Roll No._____ DAE/IA-2019/10

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. Simplify the complex number $\frac{-9+4i}{8-3i}$.
2. Find the values of x and y from the equation $(2x-y-1)-(x-3y)\,i=(y-x)-(2-2y)\,i$
3. If $Z=2+3i$, Prove that $Z\bar{Z}=13$
4. Factorize $36a^2+100b^2$
5. Express $|Z|=2$ and $\arg Z=\frac{\pi}{3}$ in the form $x+iy$
6. What is Partial Fraction?
7. Resolve $\frac{7x+25}{(x+3)(x+4)}$ into partial fraction.
8. Write an identity equation of $\frac{6x^3+5x^2-7}{3x^2-2x-1}$
9. Form of partial fraction of $\frac{1}{(x^2+1)(x-4)^2}$ is _____.
10. Define "Decimal number".
11. Convert 110011.11_2 to decimal numbers.
12. Define NOT Gate and draw logic circuit diagram.
13. Prove $XY+YZ+\bar{Y}Z=XY+Z$ by Boolean Algebra rules.
14. Construct a logic diagram for expression B. (A +C)
15. Find distance between the points (-3, 1) and (3, -2)
16. Show that the points A(-1, -1), B (4, 1) and C(12, 4) lies on a straight line.
17. Find the co-ordinates of the point P(x,y) which divide internally the segment through P_1 (-2,5) and P_2 (4, -1) in the ratio of $\frac{r_1}{r_2}=\frac{6}{5}$.
18. If the mid-point of a segment is (6,3) and one end point is(8, -4), what are the co-ordinates of the other end point.
19. Find the slope of a line which is perpendicular to the line joining $P_1(2, 4)$ and $P_2(-2, 1)$.
20. Find the equation of a line through the points (– 1, 2) and (3, 4).
21. Find the equation of line having x–intercept-2 and y – intercept 3.
22. Reduce the equation $3x+4y-2=0$ into intercept form.
23. Find the distance from the point (-2,1) to the line $3x+4y-12=0$
24. Write the general form of the circle, also represent the centre and radius in this form.
25. Find the equation of the circle with centre $(-\sqrt{2},-2)$ and $r=\sqrt{6}$.
26. Reduce the equation into standard form $x^2+y^2-10y=0$.
27. What type of circle is represented by $x^2+y^2-2x+4y+8=0$

SECTION-II

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

Q. 2 (a) Perform the indicated operation in $(1+i)(1-\sqrt{3}\,i)$ and give the results in polar form.

(b) Find the value of x and y in $(2x-3y)+i\,(x-y)\,6=2-i\,(2x-y+3)$

Q. 3 (a) Resolve $\frac{6x+27}{4x^3-9x}$ into partial fraction.

(b) Resolve $\frac{4x^3}{(x+1)^2(x^2-1)}$ into partial fraction.

Q. 4 (a) Convert $(10111.101)_2$ binary number to its octal equivalent.

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

Q. 5 (a) Find the ratio in which the line joining (–2, 2) and (4, 5) is cut by the axis of y.

(b) Find the distance between the parallel lines $3x-4y+11=0$ and $3x-4y-9=0$

Q. 6 (a) Find the equation of the circle having(–3, 7) and (2, -1) as the end points of its diameter. Find also its centre and radius.

(b) Find the equation of the circle through (2, –1) and (–2,0) with center on $2x-y-1=0$

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