Question 1

If the matrix $A = \begin{pmatrix} 2 & x+3 & 4 \\ 1 & 5 & 7 \\ 2z & y+1 & 0 \end{pmatrix}$ is a symmetric matrix ,then $x + y + z$ = ...

- 10
- 14
- 6
- 8

Question 2

If $\vec{A}$ (2 , 4), $\vec{C}$ (3 , n) and $\vec{B}$ (m , 7) such that $\vec{C} // \vec{A}$ and $\vec{C} \perp \vec{B}$, then $m + n$ = ...

- -8
- -20
- 8
- 20

Question 3

Prove that :

$\cos^4 x - \sin^4 x = 1 - 2 \sin^2 x$

Question 4

If $A = \begin{pmatrix} 2 & 3 & -1 \\ 4 & -7 & 6 \end{pmatrix}$, then $2A^t$ = ...

- $\begin{pmatrix} 4 & 8 \\ 6 & -14 \\ -2 & 12 \end{pmatrix}$
- $\begin{pmatrix} 2 & 8 \\ 3 & -14 \\ -1 & 12 \end{pmatrix}$
- $\begin{pmatrix} 4 & 6 & -2 \\ 8 & -14 & 12 \end{pmatrix}$
- $\begin{pmatrix} 4 & 4 \\ 6 & -7 \\ 2 & 6 \end{pmatrix}$

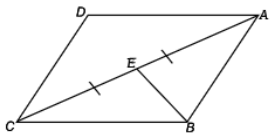
Question 5

The vector $\vec{A} = (5, \frac{5\pi}{6})$ in terms of the fundamental unit vectors is .....

- $\frac{5}{2}\vec{i} - \frac{5\sqrt{3}}{2}\vec{j}$
- $\frac{5}{2}\vec{i} + \frac{5\sqrt{3}}{2}\vec{j}$
- $\frac{5\sqrt{3}}{2}\vec{i} + \frac{5}{2}\vec{j}$
- $\frac{-5\sqrt{3}}{2}\vec{i} + \frac{5}{2}\vec{j}$

Question 6

In the opposite figure:
ABCD is a parallelogram ,
E is the midpoint of $\overline{AC}$
Prove that: $2\overrightarrow{BE} + \overrightarrow{CA} = 2\overrightarrow{BA}$



Question 7

The simplest form for the following expression:

$\frac{\sin x \cos x \tan x + \sin x \cos x \cot x}{\sin x \sec x}$ is ....

- $\cot x$
- $\tan x$
- $\csc x$
- $\cos x$

Question 8

If $\vec{A} = (3 , 5)$, $\vec{B} = (4 , 6)$, then $\|-2\vec{A} + 3\vec{B}\|$ = ...

- 10
- 6
- 8
- 14

Question 9

If A (2 , 3), B (4 , 7) and C (6 , 11), then find the ratio by which $\overline{AB}$ is divided by the point C and determine the type of division

Question 10

The value of x which satisfy the equation: 5 sin x = 12 cos x
Such that $x \in [0 , \pi]$ is .....

- 67° 22\ 48.49\\
- 22° 37\ 11.51\\
- 112° 37\ 11.51\\
- 157° 22\ 48.49\\

Question 11

If $\overline{AE}$ is the median of ΔABC such that M is the point of intersection of the medians of the triangle,
A (5 , 4) and M (7 , 8),then $\overrightarrow{AE}$ = ...

- $(\frac{4}{3} , \frac{8}{3})$
- $(\frac{2}{3} , \frac{4}{3})$
- (3 , 6)
- (1 , 2)

Question 12

If $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$ = 5 and d − c = 7 , then find the value of :

$\begin{vmatrix} a+2 & b+2 \\ c & d \end{vmatrix}$

Question 13

If $\overrightarrow{AB}$ = (5 , 6), $\overrightarrow{BC}$ = (1 , -4), then $\overrightarrow{AC}$ = ...

- (4 , 10)
- (4 , 2)
- (-4 , -10)
- (6 , 2)

Question 14

If A (-7 , 8) , $\overrightarrow{AB}$ = (5 , 2) then B .....

- (-2 , 10)
- (2 , -10)
- (-12 , 6)
- (12 , -6)

Question 15

If $A = \begin{pmatrix} \sin^2 x & 1 \\ \tan^2 x & \cot^2 x \end{pmatrix}$, $B = \begin{pmatrix} m - \cos^2 x & 1 \\ f + \sec^2 x & n + \csc^2 x \end{pmatrix}$

Such that: $A = B$, then $m + f - n$ = ...

