Tenkasi District

## 03-01-2024

Time: 3.00 Hours

## Standard 11

MATHEMATICS

## I. Choose the correct Answer:

Marks: 90
$20 \times 1=20$

1) If $n[(A \times B) \cap(A \cap C)]=8$ and $n(B \cap C)=2$ then $n(A)=$
a) 6
b) 4
c) 8
d) 16
2) If the function $f:[-3,3] \rightarrow S$ defined by $f(x)=x^{2}$ is on-to then $S$ is
a) $[-9,9]$
b) $R$
c) $[-3,3]$
d) $[0,9]$
3) The solution set of the following inequality $|x-1| \geq|x-3|$ is
a) $[0,2]$
b) $[2, \infty]$
c) $(0,2)$
d) $(-\infty, 2)$
4) The number of roots of $(x+3)^{4}+(x+5)^{4}=16$ is
a) 4
b). 3
c) 2
d) 0
5) $\cos 1^{\circ}+\cos 2^{\circ}+\ldots \ldots \ldots+\cos 179^{\circ}=$
a) 0
b) 1
c) -1
d) 89
6) If $\tan \alpha$ and $\tan \beta$ are roots of $x^{2}+a x+b=0$ then $\frac{\sin (\alpha+\beta)}{\sin \alpha \sin \beta}$ is equal to
a) $b / a$
b) $a / b$
c) $-a / b$
d) $-b / a$
7) If $\left(a^{2}-a\right)_{C_{2}}=\left(a^{2}-a\right)_{C_{4}}$ then the value of $a$ is
a) 2
b) 3
c) 4
d) 5
8) In a plane there are 10 points are there out of which 4 points are collinear, then the number of triangles formed is
a) 110
b) ${ }^{10} C_{3}$
c) 120
d) 116
9) The $n^{\text {th }}$ term of the sequence $1 \cdot 2 \cdot 4.7 .11 \ldots$. is
a) $n^{3}+3 n^{2}+2 n$
b) $n^{3}-3 n^{2}+3 n$
c) $\frac{n(n+1)(n+2)}{3}$
d) $\frac{n^{2}-n+2}{2}$
10) The sum of an infinite G.P. is 18 . If the first term is 6 , the common ratio is
a) $1 / 3$
b) $2 / 3$
c) $1 / 6$
d) $3 / 4$
11) The slope of the line which makes an angle $45^{\circ}$ with the line $3 x-y=-5$ are
a) $1,-1$
b) $1 / 2,-2$
c) $1,1 / 2$
d) $2,-1 / 2$
12) A root of the equation $\left|\begin{array}{ccc}3-x & -6 & 3 \\ -6 & 3-x & 3 \\ 3 & 3 & -6-x\end{array}\right|=0$ is
a) 6
b) 3
c) 0
d) -6
13) If $\lambda \vec{i}+2 \lambda \vec{j}+2 \lambda \vec{k}$ is a unit vector, then the value of $\lambda$ is
a) $1 / 3$
b) $1 / 4$
c) $1 / 9$
d) $1 / 2$

Kindly send me your answer keys to us - padasalai.net@gmail.com

## Tsil1M

14) If $(1,2,4)$ and $(2,-3 \lambda,-3)$ are initial and terminal points of the vector $\vec{i}+5 \vec{j}-7 \vec{k}$ the value of $\lambda$ is equal to
a) $7 / 3$
b) $-7 / 3$
c) $-5 / 3$
d) $5 / 3$
15) $\operatorname{Lim}_{x \rightarrow 0} \frac{e^{\sin x}-1}{x}=$
a) 1
b) e
c) $1 / e$
d) 0
16) $\frac{d}{d x}\left(e^{x+5 \log x}\right)$ is
a) $e^{x} \cdot x^{4}(x+5)$
b) $e^{x} \cdot x(x+5)$
c) $e^{x}+5 / x$
d) $e^{x}-5 / x$
17) If $f(x)=x+2$ then $f^{\prime}[f(x)]$ at $x=4$ is
a) 8
b) 1
c) 4
d) 5
18) $\int 2^{3 x+5} d x$ is
a) $\frac{3\left(2^{3 x+5}\right)}{\log 2}+c$
b) $\frac{2^{3 x+5}}{2 \log (3 x+5)}+c$
c) $\frac{2^{3 x+5}}{2 \log 3}+c$
d) $\frac{2^{3 x+5}}{3 \log 2}+c$
19) The pt of intersection of the line $x+3 y+2=0$ and $2 x-y-3=0$ is
a) $(1,1)$
b) $(-1,1)$
c) $(1,-1)$
d) $(-1,-1)$
20) The minor of the element in the $i^{\text {th }}$ row, $\mathrm{j}^{\text {th }}$ column is denoted by
a) $M_{i j}$
b) $M_{\mathrm{ji}}$
c) $(-1)^{i+j} M_{i j}$
d) $(-1)^{j+i} M_{j i}$
II. Answer any 7 'questions. Qn.no. 30 is compulsory.
21) If $A=\{1,2,3,4\}$ and $B=\{3,4,5,6\}$ find $n[(A \cup B) \times(A \cap B) \times(A \Delta B)]$
22) If $a$ and $b$ are roots of the equation $x^{2}-p x+q=0$. Find the value of $\frac{1}{a}+\frac{1}{b}$
23). Find the general solution of $\sec \theta=-2$
23) A mathematics club has 15 members. In that 8 are girls 6 of the members are to be selected for a competition and half of them should be girls. How many ways of these selection are possible?
24) Expand $(1+x)^{2 / 3}$ upto four terms for $|x|<1$
25) Find the value of $K$, if the equation $12 x^{2}+7 x y-12 y^{2}-x+7 y+k=0$ represents a pair of straight line.
26) Find the angle between the vectors $5 \vec{i}+3 \vec{j}+4 \vec{k}$ and $6 \vec{i}-8 \vec{j}-\bar{k}$
27) If $y=\frac{x+1}{x-1}$ then find $\frac{d y}{d x}$
28) Evaluate: $\int \sqrt{4-x^{2}} d x$

