



General Instructions:

- 1) Questions 1 to 4 carries 1 mark each.
- 2) Questions 5 to 8 carries 2 marks each.
- 3) Questions 9 and 10 carries 4 marks each.

SECTION A		
1.	Where is $f(x) = [x]$, $-1 < x < 2$ is not differentiable? a) -1 & 2 b) (-1,2) c) 0 & 1 d) 1 & 2	1
2.	A is a matrix of order 3×3 , such that $ A = -4$. Find $ A \cdot adjA $ a) 16 b) -64 c) -16 d) 64	1
3.	$A = \begin{bmatrix} 3 & 2 & 5 \\ -2 & 0 & 1 \\ 4 & 5 & 6 \end{bmatrix}$ if A_{ij} is the cofactor of a_{ij} , find $a_{11}A_{21} + a_{12}A_{22} + a_{13}A_{23}$ a) 43 b) -43 c) -87 d) 0	1
4.	If $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$, find $\frac{dy}{dx}$ a) $\frac{2}{1+x^2}$ b) $\frac{2}{1-x^2}$ c) $\frac{2}{\sqrt{1-x^2}}$ d) $\frac{-2}{\sqrt{1+x^2}}$	1
SECTION B		
5.	$A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I = O$. Hence find A^{-1} .	2
6.	$A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$ $B = \begin{bmatrix} a & -1 \\ b & -1 \end{bmatrix}$ If $(A + B)^2 = A^2 + B^2$, find a and b.	2
7.	If $x^y = y^x$, find $\frac{dy}{dx}$	2
8.	If $f(x) = \begin{cases} 5, & x \leq 2 \\ ax + b, & 2 < x < 10 \\ 21, & x \geq 10 \end{cases}$ is continuous, find the values of a and b	2

SECTION C

9. $x = a(\cos t + t \sin t)$, $y = a(\sin t - t \cos t)$. Find $\frac{d^2y}{dx^2}$. 4

10. In a legislative assembly election, a political party hired a public relations firm to promote its candidate in 3 ways : telephone , house calls and letters. The cost per contact (in paise) is given in Matrix A as

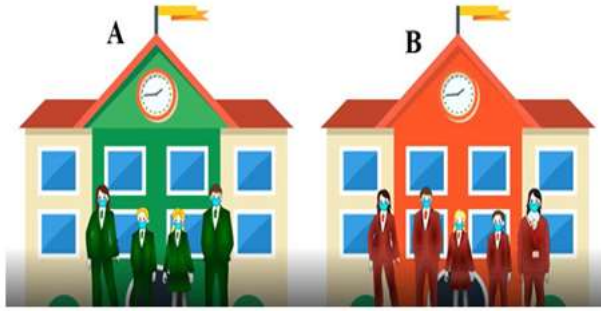


<p>Cost per contact</p> $A = \begin{bmatrix} 40 \\ 100 \\ 50 \end{bmatrix}$	<p>The no. of contact of each type made in 2 cities X and Y is given by</p> <p style="text-align: center;">Telephone Housecall Letter</p> $B = \begin{bmatrix} 1000 & 500 & 5000 \\ 3000 & 1000 & 10,000 \end{bmatrix} \begin{matrix} \rightarrow X \\ \rightarrow Y \end{matrix}$ <p>i) Find the total amount spent by the group in the city X</p> <p>ii) Find the total amount spent by the group in the city Y</p> <p>iii) Find AB or BA if possible</p>
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2

(OR)

Two schools P and Q want to award their selected students on the values of Tolerance, Kindness and leadership. The school P wants to award Rs x each , Rs y each and Rs z each for the three respective values to 3 , 2 and 1 students respectively with a total award money Rs 2200. School Q wants to spend Rs 3100 to award its 4,1 and 3 students on the respective values (by giving the same award money to the three values as school P) . If the total amount of award for one prize on each value is Rs 1200, using matrices &, find the answer for the following.



- (i) What is the award money for Tolerance?
- (ii) What is the award money for Kindness?
- (iii) What is the award money for Leadership?
- (iv) Write the adjoint matrix of the 3×3 matrix used in this case.

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