RAVI MATHS TUITION CENTER ,GKM COLONY, CH- 82. PH: 8056206308

1st MID - TERM MODEL PAPER 1

Date : 16-Jul-19

12th Standard 2019 EM

Maths

Reg.No. : | | | | | | |

Time : 01:15:00 Hrs

Total Marks : 45

ANSWER ALL

10 x 1 = 10

1) If $|adj(adj\ A)| = |A|^9$, then the order of the square matrix A is

(a) 3 (b) 4 (c) 2 (d) 5

2) If $A\begin{bmatrix}1 & -2\\ 1 & 4\end{bmatrix} = \begin{bmatrix}6 & 0\\ 0 & 6\end{bmatrix}$, then A =

(a) $\begin{bmatrix}1 & -2\\ 1 & 4\end{bmatrix}$ (b) $\begin{bmatrix}1 & 2\\ -1 & 4\end{bmatrix}$ (c) $\begin{bmatrix}4 & 2\\ -1 & 1\end{bmatrix}$ (d) $\begin{bmatrix}4 & -1\\ 2 & 1\end{bmatrix}$

3) If $A = \begin{bmatrix}2 & 3\\ 5 & -2\end{bmatrix}$ be such that $\lambda A^{-1} = A$, then λ is

(a) 17 (b) 14 (c) 19 (d) 21

4) $i^n+i^{n+1}+i^{n+2}+i^{n+3}$ is

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

5) The area of the triangle formed by the complex numbers z,iz, and z+iz in the Argand's diagram is

(a) $\frac{1}{2}|z|^2$ (b) $|z|^2$ (c) $\frac{3}{2}|z|^2$ (d) $2|z|^2$

6) The value of $\left(\frac{1+3\sqrt{i}}{1-\sqrt{3i}}\right)^{10}$

(a) $cis\frac{2\pi}{3}$ (b) $cis\frac{4\pi}{3}$ (c) $-cis\frac{2}{3}$

7) A zero of $x^3 + 64$ is

(a) 0 (b) 4 (c) 4i (d) -4

8) If α,β and γ are the roots of x^3+px^2+qx+r, then $\Sigma\frac{1}{\alpha}$ is

(a) $-\frac{q}{r}$ (b) $\frac{p}{r}$ (c) $\frac{q}{r}$ (d) $-\frac{q}{p}$

9) The value of $\sin^{-1}(\cos x), 0 \leq x \leq \pi$ is

(a) $\pi - x$ (b) $x - \frac{\pi}{2}$ (c) $\frac{\pi}{2} - x$ (d) $\pi - x$

10) If $\sin^{-1}x = 2\sin^{-1}\alpha$ has a solution, then

(a) $|\alpha| \leq \frac{1}{\sqrt{2}}$ (b) $|\alpha| \geq \frac{1}{\sqrt{2}}$ (c) $|\alpha| < \frac{1}{\sqrt{2}}$ (d) $|\alpha| > \frac{1}{\sqrt{2}}$

ANSWER 4 [Q.16 COMPULSORY]

4 x 2 = 8

11) If $A = \begin{bmatrix}5 & 3\\ -1 & -2\end{bmatrix}$, show that $A^2 - 3A - 7I_2 = O_2$. Hence find A^{-1}.

12) Find the matrix A for which $A\begin{bmatrix}5 & 3\\ -1 & -2\end{bmatrix} = \begin{bmatrix}14 & 7\\ 7 & 7\end{bmatrix}$.

13) Write the following in the rectangular form:

$\overline{(5+9i)+(2-4i)}$

14) Find the value of $\left(\frac{1+sin\frac{\pi}{10}+icos\frac{\pi}{10}}{1+sin\frac{\pi}{10}-icos\frac{\pi}{10}}\right)^{10}$

15) If α, β and γ are the roots of the cubic equation $x^3+2x^2+3x+4=0$, form a cubic equation whose roots are,

$2\alpha, 2\beta, 2\gamma$

16) Find the value of

$2cos^{-1}\left(\frac{1}{2}\right) + sin^{-1}\left(\frac{1}{2}\right)$

ANSWER 4 [Q.22 COMPULSORY] 4 x 3 = 12

17) Find a matrix A if adj(A) = $\begin{bmatrix} 7 & 7 & -7 \\ -1 & 11 & 7 \\ 11 & 5 & 7 \end{bmatrix}$.

18) Solve 2x - 3y = 7, 4x - 6y = 14 by Gaussian Jordan method.

19) If $\frac{z+3}{z-5i} = \frac{1+4i}{2}$, find the complex number z

20) Find the fourth roots of unity.

21) Find the value of $\tan^{-1}(-1) + \cos^{-1}\left(\frac{1}{2}\right) + sin^{-}1\left(-\frac{1}{2}\right)$

22) a) If α and β are the roots of the quadratic equation $17x^2+43x-73 = 0$, construct a quadratic equation whose roots are $\alpha + 2$ and $\beta + 2$.

ANSWER ALL 3 x 5 = 15

23) If z=x+iy and $\arg\left(\frac{z-1}{z+1}\right) = \frac{\pi}{2}$,then show that $x^2+y^2=1$.

24) Find the monic polynomial equation of minimum degree with real coefficients having $2-\sqrt{3}\,i$ as a root.

25) Find (i) $\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right)$

ii) $\cos^{-1}\left(cos\left(-\frac{\pi}{3}\right)\right)$

iii) $\cos^{-1}\left(cos\left(-\frac{7\pi}{6}\right)\right)$

26) Reduce the matrix $\begin{bmatrix} 0 & 3 & 1 & 6 \\ -1 & 0 & 2 & 5 \\ 4 & 2 & 0 & 0 \end{bmatrix}$ to row-echelon form.

27) Let z_1,z_2, and z_3 be complex numbers such that $|z_1| = |z_2| = |z_3| = r > 0$ and $z_1+z_2+z_3 \neq 0$ prove that $\left|\frac{z_1z_2 + z_2z_3 + z_3z_2}{z_1 + z_2 + z_3}\right|$ =r

28) Investigate for what values of λ and μ the system of linear equations

x + 2y + z = 7, x + y + λz = μ, x + 3y − 5z = 5 has

(i) no solution

(ii) a unique solution

(iii) an infinite number of solutions

****