VICTORY TUITION CENTRE, CBE – 25 CLASS: XI MATHEMATICS MARKS: 70

I ANSWER ANY 7 QUESTIONS(Q.NO.10 IS COMPULSORY) 5X2=10

1. Compute |A| if A$\begin{bmatrix}3 & 4 & 1\\ 0 & -1 & 2\\ 5 & -2 & 6\end{bmatrix}$
2. Find the area of the parallelogram whose adjacent sides are $\vec{a} = 3\hat{\imath} + \hat{\jmath} + 4\hat{k}$ and $\vec{b} = \hat{\imath} - \hat{\jmath} + \hat{k}$
3. Consider the function f(x)=$\sqrt{x}$, x≥ 0, Does $\lim_{x\to 0}\sqrt{x}$ exists
4. Differentiate y=4cosecx-logx with respect to x
5. Integrate $\frac{\cot x}{sinx}$ with respect to x
6. If tow coins are tossed simultaneously, then find the probability of getting one head and one tail.
7. Differentiate y= e^{sinx}
8. Evaluate $\lim_{\sqrt{x}\to 3}\frac{x^2-81}{\sqrt{x}-3}$
9. Find $\vec{a}.\vec{b}$ if$\vec{a} = \hat{\imath} - 2\,\hat{\jmath} + \hat{k}$ and $\vec{a} = 3\hat{\imath} - 4\hat{\jmath} - 2\hat{k}$
10. If A=$\begin{bmatrix}3 & x & 1\\ -4 & 1 & 1\\ -4 & 1 & 1\end{bmatrix}$ is a singular matrix, find the value of x

II ANSWER ANY 7 (Q.NO. 20 IS COMPULSORY) 7X3=21

11. Show that $\begin{vmatrix}1 & 1 & 1\\ x & y & z\\ x^2 & y^2 & z^2\end{vmatrix}$=(x-y)(y-z)(z-x)
12. Show that the points whose position vectors are $2\hat{\imath} + 3\,\hat{\jmath} - 5\hat{k}$, $3\hat{\imath} + \hat{\jmath} - 2\hat{k}$ and $6\hat{\imath} - 5\,\hat{\jmath} + 7\hat{k}$ are collinear.
13. Calculate $\lim_{x\to 3}\frac{x^2-6x+5}{x^3-8x+7}$
14. Find $\frac{dy}{dx}$ if $x^2+y^2=1$
15. Evaluate $\int x\,e^x dx$
16. Integral xlogx with respect to x
17. If A and B mutually exclusive events P(A)=3/8. P(B)=1/8 then find (i) P($\bar{A}$ ∩ B) (II) P($\bar{A} \cap \bar{B}$)
18. Differentiate y=$\frac{cosx}{x^3}$
19. If the area of the triangle with vertices (-1,0),(3,0) and (0,k) is 9 square units find the value of k
20. If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$ Prove that $\vec{a}$ *and* $\vec{b}$ are perpendicular.

III ANSWER THE FOLLOWING 7X5=35

21a) Express the matrix A =$\begin{bmatrix}1 & 3 & 5\\ -6 & 8 & 3\\ -4 & 6 & 5\end{bmatrix}$ as the sum of a symmetric and a skew symmetric and a skew symmetric matrices(OR)

b) Prove that $\begin{vmatrix}1+a & 1 & 1\\ 1 & 1+b & 1\\ 1 & 1 & 1+c\end{vmatrix}$= abc(1+$\frac{1}{a}+\frac{1}{b}+\frac{1}{c}$)

22 a) If ABCD is a quadrilateral and E and F are the midpoint of AC and BD respectively. Prove that $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{CB} + \overrightarrow{CD} = 4\overrightarrow{EF}$ (OR)

b) Prove that the points whose position vectors are $2\hat{\imath} + 4\,\hat{\jmath} + 3\hat{k}$, $4\hat{\imath} + \hat{\jmath} + 9\hat{k}$, $10\hat{\imath} - \hat{\jmath} + 6\hat{k}$ form a right angled triangle.

23 a) Prove that $\lim_{\theta\to 0}\frac{sin\theta}{\theta}$=1 (OR)

b)Find the points of discontinuity of function f, where f(x) =$\begin{cases}4x+5, if\ x \leq 3\\ 4x-5, if\ x > 3\end{cases}$

24a) Find $\frac{d^2y}{dx^2}$ if $x^2+y^2=4$ (OR)

b) If y=$e^{tan^{-1}x}$ S.T $(1+x^2)y'' + (2x-1)y'=0$

25a) Evaluate $\int\frac{2x+4}{x^2+4x+6}dx$ (OR) b) Evaluate $\int x\,vosx\,dx$

26a) A factory has tow machines I and II, Machine I produces 40% of items of the output and Machine I produces 60% of tge items. Further 4% of items produced by machine I are defective and 5% produced by machine II are defective. An item is drawn at random . If the drawn item is defective find the probability that it was produced by Machine II. (OR)

b)There are two identical urns containing respective 6 black and 4 red balls, 2 black and 2 red balls. An urn is chose at a random and a ball is drawn (i) find the probability that the ball is black (ii) if the ball is black. What is the probability that it is from the first urn?

27a) Show that the points whose position vectors $4\hat{\imath} + 5\hat{\jmath} + \hat{k}$, $3\hat{\imath} + 9\,\hat{\jmath} + 4\hat{k}$, $-\hat{\jmath} - \hat{k}$, $-4\hat{\imath} + 4\,\hat{\jmath} + 4\hat{k}$ are coplanar (OR)

b) Do the limits of $\frac{\sin |X|}{x}$ exist state the reason.