Kindly send me your answer keys to us - padasalai.net@gmail.co

## III. Answer any 7 questions. Qn. no. 40 is compulsory.

31) Draw the graph $f(x)=|x|, f(x)=|x-1|, f(x)=|x+1|$
32) If $f:\left[R-\{-1,1\} \rightarrow \mathbb{R}\right.$ is defined by $f(x)=\frac{x}{x^{2}-1}$, verify whether $f$ is one-toone or not.
33) Prove that $32 \sqrt{3}, \sin \pi / 48 \cos \pi / 48 \cos \pi / 24 \cos \pi / 12 \cos \pi / 6=3$
34) Find the rank of the word BLEAT
35) If $a, b, c$ are in geometric progression and if $a^{1 / x}=b^{1 / y}=c^{1 / z}$ then prove that $x, y, z$ are in arithmetic progression.
36) Find the equation of lines passing through the point of intersection of lines $4 x-y+3=0$ and $5 x+2 y+7=0$ and (i) through the piont $(-1,2)$ (ii) parallel to $x-y+5=0$.
37) Find the area of the triangle whose vertics are $(-2,-3),(3,2)$ and $(-1,-8)$
38) Evaluate $\operatorname{Lim}_{x \rightarrow 0} \frac{\sin x(1-\cos x)}{x^{3}}$
39) Evaluate: $\int e^{-4 x} \sin 2 x d x$
40) If $A B C D$ is a quadrilateral and $E$ and $F$ are the mid points of $A C$ and $B D$ respectively then prove that $\overline{A B}+\overline{A D}+\overline{C B}+\overline{C D}=4 \overline{\mathrm{EF}}$
41) a] Write the value of $f$ at $-4,1,-2,7,0$ if $f(x)=\left\{\begin{array}{cl}x 2-x, & \text { if }-2 \leq x<1 \\ x-x^{2}, & \text { if } 1 \leq x<7 \\ 0, & \text { otherwise }\end{array}\right.$
(OR)
b] Prove that $\left|\begin{array}{ccc}1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c\end{array}\right|=a b c\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$
42) a] If $A+B+C=\pi$, $\quad \cos ^{2} B+\cos ^{2} C=1-2 \cos A \cos B \cos C$ prove that $\cos ^{2} \mathrm{~A}+$ (OR)
b] Show that $\operatorname{Lim}_{\theta \rightarrow 0} \frac{\sin \theta}{\theta}=1$
43) a] Express the matrix $A=\left[\begin{array}{rrr}1 & 3 & 5 \\ -6 & 8 & 3 \\ -4 & 6 & 5\end{array}\right]$ as a sum of symmetric and a skew symmetric matrices.
b] Solve $\log _{5-x}\left(x^{2}-6 x+65\right)=2$

Kindly send me your answer keys to us - padasalai.net@gmail.com
44) a] Show that the equation $9 x^{2}-24 x y+16 y^{2}-12 x+16 y-12=0$ represents a pair of parallel lines. Find the distance between them.
(OR)
b] Evaluate: $\int \frac{3 x+5}{x^{2}+4 x+7} d x$
45) a] Resolve the rational expressions into partial fractions $\frac{9}{(x+1)(x+2)^{2}}$
(OR)
b] The AM of two numbers exceeds their GM by 10 and HM by 16 . Find the numbers.
46) a] Prove that $\sqrt[3]{x^{2}+7}-\sqrt[3]{x^{2}+4}$ is approximately equal to $1 / x^{2}$ when $x$ is large.
(OR)
b] Show that the points whose position vectors $4 \bar{i}+5 \vec{j}+\vec{k},-\bar{j}-\vec{k}$, $3 \vec{i}+9 \vec{j}+4 \vec{k}$ and $-4 \vec{i}+4 \vec{j}+4 \vec{k}$ are coplanar.
47) a] If $y=\left(\cos ^{-1} x\right)^{2}$, prove that $\left(1-x^{2}\right) \frac{d^{2} y}{d x^{2}}-x \frac{d y}{d x}-2=0$. Hence find $y_{2}$ when $x=0$.
(OR)
b] $\int \sqrt{9-(2 x+5)^{2}} d x$
SIVAKNMAR, M, SXIRam Matric HSS,
Vallam-62 2809, Tenkeasi Dist.

Kindly send me your answer keys to us - padasalai.net@gmail.com

