Serial No. of Answer Book
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MRD-E/XI (A)

Mathematics Part-I

Roll Number
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Fic. No. ____________

Fic. No. ____________

Mathematics Part-I

SECTION "A"

Time: 20 Min Marks: 20

NOTE:Use this sheet for this section. No marks will be awarded for cutting, erasing or overwriting.

Q1.Choose the correct answer from the given choices i.e. (a, b, c, d) and insert into the relevant box.

(i). $(-i)^{-19}$ = ______________.
(A) í (B) - í (C)1 (D)-1

(ii). A group G is called abelian group if it has ____________.
(A)Distributive prop (B)Associative prop (C)Commutative prop (D) Identity

(iii). If z = a + íb then $|-\bar{z}|$ = __________.
(A) $a^2 - b^2$ (B) $a^2 + b^2$ (C) $\sqrt{a^2+b^2}$ (D) $\sqrt{a^2-b^2}$

(iv). If A is a square Matrix and |A|= o the a^{-1} = _____________.
(A) = A (B) $\frac{1}{|A|}adjA$ (C) Not exist (D) = -A

(v). If A is a square Matrix of order n the cofactor of the element a_{ij} i-e $A_{íj}$ =________.
(A) $(-1)^{i+j} M_{ij}$ (B) M_{ij} (C) $-M_{ij}$ (D) $(-1)^{i+í} M_{jí}$

(vi). The equation $4x^2 + x + 1 = 0$ has __________ roots.
(A) Real (B) Imaginary (C) Complex (D) None

(vii). ω^{-5} = _____________. Where w is a cube root of unity.
(A) 1 (B) 0 (C) ω (D) ω^2

(viii). If the roots of the quadratic equation are rational then _________ .
(A) $b^2 - 4ac = 0$ (B) $b^2 - 4ac > 0$ (C) $b^2 - 4ac \geq 0$ (D) $b^2 - 4ac < 0$

(ix). If $a_n = (-1)^n(n+1)$ then a3 = ______________.
(A) 3 (B) -4 (C) 4 (D)2

(x). True relation between Arithmetic Geometric and Harmonic Means is _________.
(A) A>H>G (B) G>H>A (C) H>G>A (D) A>G>H

(xi). $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+--------$ is the series of ______________.
(A) Arithmetic (B)Geometric (C) Harmonic (D) Neither of them

(xii). ${}^{n}C_{r}$ = _____________.
(A) $\frac{1}{r!}\,{}^{n}P_{r}$ (B) ${}^{n}P_{r}$ (C) ${}^{n-1}C_{r}$ (D) ${}^{c}C_{r-1}$

(xiii). In the binomial expansion of $(a+b)^n$ the number of terms are ____________.
(A) n+2 (B) n+1 (C) n (D) n-1

(xiv). $\frac{-3\pi}{4} radians =$ __________.
(a) 130^0 (b) -135^0 (c) 135^0 (d) $\frac{180}{\pi}$

(xv). Cos $(\alpha + (\frac{\pi}{2})$. = _____________.
(A) cos α (B) -cos α (C) sin α (D) -sin α

(xvi). Period of 5 Sin 3x is ________.
(A) 2π (B) $\frac{3\pi}{2}$ (C) - π (D) $\frac{2\pi}{3}$

(xvii). In law of tangents $\frac{a+c}{a-c}$ = _____________.
(A) tan $(\frac{\alpha+\beta}{2})$ (B) $\frac{\tan(\frac{\alpha+y}{2})}{\tan(\frac{\alpha-y}{2})}$ (C) tan $(\frac{\beta-y}{2})$ (D) $\frac{\tan(\frac{\alpha-y}{2})}{\tan(\frac{\alpha+y}{2})}$

(xviii). A circle drawn inside a triangle and touching the sides of a triangle is called _____.
(A) In Circle (B) Circum Circle (C) Escribe Circle (D) None of these

(xix). Domain of y = see x is ____________.
(a). [0, π] (b). [-π , π] (c). (-2π ,2π) (d). [0, π]-$\frac{\pi}{2}$

(xx). $Cos^{-1}(-x)$ = ______________.
(a). π -$Cos^{-1}x$ (b). π +$Cos^{-1}x$ (c).$Cos^{-1}x$ (d).-$Cos^{-1}x$

MRD-E/XI (A)

Mathematics Part-I

Time: Allowed: 2.40h | Marks: 80

SECTION "B"

Marks: 50

Q2. Answer any Ten (10) of the following Parts.

(i) if Z1 = a +íb , Z2 = c + íd then prove that $\left[\overline{\frac{Z1}{Z2}}\right] = \frac{\overline{Z1}}{\overline{Z2}}$

(ii) S={0,1,2,3} show that (S,+) is a Semi group. Where + defines addition Modulo 4.

(iii) Find the inverse of the Matrix $\begin{bmatrix} 4 & -2 & 5 \\ 2 & 1 & 0 \\ -2 & 2 & 3 \end{bmatrix}$ by using elementary row operation.

(iv) Solve the equation (x-3) (x+9) (x+5) (x-7) = 385

(v) If α, β are the roots of x^2-4x+2 = 0 then find the equation whose roots are $\alpha + \frac{1}{\alpha}, \beta + \frac{1}{\beta}$

(vi) Decompose $\frac{x^2+3}{(x-1)(x^2+1)^2}$ into Partial fraction.

(vii) Find four numbers in A.P such that their sum is 66 and the sum of their squares is 1214.

(viii) Find the Sum to n terms of the series 2.3.1 + 3.4.4 + 4.5.7+ ----------------

(ix) Find the value of n when ${}^{n}p_{4} : {}^{n-1}p_{3}$ = 9:1

(x) Prove by Mathematical Indus that $2^2+4^2+6^2$+-----------+$(2n)^2$ = $\frac{2}{3}$ n(n+1) (2n+1)

(xi) Prove that $\frac{\sin x - \cos x}{\tan^2 x - 1} = \frac{\cos^2 x}{\sin x - \cos x}$

(xii) Show that Sin5θ + 2 Sin 3θ s+Sinθ = 4Sin3θ Cos$^2\theta$

(xiii) Use the law of cosines to prove that 1+Cosα = $\frac{(b+c+a)(b+c-a)}{2bc}$

SECTION "C"

Marks: 30

Note: Attempt any THREE questions. All questions carry equal marks.

Q3. (A) Find real and imaginary Parts of $\left(\frac{1-i\sqrt{3}}{1+i\sqrt{3}}\right)^4$

(B) Solve the Matrix equation for x

$x\begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} - \begin{bmatrix} 3 & 2 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} -1 & 3 \\ 4 & 5 \end{bmatrix}$

Q4. (A) if n+1, and x-2 are the factors of the polynomial x^3-mx^2+nx+2 then using synthetic division to find the values of m & n.

(B) If $\frac{1}{y-x}, \frac{1}{2y}$ and $\frac{1}{y-z}$ from an A.P. prove that x, y and z form a G.P.

Q.5 (A) Find the term independent of x in the expansion of $\left(\sqrt{x} + \frac{1}{3x}\right)^{10}$

(B) If y = $\frac{1}{2^2} + \frac{1.3}{2!} \cdot \frac{1}{2^4} + \frac{1.3.5}{3!} \cdot \frac{1}{2^6}$ + -------------------then y^2 + 2y -1 = 0

Q.6 (A) Prove Sin$^2\frac{\theta}{2}$ = $\frac{\sin\theta . \tan\frac{\theta}{2}}{2}$

(B) The angle of elevation of a building is 48^0 from A and 61^0 from B. if AB is 20 m. Find the height of the building.