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REVISION TEST 1 [ CHAPTER 1, 2, 3 ]

Date : 26-Jun-19

12th Standard 2019 EM

**Maths**

Reg.No. : | | | | | |

Time : 02:30:00 Hrs

Total Marks : 90

FOE ANSWERS WHATSAPP - 8056206308

20 x 1 = 20

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 = $\begin{bmatrix} 2 & 0 \\ 1 & 5 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 4 \\ 2 & 0 \end{bmatrix}$ then |adj (AB)| =

(a) -40 (b) -80 (c) -60 (d) -20

3) If A, B and C are invertible matrices of some order, then which one of the following is not true?

(a) adj A = $|A|A^{-1}$ (b) adj(AB) = (adj A)(adj B) (c) det $A^{-1}$ = $(\det A)^{-1}$ (d) $(ABC)^{-1} = C^{-1}B^{-1}A^{-1}$

4) If $A^TA^{-1}$ is symmetric, then $A^2$ =

(a) $A^{-1}$ (b) $(A^T)^2$ (c) $A^T$ (d) $(A^{-1})^2$

5) 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

6) If $x^ay^b = e^m$, $x^cy^d = e^n$, $\Delta_1 = \begin{vmatrix} m & b \\ n & d \end{vmatrix}$, $\Delta_2 = \begin{vmatrix} a & m \\ c & n \end{vmatrix}$, $\Delta_3 = \begin{vmatrix} a & b \\ c & d \end{vmatrix}$, then the values of x and y are respectively,

(a) $e^{(\Delta_2/\Delta_1)}, e^{(\Delta_3/\Delta_1)}$ (b) $\log(\Delta_1/\Delta_3), \log(\Delta_2/\Delta_3)$ (c) $\log(\Delta_2/\Delta_1), \log(\Delta_3/\Delta_1)$ (d) $e^{(\Delta_1/\Delta_3)}, e^{(\Delta_2/\Delta_3)}$

7) Which of the following is/are correct?

(i) Adjoint of a symmetric matrix is also a symmetric matrix.

(ii) Adjoint of a diagonal matrix is also a diagonal matrix.

(iii) If A is a square matrix of order n and $\lambda$ is a scalar, then adj($\lambda$A) = $\lambda^n$ adj(A).

(iv) A(adjA) = (adjA)A = |A|I

(a) Only (i) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i), (ii) and (iv)

8) If A is a square matrix of order n, then |adj A| =

(a) $|A|^{n-1}$ (b) $|A|^{n-2}$ (c) $|A|^n$ (d) None

9) If the system of equations x + 2y - 3x = 2, (k + 3) z = 3, (2k + 1) y + z = 2. is inconsistent then k is

(a) -3, $-\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 1 (d) 2

10) 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) $2|z|^2$

11) If z is a non zero complex number, such that $2iz^2 = \bar{z}$ then |z|is then |z| is

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

12) If $z - 2 + i \leq 2$ then the greatest value of |z| is

(a) $\sqrt{3} - 2$ (b) $\sqrt{3} + 2$ (c) $\sqrt{5} - 2$ (d) $\sqrt{5} + 2$

13) If |z|=1, then the value of $\frac{1+z}{1+z}$ is

(a) z (b) $\bar{z}$ (c) $\frac{1}{2}$ (d) 1

14) If $|z_1|=1, |z_2|=2|z_3|=3$ and $|9z_1z_2+4z_1z_3+z_2z_3|=12$, then the value of $|z_1+z_2+z_3|$ is

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

15) If z=x+iy is a complex number such that |z+2|=|z−2|, then the locus of z is

(a) real axis (b) imaginary axis (c) ellipse (d) circle

16) The principal argument of (sin 40°+i cos40°)5 is

(a) −110° (b) −70° (c) 70° (d) 110°

17) A polynomial equation in x of degree n always has

(a) n distinct roots (b) n real roots (c) n imaginary roots (d) at most one root

18) 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) $-\frac{q}{p}$

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

(a) 2 (b) 4 (c) 1 (d) °

20) The polynomial $x^3+2x+3$ has

(a) one negative and two real roots (b) one positive and two imaginary roots (c) three real roots (d) no solution

ANSWER 7 ONLY [ Q.NO 30 COMPULSORY ] 7 x 2 = 14

21) If A = $\begin{bmatrix} 8 & -4 \\ -5 & 3 \end{bmatrix}$, verify that A(adj A) = $|A|I_2$.

22) Given A = $\begin{bmatrix} 1 & -1 \\ 2 & 0 \end{bmatrix}$, B = $\begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$ and C = $\begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$, find a matrix X such that AXB = C.

