Roll no:-_____

Time:-3 hours

M.M:- 90

General Instruction:

(i) All questions are compulsory

(ii)This question paper contain 27 questions

(iii)Questions 1-4 in section A are very short carrying 1 mark each.

iv)Questions 5-12 in section B are short carrying 2 mark each.

(v) Questions 13-22 in section C are long-1 carrying 4 mark each .

(vi)Questions 23-27 in section D are long -2 carrying 6 mark each .

SECTION:-A

Que 1 How many number of sub sets of a set containing n elements?

Que 2 Find the value of $\tan \frac{19\pi}{3}$.

Que 3 Find the value of $(1+i)(1+i^2)(1+i^3)(1+i^4)$.

Que 4 Which is larger $(1.01)^{1000000}$ or 100000?

SECTION:-B

Que5 For any two sets A and B, Prove by using properties of sets (i) $(A \cup B) - (A \cap B) = (A-B) \cup (B-A)$

Que 6 let f, g be two real function defined by $f(x)=\sqrt{x+1}$ and $g(x)= \sqrt{9-x^2}$ .Then describe each of the following function(i) $2f - \sqrt{5} g$ (ii) $f^2 + 7f$ (iii) $\frac{5}{g}$ (iv) $\frac{g}{f}$

Que 7 If any triangle ABC prove that $\frac{a^2-c^2}{b^2}=\frac{\sin(A-C)}{\sin(A+C)}$

Que 8 Find the square root of i

Que9 Solve $\frac{2x-3}{4}+6 \geq 2+ \frac{4x}{3}$ and represent it on number line.

Que10 Find 13th term in the expansion $(9x - \frac{1}{3\sqrt{x}})^{18}$

Que11 If A = {-1 , 1} find A x A x A

Que 12 Find a positive value of m for which the coefficient of x^2 in the expansion of $(1+x)^m$ is 6.

SECTION:-C

Que13 let U={1,2,3,4,5,6,7,8,9}   A={2,4,6,8}   B={2,3,5,7}.Verify that (i)$(A \cup B)'=A' \cap B'$ (ii)$(A \cap B)'= A' \cup B'$ Also make venn diagram (i) $A' \cap B'$ (ii) $A' \cup B'$

Que14 Find the range of $\frac{1-x+x^2}{1+x+x^2}$

Que15 Prove that $\cot\frac{\pi}{24}=\sqrt{2}+\sqrt{3}+\sqrt{4}+\sqrt{6}$

OR

Show that $\sqrt{2+\sqrt{2+\sqrt{2+2\cos8\theta}}}=2\cos\theta$

Que 16 Using P.M.I, Prove that $x^{2n}-y^{2n}$ is divisible by x+y

Que17 If $(1+i)(1+2i)(1+3i).....(1+ni)=x+iy$.
Show that $2.5.10.........(1+n^2)=x^2+y^2$

Que 18 Find the coefficient of a^4 in the product $(1+2a)^4(2-a)^5$.

Que 19 Solve the linear equations graphically
$x-y\leq1$, $x+2y\leq8$, $2x+y\geq2$, $x\geq0$, $y\geq0$

Que 20 Show that tan3x-tan2x −tanx=tan3x tan2x tanx

OR

$\tan70°=2\tan50°+\tan20°$

Que 21 How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

Que 22 Find the domain and range of $\sqrt{9-x^2}$

SECTION:-D

Que 23 In a survey of 25 student it was found that 15 had taken mathematics ,12 had taken physics and 11 had taken chemistry 5 had taken mathematics and chemistry, 9 had taken mathematics and physics, 4 had taken physics and chemistry and three had taken all the tree subject .find the number of student had (by using venn digram)
(i)only chemistry
(ii)physics and chemistry but not mathematics
(iii)only one of the subject
(iv) atleast one of the three subject
(v)none of the subject .
(vi)only two subject

Que 24 Evaluate tan 20° tan40° tan 60° tan 80°=3

OR

Show that $\sqrt{3}\csc20°-\sec20°=4$

Que 25 Convert $\dfrac{i-1}{\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}}$ into polar form

Que 26 Using P.M.I ,Prove that
$a+ar+ar^2+ar^3.......ar^n=a\left(\dfrac{r^n-1}{r-1}\right)$

Que27 Using binomial theorm $\left(1+\frac{x}{2}-\frac{2}{x}\right)^4$

OR

The sum of the coefficient of first three terms in the expansion of $\left(x-\frac{3}{x^2}\right)^m$, m being a natural number is 559. Find the term of the expansion containing x^3