Roll No._____

DAE/IIA-2019/10

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 Marks: 60

SECTION-I

Q. 1 Write short answers to any Eighteen (18) questions. **18x2=36**

1. Write the conjugate and modules of $(-2 + i)$.
2. Simplify the complex number $\frac{-9+4i}{8-3i}$.
3. Show that $\left|\frac{1+2i}{2-i}\right| = 1$
4. Find the multiplicative inverse of (-3, 4).
5. Factorize $(36a^2 + 100b^2)$.
6. Resolve into partial fraction $\left(\frac{7x+25}{(x+3)(x+4)}\right)$.
7. Resolve $\frac{1}{x^2-1}$ into partial fractions.
8. Write in the form of partial fractions $\frac{x^5}{x^4-1}$.
9. Write in the form of partial fractions $\frac{1}{(x+2)^2(x-1)}$.
10. Define octal numbers.
11. Add the binary number $(110)_2 + (1011)_2$
12. Define (i) OR gate (ii) AND gate.
13. Prove by Boolean algebra rules $X + \bar{X}Y = X + Y$
14. Construct a logic diagram for B. (A + C).
15. Write distance formula between two points (x_1, y_1) and (x_2, y_2).
16. Find the slope of the line which is perpendicular to the line joining P_1 (2, 4) and P_2 (-2, 1).
17. Find the equation of line having x-intercept = -2 and y-intercept = 3.
18. Find the equation of a line whose perpendicular distance from the origin is 2 and inclination of the perpendicular is 225^o.
19. Show that the points (1, 9), (-2, 3) and (-5, -3) are collinear.
20. Find the distance of the point (-2, 1) from the line $3x + 4y - 12 = 0$
21. Find the co-ordinates of the mid point of the segment A(3, 7) and B(-2, 3).
22. Reduce the equation $3x + 4y - 2 = 0$ into intercept form.
23. Define a circle.
24. Write the general form of the equation of a circle.
25. Find the centre and the radius of the circle $x^2 + y^2 + 9x - 7y - 33 = 0$.
26. Find the equation of circle with centre at (-1, 3) and tangent to x-axis.
27. Reduce the equation of the circle $x^2 + y^2 - 4x + 6y - 12 = 0$ into standard form.

SECTION-II

Note: Attempt any three (03) questions. **3x8=24**

Q. 2 a) Simplify $(-1 + \sqrt{3}i)^3$.

b) Find the multiplicative inverse of (-3, 4).

Q. 3 Resolve $\frac{1}{x^4(x+1)}$ into partial fractions.

Q. 4 a) i) Convert $(35)_8$ into decimal number.

ii) Convert $(245)_{10}$ to its octal equivalent.

b) Prepare a truth table for the Boolean expression $X.Y.Z + \bar{X}.\bar{Y}.\bar{Z}$

Q. 5 Reduce the equation $3x + 4y = 10$ to.

a) Slope-intercept form b) Intercept form c) Normal form

Q. 6 a) Find the equation of the circle having (-2, 5) and (3, 4) as the end points of its diameter.

b) Find the centre and the radius of the circle $x^2 + y^2 - 6x + 6y = 0$.

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