- -2
- 2
- -1
- 1

Question 16

If $\vec{f} = (\frac{1}{2}, \frac{\sqrt{3}}{2})$,then the polar form for the vector $\vec{f}$ = ...

- $(1, \frac{5\pi}{6})$
- $(2, \frac{\pi}{3})$
- $(1, \frac{\pi}{3})$
- $(1, \frac{\pi}{6})$

Question 17

A car (*A*) moves on a road with velocity 100 km/h .another car (*B*) moves on the same road with velocity 80 km/h .Find the velocity of car *B* relative to car *A*

In the following cases :

1- The two cars move in the same direction

2- The two cars move in two opposite directions

Question 18

If *ABCD* is a Rhombus in which *A* (1 , 2), *B* (5 , 2) and *C* (8 , 7), then *D* (..... , ...)

- (4 , 7)
- (-4 , -7)
- (2 , 3)
- (-2 , -3)

Question 19

If $\overrightarrow{AB}$ = (5 , 9), $\overrightarrow{AC}$ = (6 , 8), then $\overrightarrow{BC}$ = ...

- (1 , 1)
- (1 , -1)
- (11 , 17)
- (-1 , 1)

Question 20

The metro company offers three types of tickets each depends on the numbers of stations the passenger use the metro on it as shown in the following table:

type	1st	2nd	3rd
Price	3 LE	5 LE	7 LE

If a group of persons buy 15 tickets from the first type , 20 tickets from the second type and 10 tickets from the third type .Write the matrix that represents the selling prices from each type and the total selling price in the form of a matrix

Question 21

If a particle moves in a straight line from the position A (2 , 3) to the position B (6 , 4),then the displacement vector $\overrightarrow{AB}$ = ...

- (7 , 8)
- (8 , 7)
- (-4 , -1)
- (4 , 1)

Question 22

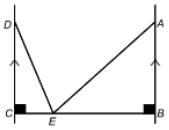
If $(AB)^t = \begin{pmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \end{pmatrix}$, then B^tA^t = ...

- $\begin{pmatrix} 5 & 6 & 7 \\ 2 & 3 & 4 \end{pmatrix}$
- $\begin{pmatrix} 2 & 5 \\ 3 & 6 \\ 4 & 7 \end{pmatrix}$
- $\begin{pmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \end{pmatrix}$
- $\begin{pmatrix} 5 & 2 \\ 6 & 3 \\ 7 & 4 \end{pmatrix}$

Question 23

The opposite figure represents the position of a boat at the point E that lies between the two sides of a river $\overrightarrow{AB}$ and $\overrightarrow{DC}$ which are parallel to each other , m ($\angle BAE$) = 45° , m ($\angle EDC$) = 30°, AB = 20 m and DC = 25 m

Find the width of the river to the nearest meter.



Question 24

If $\begin{vmatrix} a\sin x & 0 & 0 \\ 1 & a\cos x & 0 \\ \sec x & \cot x & a\tan x \end{vmatrix} = -a^3\cos^2 x + 8$, then a = ...

- -8
- 2
- -2
- 8

Question 25

The general solution for the equation:

$\frac{\tan 5x}{\tan(90° + 4x)} = -1$ is .....

- $x = 90 + 360n : n \in z$
- $x = 10 + 20n : n \in z$
- $x = 10 + 40n , x = 90 + 360n : n \in z$
- $x = 90 + 180n : n \in z$

Question 26

If the y-axis divides the line-segment $\overline{AB}$ with the ratio 2 : 3

such that $A(6 , 3)$, $B(-9 , 6)$,then find the coordinates of the point of intersection

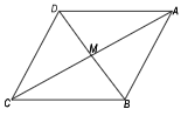
Question 27

If $\begin{vmatrix} 2x^2 & 3 \\ 9 & 4x \end{vmatrix} = 0$, then the value of x that satisfy the equation is .....

- $\frac{3}{2}$
- $\frac{2}{3}$
- $\frac{-2}{3}$
- $\frac{-3}{2}$

Question 28

In the opposite figure:
ABCD is a Rhombus in which
AC = 24cm, *BD* = 10cm,then
tan (∠*BAM*) + *tan* (∠*ABM*) = ...



- $\frac{169}{60}$
- 1
- $\frac{27}{13}$
- $\frac{13}{27}$