23) Decrypt the received encoded message $\begin{bmatrix} 2 & -3 \end{bmatrix}\begin{bmatrix} 20 & 4 \end{bmatrix}$ with the encryption matrix $\begin{bmatrix} -1 & -1 \\ 2 & 1 \end{bmatrix}$ and the decryption matrix as its inverse, where the system of codes are described by the numbers 1 - 26 to the letters A - Z respectively, and the number 0 to a blank space.

24) The complex numbers u,v, and w are related by $\frac{1}{u} = \frac{1}{v} + \frac{1}{w}$ If v=3−4i and w=4+3i, find u in rectangular form.

25) Show that $\left(2+i\sqrt{3}\right)^{10} - \left(2-i\sqrt{3}\right)^{10}$

26) Which one of the points10 − 8i , 11+ 6i is closest to1+ i .

27) If $z_1$ and $z_2$ are 1-i, -2+4i then find Im$\left(\frac{z_1z_2}{\bar{z_1}}\right)$ .

28) If the sides of a cubic box are increased by 1, 2, 3 units respectively to form a cuboid, then the volume is increased by 52 cubic units. Find the volume of the cuboid.

29) Find the sum of squares of roots of the equation $2x^4-8x+6x^2-3=0$.

30) Find a polynomial equation of minimum degree with rational coefficients, having 2+$\sqrt{3}$ i as a root.

ANSWER 7 ONLY [ Q.NO 40 COMPULSORY ] 7 x 3 = 21

31) If adj A = $\begin{bmatrix} -1 & 2 & 2 \\ 1 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, find $A^{-1}$.

32) Solve the following system of equations, using matrix inversion method:

$2x_1 + 3x_2 + 3x_3 = 5, x_1 - 2x_2 + x_3 = -4, 3x_1 - x_2 - 2x_3 = 3$.

33) Determine the values of λ for which the following system of equations (3λ − 8)x + 3y + 3z = 0, 3x + (3λ − 8)y + 3z = 0, 3x + 3y + (3λ − 8)z = 0. has a non-trivial solution.

34) Simplify $\left(\frac{1+i}{1-i}\right)^3 - \left(\frac{1-i}{1+i}\right)^3$

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

36) Find $z^{-1}$, if z=(2+3i)(1− i).

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

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

39) Find the condition that the roots of $x^3+ax^2+bx+c = 0$ are in the ratio p:q:r.

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

ANSWER 7 ONLY 7 x 5=35

41) a) Test for consistency of the following system of linear equations and if possible solve:

x - y + z = -9, 2x - 2y + 2z = -18, 3x - 3y + 3z + 27 = 0.

**(OR)**

b) Find the rank of the matrix $\begin{bmatrix} 2 & -2 & 4 & 3 \\ -3 & 4 & -2 & -1 \\ 6 & 2 & -1 & 7 \end{bmatrix}$ by reducing it to an echelon form.

42) a) Investigate for what values of $\lambda$ and $\mu$ the system of linear equations

$x + 2y + z = 7, x + y + \lambda z = \mu, x + 3y - 5z = 5$ has

(i) no solution

(ii) a unique solution

(iii) an infinite number of solutions

**(OR)**

b) Solve: $\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4, \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1, \frac{6}{x} + \frac{9}{y} - \frac{20}{z}$ =2

43) a) For what value of $\lambda$, the system of equations x+y+z=1, x+2y+4z=$\lambda$, x+4y+10z=$\lambda^2$ is consistent.

**(OR)**

b) Solve the equation (x-2)(x-7)(x-3)(x+2)+19=0

44) a) Solve: $(2x^2 - 3x + 1)(2x^2 + 5x + 1) = 9x^2$.

**(OR)**

b) Discuss the nature of the roots of the following polynomials:

$x^5-19x^4+2x^3+5x^2+11$

45) a) If the sum of the roots of the quadratic equation $ax^2+ bx + c = 0$ (abe- 0) is equal to the sum of the squares of their reciprocals, then $\frac{a}{c}, \frac{b}{a}, \frac{c}{b}$ are H.P.

**(OR)**

b) If $z_1$,$z_2$ and $z_3$ ,are complex numbers such that $|z_1|=|z_2|=|z_3|=|z_1+z_2+z_3|=1$ find the value of $\left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}\right|$

46) a) Find the following $\left|\frac{i(2+i)^3}{(1+i)^2}\right|$

**(OR)**

b) Find the modulus and principal argument of the following complex numbers.

$-\sqrt{3}+i$

47) a) Find the radius and centre of the circle $z\bar{z}$ -(2+3i)z-(2-3i)$\bar{z}$ +9 =0 where z is a complex number.

**(OR)**

b) Solve, by Cramer's rule, the system of equations

$x_1 - x_2 = 3$, $2x_1 + 3x_2 + 4x_3 = 17$, $x_2 + 2x_3 = 7$.

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