (-1, 2) and (3, 4).

18. Find an equation of the line with the intercepts are a = 2, b = −5.

19. Reduce the equation 3x + 4y – 2 = 0 into intercept form.

20. Find the points of intersection of the lines x + 2y – 3 = 0, 2x – 3y + 8 = 0

21. Find the slope of the line joining the points (2, 4) and (-2, 1).

22. Find the equation of a line through the point (3, -2) with slope $m = 3/4$.

23. Find the equation of circle with center on origin and radius is ½.

24. Find the center and radius of the circle $x^2+y^2+9x-7y-33=0$

25. What type of circle is represented by $x^2+y^2-2x+4y+8=0$

26. Reduce the equation $x^2+y^2-4x+6y-12=0$ into standard form of the circle.

27. Define the circle.

SECTION – II

Note: Attempt any three (03) questions. $3 \times 8 = 24$

Q.2: **(a)** Simplify $\frac{2+i}{1-3i}$

(b) Find the multiplicative inverse of $4+3i$

Q.3: Resolve into partial fractions $\frac{6x^2-11x-32}{(x+6)(x+1)^2}$

Q.4: **(a-i)** Convert $(65)_8$ to binary number.

(a-ii) Convert $(10110010)_2$ to its octal equivalent.

(b) Prove preparing truth table that $(X+Y)(X+Z)=X+YZ$

Q.5: **(a)** Show that (-3, 1), (2, 4) and (0, -4) are the vertices of a right angled triangle.

(b) Find the equation for the straight line passing Through the points (4, 2) and (-5, -1).

Q.6: Find the equation of the circle passing through the points (0, 1), (3, -3) and (3, -1).

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