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1. Use dark blue or black pen for markings.
2. Do not write or scribble anything extra.
3. Do not fold, tear, wrinkle or staple.
4. Mark only one choice per question.
5. Correct marking : ☐ ☒ ☐ ☐
6. Incorrect markings : ☒ ☒ ☒ ☒

SIWS College, Wadala

Invigilator :

Name :

Class : Div :

Exam : U2

Subject : Mathematics

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MODEL QUESTION PAPER FOR THE SECOND UNIT TEST

PORTION : VECTORS, MATRICES, PERMUTATIONS, COMBINATIONS, BINOMIAL THM

1. If $\vec{a} = 2\vec{i} + 3\vec{j} + 4\vec{k}$ and $\vec{b} = -2\vec{i} - 2\vec{j} + 3\vec{k}$ then $\vec{a} \cdot \vec{b}$ is [1]

(a) 2 (b) -2 (c) 6 (d) -6
2. If $A \equiv (-4, -4, 2)$ and $B \equiv (3, -6, 4)$, then the unit vector along \overline{AB} is [1]

(a) $\frac{7\vec{i} - 2\vec{j} - 2\vec{k}}{\sqrt{57}}$ (b) $\frac{7\vec{i} - 2\vec{j} + 2\vec{k}}{\sqrt{57}}$ (c) $\frac{7\vec{i} + 2\vec{j} + 2\vec{k}}{\sqrt{57}}$ (d) none of these
3. If ${}^8P_r = {}^7P_3 + 3({}^7P_2)$, then [1]

(a) $r = 2$ (b) $r = 3$ (c) $r = 4$ (d) $r = 5$
4. The number of diagonals of a regular polygon of 17 sides is [1]

(a) 90 (b) 119 (c) 236 (d) none of these
5. If $\vec{p} = -\vec{i} + 3\vec{j} + a\vec{k}$ is perpendicular to $\vec{q} = 4\vec{i} + 2\vec{j} + \vec{k}$ then the value of 'a' is [1]

(a) 2 (b) -2 (c) 0 (d) -1

6. In how many ways can a mixed double table tennis match be arranged from 4 men and 3 women ? [1]
 (a) 36 (b) 18 (c) 48 (d) none of these
7. If $A = \begin{bmatrix} 1 & 4 \\ 2 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then $|AB| =$ [1]
 (a) -21 (b) 21 (c) -3 (d) 3
8. Numbers of four different digits are formed from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9. How many of them are greater than 4000 ? [2]
 (a) 2010 (b) ${}^9P_4 - 4!$ (c) 7016 (d) none of these
9. If $A = \begin{bmatrix} 2 & 5 & -3 \\ -1 & 3 & 1 \\ 4 & 1 & 2 \end{bmatrix}$ then A^2 is [2]
 (a) $\begin{bmatrix} -13 & 22 & -7 \\ 15 & 25 & -7 \\ -1 & 5 & 8 \end{bmatrix}$ (b) $\begin{bmatrix} -13 & 22 & -7 \\ -1 & 5 & 8 \\ 15 & 25 & -7 \end{bmatrix}$ (c) $\begin{bmatrix} -13 & 22 & -7 \\ 15 & 25 & 7 \\ 1 & 5 & 8 \end{bmatrix}$ (d) $\begin{bmatrix} 13 & 22 & 7 \\ 15 & 25 & -7 \\ -1 & 5 & 8 \end{bmatrix}$
10. If $\left(3 \begin{bmatrix} 2 & -5 & 7 \\ 1 & -1 & 3 \end{bmatrix} - \begin{bmatrix} 1 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \right) \begin{bmatrix} 3 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$ then [2]
 (a) $x = 35, y = -9$ (b) $x = -35, y = -9$ (c) $x = -35, y = 9$ (d) $x = 35, y = 9$
11. The angle between the vectors $\vec{a} = \vec{i} + 2\vec{j} + 2\vec{k}$ and $\vec{b} = 2\vec{i} + 2\vec{j} + \vec{k}$ is [2]
 (a) $\cos^{-1}(8/9)$ (b) $\cos^{-1}(9/8)$ (c) $\cos^{-1}(3/2)$ (d) $\cos^{-1}(2/3)$
12. If ${}^{56}P_{r+6} : {}^{54}P_{r+3} = 30800 : 1$, then [2]
 (a) $r = 28$ (b) $r = 32$ (c) $r = 41$ (d) none of these
13. There are 22 points in a plane of which p points are collinear. If 211 different lines can be obtained by joining the given points, then [2]
 (a) $p = 7$ (b) $p = 8$ (c) $p = 9$ (d) none of these
14. If ${}^{28}C_{2r} : {}^{24}C_{2r-4} = 225 : 11$, then [2]
 (a) $r = 4$ (b) $r = 3$ (c) $r = 7$ (d) $r = 8$
15. The value of $(\sqrt{5} + 1)^5 - (\sqrt{5} - 1)^5$ is [2]
 (a) 152 (b) 156 (c) 352 (d) none of these
16. The coefficient of x^9 in the expansion of $\left(\frac{1}{x^2} + x \right)^{18}$ is [2]
 (a) 916 (b) ${}^{18}C_9$ (c) 816 (d) none of these