



INDIAN SCHOOL AL WADI AL KABIR
Department of Mathematics, 2020-2021
Subject: Applied Mathematics

CLASS: XII E

UNIT TEST 1

01-06-2021 Max marks: 30

Q.1.	$\text{If } A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 1 \end{bmatrix}, \text{ then } A \text{ is a}$																								
A	Diagonal matrix	B	scalar matrix	C	Square matrix	D	zero matrix																		
Q.2.	$\text{If } A = \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix} \text{ and } B = [1 \ 0 \ 2] \text{ then } AB$																								
A.	is not defined	B.	$[1 \ 0 \ 0]$	C.	$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$	D.	$\begin{bmatrix} 1 & 0 & 2 \\ 2 & 0 & 4 \\ 0 & 0 & 0 \end{bmatrix}$																		
Q.3.	$\text{If } A = \begin{bmatrix} 5 & 7 \\ 3 & 4 \end{bmatrix}, \text{ then } A^{-1}$																								
A.	$\begin{bmatrix} 4 & -7 \\ -3 & 5 \end{bmatrix}$	B.	$\begin{bmatrix} -4 & 7 \\ 3 & -5 \end{bmatrix}$	C.	$\begin{bmatrix} 5 & -7 \\ -3 & 4 \end{bmatrix}$	D.	$\begin{bmatrix} -5 & -3 \\ -7 & -4 \end{bmatrix}$																		
Q.4.	$\text{If } A = \begin{bmatrix} 3 & 0 & 1 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, \text{ then } A \cdot \text{adj}A $																								
A.	3	B.	9	C.	27	D.	0																		
Q.5 To Q7	<p>Three schools P, Q and R decided to organize a fair for collecting money for helping the flood victims. They sold handmade fans, mats and plates from recycled material at a cost of ₹ 25, ₹ 100 and ₹ 50 each respectively. The number of articles sold are given below.</p> <p>Based on the information, answer the following questions:</p>																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">School→ Article↓</th> <th style="width: 15%;">P</th> <th style="width: 15%;">Q</th> <th style="width: 15%;">R</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"> Handmade fans </td> <td style="text-align: center;">40</td> <td style="text-align: center;">25</td> <td style="text-align: center;">35</td> </tr> <tr> <td style="padding: 5px;"> Mats </td> <td style="text-align: center;">50</td> <td style="text-align: center;">40</td> <td style="text-align: center;">50</td> </tr> <tr> <td style="padding: 5px;"> Plates </td> <td style="text-align: center;">20</td> <td style="text-align: center;">30</td> <td style="text-align: center;">40</td> </tr> </tbody> </table>				School→ Article↓	P	Q	R	Handmade fans 	40	25	35	Mats 	50	40	50	Plates 	20	30	40	<p>A. What is the total money (in ₹) collected by the school P?</p>			<p>B. What is the total money (in ₹) collected by the school Q and R?</p>		
School→ Article↓	P	Q	R																						
Handmade fans 	40	25	35																						
Mats 	50	40	50																						
Plates 	20	30	40																						
				<p>C. If the number of handmade fans and plates are interchanged for all the schools, then what is the total money (in ₹) collected by all schools?</p>																					

	A	21000	B	21250	C	7000	D	14000
Q8.	If $\begin{vmatrix} x & 5 \\ 0 & x \end{vmatrix} = \begin{vmatrix} -6 & 5 \\ -8 & 4 \end{vmatrix}$, then $x =$							
	A	4	B	-4	C	± 4	D	± 16

Q9.	If $\begin{pmatrix} 2x-y & 2x-1 \\ 5x-7 & 3x-4 \end{pmatrix} = \begin{pmatrix} 7 & 7y \\ 3x+y & x+4 \end{pmatrix}$, then value of x and y							
	A. $x = 4, y = -1$			B. $x = 4, y = 1$				
	C. $x = 1, y = 4$			D. $x = -4, y = 1$				
Q10.	If $x + y + xy = 10$, then $\frac{dy}{dx}$							
	A	$-\left(\frac{1}{1+x}\right)$	B	$-\left(\frac{10}{1+x}\right)$	C	$-\left(\frac{1+y}{1+x}\right)$	D	$-\left(\frac{1-x}{1+y}\right)$
Q11	A. If $x = at^2, y = 4at$, then $\frac{dy}{dx}$ at $t=2$							
Q12	The value of $\begin{vmatrix} 3 & 10 & 103 \\ 5 & 9 & 95 \\ 7 & 5 & 57 \end{vmatrix}$							
Q13	C. If A is a 3×3 matrix and $ A = 25$, then $ 2A $							
Q14	$y = x^x$, then $\frac{dy}{dx}$							
	A.	$x^x(1 + \log x)$	B.	x^x	C.	$x^x \log x$	D.	$x^x \log(x + 1)$
Q15.	Which of the following statement is correct? a) Matrix multiplication is commutative b) Determinant is a number associated to a square matrix c) All square matrices are symmetric matrices d) If any two rows of a determinant are interchanged, then the value remains unchanged.							
Q16.	State TRUE or FALSE: A square matrix where every element is unity is called an identity matrix.							
Q17.	On using elementary column operations $R_2 \rightarrow R_1 + 2R_2$ in the following matrix equation $\begin{pmatrix} 1 & -3 \\ 2 & 4 \end{pmatrix} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$, we have							
	A. $\begin{pmatrix} 5 & 5 \\ 2 & 4 \end{pmatrix} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$			B. $\begin{pmatrix} 5 & -5 \\ 2 & 4 \end{pmatrix} = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$				

