Roll No._____

DAE/IIA-2018/10

FIRST YEAR

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

MATH.123 APPLIED MATHEMATICS-I

PAPER 'B' (Subjective)

Time: 2:30 Hours **Marks: 60**

SECTION-I

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

1. Write the conjugate and modulus of $-\frac{2}{3}-\frac{4}{9}i$
2. Prove that if $Z=\bar{Z}$, then $\bar{Z}$ is real.
3. Factorize $2x^2+5y^2$
4. Express complex number $3-\sqrt{3}\,i$ in polar (trigonometric) form.
5. Express $|Z| = 3$ and $\arg Z = -\frac{\pi}{2}$ in the form $x + iy$
6. Define improper fraction and given one example:
7. Resolve $\frac{1}{x^2-1}$ into partial fraction:
8. Write an identity equation of $\frac{2x+5}{x^2+5x+6}$
9. Form of partial fraction of $\frac{1}{(x+1)^2(x-2)}$ is _____.
10. Define "Binary Number".
11. Convert octal number 107_8 to binary numbers.
12. Prove $X + X\bar{Z} = X$ by Boolean Algebra rules.
13. Prove $X(\bar{X} + Y) = XY$ by Boolean Algebra rules.
14. Prepare a truth table of $X(X+Y) = X$
15. Find the co-ordinate of the mid-point of the segment $P_1(3,7)$, $P_2(-2, 3)$.
16. For the triangle whose vertices are A(0,1), B (7,2) and C(3,8). Find the length of the median from C to AB.
17. Find the angle between the lines having slopes –3 and 2
18. Find the equation of a line through the point (3,-2) with slope $m = \frac{3}{4}$.
19. Find the equation of a line whose perpendicular distance from the origin is 2, and inclination of the perpendicular is 225°.
20. Find the equation of the line passing the point (1, –2) making an angle of 135° with the x-axis.
21. Find the point of intersection of the lines $x + 2y - 3 = 0$, $2x - 3y + 8 = 0$
22. Show that the points (1,9), (-2, 3) and (-5, -3) are collinear.
23. Show that the lines passing through the points (0, -7), (8, -5) and (5, 7), (8, -5) are perpendicular.
24. Write the equation of circle with centre at (h, k) and radius r.
25. Find centre and radius of the circle $x^2+y^2+9x-7y-33=0$
26. Reduce the equation into standard form $x^2+y^2-4x+6y-12=0$
27. Find the equation of the circle which touches both the axes of 4th quadrant and has a radius of 5 units.

Contd……P/2

SECTION-II

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

Q. 2 (a) Extract the square root of $-3 + 4i$.

(b) Write complex number 4 Cis 240° in the form $a + bi$.

Q. 3 (a) Resolve $\frac{1}{(1-x)(1-2x)(1-3x)}$ into partial fraction.

(b) Resolve $\frac{1}{x^3-1}$ into partial fraction.

Q. 4 (a) Convert 18×24 to binary form and then perform binary multiplication.

(b) Minimize the expression $X = \overline{A}\,B\,\overline{C} + A\overline{B}\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C}$

Q. 5 (a) The point (x, y) is on the x-axis and is 6 units away from the point (1, 4), find x and y.

(b) Find the points trisecting the join of A(-1, 4) and B(6 , 2)

Q. 6 Find the equation of the circle Passing through the points (0,1), (3, –3) and (3, –1).

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