DAE/IA-2016/08 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. Simplify the complex numbers $\frac{-9+4i}{8-3i}$

2. Find the multiplicative inverse of $-3+4i$.

3. Factorize: $36\mathrm{a}^2+100\mathrm{b}^2$

4. Write the conjugate and modulus of $-\frac{2}{3}-\frac{4}{9}i$

5. Express the complex number in the form $a+bi$ When $|\mathrm{z}|=2$, $\arg z=\frac{\pi}{3}$

6. Define improper fraction and give one example.

7. Resolve $\frac{1}{\mathrm{x}^2-\mathrm{x}}$ into partial fractions.

8. Write an identity equation of $\frac{2\mathrm{x}+5}{\mathrm{x}^2+5\mathrm{x}+6}$

9. From of partial fractions of $\frac{1}{(\mathrm{x}+1)^2(\mathrm{x}-2)}$ is:

10. Define Decimal number.

11. Convert Binary number $(10101)_2$ to decimal number.

12. Prove by Boolean Algebra Rules $\mathrm{X}+\overline{\mathrm{X}}\mathrm{Y}=\mathrm{X}+\mathrm{Y}$

13. Prove that by Boolean Algebra Rules. $\mathrm{XY}+\mathrm{YZ}+\overline{\mathrm{Y}}\mathrm{Z}=\mathrm{XY}+\mathrm{Z}$

14. Prove by truth table that $\mathrm{X}(\mathrm{X}+\mathrm{Y})=\mathrm{X}$

15. Show that the points A(1, 2), B(7, 6) and C(4, 4) lies on a same straight line.

16. If the mid-point of a segment is (6, 3) and one end point is (8, - 4), what are the coordinates of the other end point.

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

18. Find the angle between the lines having slopes -3 and 2.

19. Show that the lines passing through the points (0, -7), (8, -5) and (5, 7), (8, -5) are perpendicular.

20. Find distance between the points (-3, 1) and (3, -2).

21. Find the equation of line having x-intercept -2 and y-intercept 3.

22. Show that the points (1, 9), (-2, 3) and (-5, -3) are collinear.

23. Write the equation of circle with, center at (h, k) and radius 'r'.

24. Find the equation of circle with center (0, 0) and radius r.

25. Find the center and radius of the circle $6\mathrm{x}^2+6\mathrm{y}^2-18\mathrm{y}=0$

26. Find the equation of a circle with center at $(-1,\ 3)$ and tangent to x-axis.

27. Reduce the equation $\mathrm{x}^2+\mathrm{y}^2-4\mathrm{x}+6\mathrm{y}-12=0$ into standard form of the circle.

SECTION – II

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

Q.2: (a) Reduce the complex number $\frac{(2+3i)(3+2i)}{4-3i}$ to the form $a+bi$.

(b) Prove that $\frac{1}{\cos\theta - i\sin\theta} = \cos\theta + i\sin\theta$.

Q.3: Resolve $\frac{4+7x}{(2+3x)(1+x)^2}$ into partial fractions.

Q.4: (a) Convert $(39.4475)_{10}$ to its octal equivalent.

(b) Prepare a truth table for the Boolean expression $XYZ + \overline{X}\ \overline{Y}\ \overline{Z}$

Q.5: (a) Is the point (0,4) inside or outside the circle of radius 4 with center at (-3,1)?

(b) For the triangle A(1, 3), B(-2, 1), C(0, -4). Find Slope of a line perpendicular to $\overline{AB}$.

Q.6: Find the equation of the circle passing through the points (9, -7), (-3, -1) and (6, 2).

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