	c. $\begin{pmatrix} 5 & 5 \\ 2 & 4 \end{pmatrix} = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$	D. $\begin{pmatrix} 5 & -5 \\ 2 & 4 \end{pmatrix} = \begin{pmatrix} -1 & -1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$																	
Q18.	If $A = \begin{pmatrix} 1 & 5 \\ 7 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 1 \\ 7 & 3 \end{pmatrix}$ and $3A + 5B + C$ is a null matrix. Then $C =$ _____																		
	A. $\begin{pmatrix} 13 & 20 \\ 56 & 17 \end{pmatrix}$	B. $\begin{pmatrix} -13 & -20 \\ -56 & -27 \end{pmatrix}$																	
	C. $\begin{pmatrix} 13 & 20 \\ 14 & 7 \end{pmatrix}$	D. $\begin{pmatrix} -3 & -6 \\ -14 & -7 \end{pmatrix}$																	
Q19.	If P is a 2×2 matrix whose elements are given by $a_{ij} = (i - 2j)^2$, then P																		
	A. $\begin{pmatrix} 1 & 1 \\ 1 & 4 \end{pmatrix}$ B. $\begin{pmatrix} 1 & 9 \\ 0 & 4 \end{pmatrix}$ C. $\begin{pmatrix} 1 & 0 \\ 9 & 4 \end{pmatrix}$ D. $\begin{pmatrix} 0 & 9 \\ 1 & 0 \end{pmatrix}$																		
Q20.	If $\begin{vmatrix} 3-x & 3+x & 3+x \\ 3+x & 3-x & 3+x \\ 3+x & 3+x & 3-x \end{vmatrix} = 0$, then the values of x																		
	A. $x = 0, x = 3$ B. $x = 0, x = 9$ C. $x = 0, x = -9$ D. $x = 0, x = -3$																		
Q21.	For the two-sector economy input-output table is given below. Find the technology matrix.																		
	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="width: 25%;">Output → Input ↓</th> <th style="width: 25%;">Industry 1</th> <th style="width: 25%;">Industry 2</th> <th style="width: 25%;">Final Demand</th> <th style="width: 25%;">Total output</th> </tr> </thead> <tbody> <tr> <td>Industry 1</td> <td>14</td> <td>6</td> <td>8</td> <td>28</td> </tr> <tr> <td>Industry 2</td> <td>7</td> <td>18</td> <td>11</td> <td>36</td> </tr> </tbody> </table>				Output → Input ↓	Industry 1	Industry 2	Final Demand	Total output	Industry 1	14	6	8	28	Industry 2	7	18	11	36
Output → Input ↓	Industry 1	Industry 2	Final Demand	Total output															
Industry 1	14	6	8	28															
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	A. $\begin{pmatrix} 14 & 6 \\ 7 & 18 \end{pmatrix}$		B. $\begin{pmatrix} \frac{1}{2} & \frac{3}{14} \\ \frac{7}{11} & \frac{1}{2} \end{pmatrix}$																
	C. $\begin{pmatrix} \frac{1}{6} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{4} \end{pmatrix}$		D. $\begin{pmatrix} \frac{1}{2} & \frac{1}{6} \\ \frac{1}{4} & \frac{1}{2} \end{pmatrix}$																
Q22.	If I represents an identity matrix and A is a square matrix such that $A^2 = A$, then $(I + A)^2 - 3A$ is equal to																		
	A. Null matrix	B. A	C. an identity matrix	D. 6A															
Q23.	If A(3, 4) and B(2, 1), then equation of line AB																		

	A. $x+y-7=0$	B. $3x+y-5=0$	C. $3x-y+5=0$	D. $3x-y-5=0$
Q24.	If $y = xe^x$, then $\frac{d^2y}{dx^2}$.			
	A. $e^x(x+2)$	B. e^x	C. $e^x(x+1)$	D. $xe^x + 1$
Q25.	If $a^x + a^y = a^a$, then $\frac{dy}{dx}$.			
	A. a^{x-y}	B. $-a^{x-y}$	C. a^{a+x-y}	D. a^{-x-y}
Q26.	If $y = \frac{x}{x+1}$, then $\frac{dy}{dx}$			
	A. $\frac{1}{x+1}$	B. $\frac{-1}{x+1}$	C. $\frac{1}{(x+1)^2}$	D. $\frac{-1}{(x+1)^2}$
Q27	Which of the following is the derivative of $\log(\log(x^2 + 1))$ with respect to x			
	<p>A. $\frac{2x}{(x^2+1)\log(x^2+1)}$</p> <p>B. $\frac{2x}{\log(\log(x^2+1))}$</p> <p>C. $\frac{1}{2x\log(x^2+1)}$</p> <p>D. None of these</p>			
28	If a matrix A has 9 elements, which of the following statement is correct?			
	<p>A. A is a square matrix</p> <p>B. A is either a row matrix or a column matrix or a square matrix.</p> <p>C. A is a row matrix</p> <p>D. A is a column matrix</p>			
29.	Total number of matrices of order 3X3 with each entry 2 or 0			
	A. 9 C. 81 D.512		B. 27	
	C. 81		D.512	
30.	If A is a non-singular matrix of order 3, then which of the following is NOT true?			
	A. $ A \neq 0$		B. $ \text{adj}A = A ^2$	
	C. $(A^{-1})^{-1} = A$		D. $A^2 = A$	

Answer

1	A	16	False
2	D	17	C
3	B	18	C
4	C	19	B
5	C	20	B
6	D	21	D
7	A	22	C
8	C	23	D
9	B	24	C
10	C	25	B
11	1	26	C
12	0	27	A
13	200	28	A
14	A	29	D
15	B	30	D