CLASS : XI A/B/C

SUBJECT : MATHEMATICS

M:M : 50

TIME: $1\frac{1}{2}$ hrs

SECTION – A

Consists of 6 questions carrying 1 mark each.

1. Evaluate $\lim_{x \to 0} \frac{\cos ax - \cos bx}{x^2}$

2. Find $\frac{dy}{dx}$ if $y = \sin^2 \log a^{\sqrt{x}}$

3. If the circle $x^2 + y^2 - 4x - 6y + \lambda = 0$ touches axis of x. Find λ.

4. If $(x + iy)(2 - 3i) = 4 + i$, find x and y.

5. In how many ways letter of the word GARDEN be arranged so that two vowels are never together.

6. Find the no of terms in $(1+x)^{101}\left(1 - x + x^2\right)^{100}$.

SECTION – B

Consists of 5 questions carrying 4 marks each.

7. How many five letter words can be formed using the letters of the word INDEPENDENT

8. Find the derivative of $\sin\sqrt{x}$ using first principle.

9. If $x^2+x+1=0$, Find the value of $\left(x+\frac{1}{x}\right)^3+\left(x^2+\frac{1}{x^2}\right)^3+\ldots\ldots\left(x^{30}+\frac{1}{x^{30}}\right)^3$

10. Evaluate $\lim_{x\to 0}\frac{8^x-4^x-2^x+1}{\sqrt{2}-\sqrt{1+\cos x}}$

11. Show that the circles $x^2+y^2-4x-2y-4=0$ and $x^2+y^2-12x-8y=12$ touch each other. Also find the point where the two circles touch each other

SECTION – C

Consists of 4 questions carrying 6 marks each.

12. The third, fourth and fifth terms in the expansion of $(x+a)^n$ are respectively 84, 280 and 560. Find the values of x, a and n.

13. (a) Find the square root of $-7-24i$

(b) If $x=-5+2\sqrt{-4}$, find the value of $x^4+9x^3+35x^2-x+160$.

14. (a) If $(x+y)^{m+n}=x^m.y^n$, show that $\frac{dy}{dx}=\frac{y}{x}$.

(b) If $x=2\cos t-2\cos 2t$ and $y=2\sin t-\sin 2t$, find $\frac{dy}{dx}$.

15. (a)The letters of the word RANDOM are arranged in all possible ways and the words so formed are arranged as in dictionary. Find the rank of the word random in that arrangement.

(b) Find the maximum number of points of intersection of 4 circles and 6 st. lines.