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Lahore Board - Annual 2008 Group II
Mathematics Paper-I(Obj), Time Allowed: 30 Mints
Max. Marks: 20 , Available online @ http://www.mathcity.org/fsc

Q.1 Four possible answers to each statement are given below. Tick (✓) the correct answer

(i) $\sqrt{3}$ is

(a) Odd no. (b) Complex no (c) Rational (d) Irrational number

(ii) Inverse of $p \to q$ is:

(a) $\sim p \to \sim q$ (b) $p \to \sim q$ (c) $\sim p \to q$ (d) $\sim q \to \sim p$

(iii) $[0]$ is a:

(a) Square matrix (b) Unit matrix (c) Rectangular matrix (d) Scalar matrix

(iv) For a square matrix $|A|$ equals:

(a) A^t (b) $|A^t|$ (c) $-|A^t|$ (d) $-A^t$

(v) If $4^x = 2$ then x equals:

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

(vi) If α, β are the roots of $ax^2 + bx + c = 0, \quad a \neq 0$ then $\alpha\beta$ is equal to:

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

(vii) $\frac{x^4}{(1-x^4)}$ is

(a) Proper fraction (b) Improper fraction (c) Decimal (d) Equation

(viii) If nth term of A.P is 3n-1, then first term equals to:

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

(ix) The Sequence $3, 6, 12, \ldots$ is:

(a) A.P (b) G.P (c) H.P (d) Finite

(x) $1 + 2 + 3 + 4 + \ldots + n$ equals

(a) $\frac{n(n-1)}{2}$ (b) $\frac{n(n+1)}{2}$ (c) $\frac{(n+1)}{2}$ (d) $\frac{n(n+1)^2}{2}$

(xi) With usual notation ${}^{n}C_{r}$ equals:

(a) ${}^{n}C_{r-n}$ (b) ${}^{r}C_{n}$ (c) ${}^{n}C_{n-r}$ (d) ${}^{n-r}C_{n}$

(xii) If n(S) = 20, n (B) = 2 then P(B) equals:

(a) 10 (b) $\frac{1}{10}$ (c) $-\frac{1}{10}$ (d) 1

(xiii) The number of terms in the expansion of $(a+2h)^5$

(a) 4 (b) 5 (c) 6 (d) 7

(xiv) 1^0 equals

(a) $\frac{\pi}{180}$ radian (b) $\frac{180}{\pi}$ (c) $\frac{\pi}{90}$ (d) $\frac{\pi}{360}$

(xv) $Sin2\theta$ equals

(a) $Sin\theta Cos\theta$ (b) $2Sin\theta Cos\theta$ (c) $1-2Sin^2\theta$ (d) $2Cos^2\theta-1$

(xvi) Period of sine function is:

(a) π (b) $-\pi$ (c) 2π (d) 0

(xvii) In a right triangle no angle is greater than:

(a) 90^0 (b) 80^0 (c) 60^0 (d) 45^0

(xviii) With usual notation $\cos\frac{\partial}{2}$ equals:

(a) $\sqrt{\frac{s(s-b)}{bc}}$ (b) $\sqrt{\frac{s(s-c)}{bc}}$ (c) $\sqrt{\frac{s(s-a)}{bc}}$ (d) $\sqrt{\frac{s(s-a)}{ac}}$

(xix) $Sin(\sin^{-1}(\frac{1}{2})$ equals:

(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$

(xx) Reference angle lies in quadrant:

(a) I (b) II
(c) III (d) IV

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Lahore Board - Annual 2008 Group II

Mathematics Paper-I(Sub), Time Allowed: 2:30 Hours

Max. Marks: 80 , Available online @ http://www.mathcity.org/fsc

Section – I

Note: *Write any Twenty-Five (25) short answers. While writing answer write its part number carefully. Each part carries two marks.* *50*

Q # 2:

(i) Prove that $\frac{a+b}{c}=\frac{a}{c}+\frac{b}{c}$, where a, b, c are real numbers.

(ii) Simplify i^{101}

(iii) Define a function also give one example of a function.

(iv) Write the converse and inverse of $q \to p$

(v) Define a group.

(vi) If A is a square matrix of order 3, show that $A+A^t$ symmetric.

(vii) Without expanding show that $\begin{vmatrix} 2 & 3 & 0 \\ 3 & 9 & 6 \\ 2 & 15 & 1 \end{vmatrix} = 9 \begin{vmatrix} 2 & 1 & 0 \\ 1 & 1 & 2 \\ 2 & 5 & 1 \end{vmatrix}$

(viii) If matrices A and B are symmetric and $AB = BA$, Show that AB is symmetric.

