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

1st MID - TERM MODEL PAPER 3

Date : 16-Jul-19

12th Standard 2019 EM

Maths

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

Time : 01:15:00 Hrs

Total Marks : 50

SEARCH **RAVI MATHS TUITION CENTER** ON GOOGLE for more papers

10 x 1 = 10

LIKE AND SUBSCRIBE ON YOUTUBE **SR MATHS TEST PAPERS**

1) If $A = \begin{bmatrix} 1 & \tan\frac{\theta}{2} \\ -\tan\frac{\theta}{2} & 1 \end{bmatrix}$ and AB = I , then B =

(a) $\left(\cos^2\frac{\theta}{2}\right)A$ (b) $\left(\cos^2\frac{\theta}{2}\right)A^T$ (c) $\left(\cos^2\theta\right)I$ (d) $(\text{Sin}^2\frac{\theta}{2})A$

2) The rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 4 & 6 & 8 \\ -1 & -2 & -3 & -4 \end{bmatrix}$ is

(a) 1 (b) 2 (c) 4 (d) 3

3) The system of linear equations x + y + z = 2, 2x + y - z = 3, 3x + 2y + kz = has a unique solution if

(a) k - 0 (b) -1 < k < 1 (c) -2 < k < 2 (d) k=0

4) If z is a complex number such that $z\varepsilon C/R$ and $z + \frac{1}{z}\epsilon R$ then|z| is

(a) 0 (b) 1 (c) 2 (d) 3

5) The principal argument of $\frac{3}{-1+i}$

(a) $\frac{-5\pi}{6}$ (b) $\frac{-2\pi}{3}$ (c) $\frac{-3\pi}{4}$ (d) $\frac{-\pi}{2}$

6) The least positive integer n such that $\left(\frac{2i}{1+i}\right)^n$ is a positive integer is

(a) 16 (b) 8 (c) 4 (d) 2

7) The number of real numbers in $[0,2\pi]$ satisfying $\sin^4x-2\sin^2x+1$ is

(a) 2 (b) 4 (c) 1 (d) °

8) If $x^3+12x^2+10ax+1999$ definitely has a positive root, if and only if

(a) a≥0 (b) a > 0 (c) a< 0 (d) a≤0

9) For real x, the equation $\left|\frac{x}{x-1}\right| + |x| = \frac{x^2}{|x-1|}$ has

(a) one solution (b) two solution (c) at least two solution (d) no solution

10) If the equation ax2+ bx+c=0(a > 0) has two roots ∝ and β such that ∝< - 2 and β > 2, then

(a) b2-4ac=0 (b) $b^2 - 4ac < 0$ (c) $b^2 - 4ac > 0$ (d) $b^2 - 4ac \geq 0$

5 x 2 = 10

11) Show that the equations 3x + y + 9z = 0, 3x + 2y + 12z = 0 and 2x + y + 7z = 0 have nontrivial solutions also.

12) If z=x+iy is a complex number such that Im $\left(\frac{2z+1}{iz+1}\right) = 0$ show that the locus of z is $2x^2+2y^2+x-2y=0$

13) Find the value of $\sum_{k=1}^{8}\left(cos\frac{2k\pi}{9} + isi\frac{2k\pi}{9}\right)$.

14) Solve the equation $x^3-9x^2+14x+24=0$ if it is given that two of its roots are in the ratio 3:2.

15) Solve the equation $9x-36x^2+44x-16=0$ if the roots form an arithmetic progression.

5 x 3 = 15

16) By using Gaussian elimination method, balance the chemical reaction equation: $C_5H_8 + O_2 \longrightarrow CO_2 + H_2O$. (The above is the reaction that is taking place in the burning of organic compound called isoprene.)

17) Solve the equation $z^3+8i=0$,where

18) Show that $\left(\frac{19+9i}{5-3i}\right)^{15} - \left(\frac{8+i}{I+2i}\right)^{15}$ is purely imaginary.

19) Obtain the condition that the roots of $x^3+px^2+qx+r=0$ are in A.P.

20) Find the roots of $2x^3+3x^2+2x+3$

3 x 5 = 15

21) Find the condition on a, b and c so that the following system of linear equations has one parameter family of solutions: x + y + z = a, x + 2y + 3z = b, 3x + 5y + 7z = c.

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

23) Discuss the nature of the roots of the following polynomials:
$x^{2018}+1947x^{1950}+15x^8+26x^6+2019$

****