(ix) Convert the equation $\frac{x}{x+1}+\frac{x+1}{x}=\frac{5}{2}$ to a quadratic equation.

(x) Show that $\left(\frac{-1-\sqrt{3}i}{2}\right)=\frac{-1+\sqrt{3}i}{2}$

(xi) Show that $x-a$ is a factor of x^n-a^n, n is a positive integer.

(xii) Discuss the nature of roots of the equation $9x^2-12x+4=0$

(xiii) Resolve $\frac{7x+25}{(x+3)(x+4)}$ into partial fractions.

(xiv) Which term of the A.P.5, 2, -1, … is -85?

(xv) Define an identity.

(xvi) Find the geometric mean between a and b,find a and b when $a=-3$ *and* $b=-9$

(xvii) If 5,8 are two A.M.s between a and b ,find $\boldsymbol{a}$ and $\boldsymbol{b}$

(xviii) Find nth term of the series $1\times1+2\times4+3\times7+...$

(xix) Find the value of n,when ${}^nP_2=30$

(xx) How many diagonals can be formed by joining the vertices of the polygon having 5 sides?

(xxi) If a sample space $=\{1,2,3,_____,9\}$event $A=\{2,4,6,8\}$ and $B=\{1,3,5\}$ find $P(A\cup B)$

(xxii) How many necklaces can be made from 6 beads of different colours?

(xxiii) Prove that $1+5+9+...(4n-3)=n(2n-1)$ for n=1,2

(xxiv) Use binomial theorem to expand $\left[3a-\frac{x}{3a}\right]^4$

(xxv) Neglecting square and higher powers, show that $\frac{\sqrt{1+2x}}{\sqrt{1-x}}=1+\frac{3x}{2}$

(xxvi) Show that the area of a circular region of radius r is $\frac{1}{2}r^2\theta$ where θ is central angle of the sector.

(xxvii) Show that $2\sin 45^0-\frac{1}{2}\operatorname{cosec}45^0=\frac{3}{\sqrt{2}}$

(xxviii) Without using calculator find the value of $Sin75^0$

(xxix) If $Cos\alpha = \frac{3}{5}$ find value of $Cos\alpha, 0 < \alpha < \frac{\pi}{2}$

(xxx) Express $\sin 5\theta + \sin 3\theta$ as product

(xxxi) Find the period of $Sin(\frac{x}{5})$

(xxxii) A ladder leaning against a vertical wall makes an angle of 24^0 with the wall. Its foot is 5m from the wall. Find its length.

(xxxiii) Prove $\cos\frac{\alpha}{2} = \sqrt{\frac{s(s-a)}{bc}})$ in any triangle ABC

(xxxiv) Prove $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$ in any triangle ABC

(xxxv) Prove $r = (s-b)\tan(\frac{\beta}{2})$

(xxxvi) Find the value of $\tan(\cos^{-1}\frac{\sqrt{3}}{2})$

(xxxvii) Find the solution of $x = -\frac{\sqrt{3}}{2}$ which lies in $[0, 2\pi]$

Section – II

***Note:** Attempt any THREE questions.*

Q # 3 **(a)** Show that the $\{1, \omega, \omega^2\}$ in an abelian group w.r.t. ordinary multiplication. 5

(b) Solve the system of linear equation by Cramer's rule: 5

$$2x + 2y + z = 3$$
$$3x - 2y - 2z = 1$$
$$5x + y - 3z = 2$$

Q # 4 (a) Use synthetic division to find the values of p and q if x+1 and x-2 are the fraction of the polynomial $x^3 + px^2 + qx + 6$. 5

(b) Find the 12^{th} term of the sequence $1+i, 2i, -2+2i$ ----- 5

Q # 5 (a) How many signals can be given by 6 flags of different colours when any number of flags can be used at a time? 5

(b) Using mathematical induction, prove that 5

$$1\times 3 + 2\times 5 + 3\times 7 + \text{------} + n\times(2n+1) = \frac{n(n+1)(4n+5)}{6}$$

Q # 6 (a) If $Cot\theta = \frac{5}{2}$ and the terminal arm of the angle is in 1 quard.find the values of 5

$$\frac{3\sin\theta + 4\cos\theta}{\cos\theta - \sin\theta}$$

(b) Prove that $\sin 10^0.\sin 30^0.\sin 50^0.\sin 70^0\ \frac{1}{16}$ 5

Q # 7 (a) Prove that $r_1 + r_2 + r_3 - r = 4R$ (With usual notations) 5

(b) Prove that $\tan^{-1}\frac{3}{4} + \tan^{-1}\frac{3}{5} + \tan^{-1}\frac{8}{19} = \frac{\pi}{4}$ 5

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