MathCity.org
Merging man and maths

Lahore Board - Annual 2009 Group II
Mathematics Paper-I (Obj) , Time Allowed: 30 Mins.
Marks: 20 , Available online @ http://www.mathcity.org/fsc

Objective

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

(1) $\sqrt{\frac{5}{16}}$ is :

(a) Rational Number **(b)** Irrational Number
(c) Prime number **(d)** Whole Number

(2) $\{x / x \in E \text{ and } 4 < x < 6\}$ equals:

(a) $\{4\}$ **(b)** $\{5\}$
(c) $\{6\}$ **(d)** f

(3) The multiplicative inverse of $-i$ is :

(a) i **(b)** $-i$
(c) 1 **(d)** -1

(4) If A is a matrix of order $m \times n$ then the number of elements in each row of A is:

(a) M **(b)** N
(c) m + n **(d)** m – n

(5) If A is a square matrix of order 3×3 then $|kA|$ equals :

(a) $k|A|$ **(b)** $k^2|A|$
(c) $k^3|A|$ **(d)** $k^4|A|$

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

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

(7) If a and b are the roots of $3x^2 - 2x + 4 = 0$ then the equation whose roots are $2a, 2b$ is:

(a) $2x^2 + 6x + 8 = 0$ **(b)** $4x^2 - 2x + 3 = 0$
(c) $3x^2 - 4x + 16 = 0$ **(d)** $3x^2 + 16x - 4 = 0$

(8) An infinite arithmetic series consisting of non-zero terms is:

(a) Convergent **(b)** Divergent
(c) Neither Convergent nor Divergent **(d)** Oscillatory

(9) The product of n geometric means between a and b equals ___ A, G, H, have their usual meanings:

(a) A^n **(b)** H^n
(c) G^n **(d)** nG

(10) ${}^4P_3$ equals:

(a) ${}^4P_1$ **(b)** ${}^4P_2$
(c) ${}^4P_4$ **(d)** ${}^5P_4$

(11) P(E) equals:

(a) 1 + P(E) **(b)** P(E) – 1

(c) 2 – P(E) **(d)** 1 – P(E)

(12) If n is a positive integer then $n^2 + n$ is divisible by :

(a) 2 **(b)** 3

(c) 4 **(d)** 5

(13) If n is even positive integer, then $\binom{n}{1}+\binom{n}{3}+\binom{n}{5}+\_\_\_\_\_+\binom{n}{n-1}$ equals:

(a) 2^n **(b)** 2^{n+1}

(c) 2^{n-1} **(d)** 3^n

(14) If n is a positive integer and $|x|<1 then 1+nx+\frac{n(n-1)}{2!}x^2+\_\_\_\_\_+is$:

(a) Arithmetic Series **(b)** Geometric Series

(c) Harmonic Series **(d)** Binomial Series

(15) Which one is true :

(a) 1 radian < 1^0 **(b)** 1 radian > 1^0

(c) 1 radian = 1^0 **(d)** 5 radian < 2^0

(16) $Sin\left(\frac{p}{2}-q\right)$ equals :

(a) $Cos(q)$ **(b)** $Sin(q)$

(c) $-Cos(q)$ **(d)** $Sin(q)$

(17) $2 Sin a\ Cos b$ equals:

(a) $Sin(a+b)-Sin(a-b)$ **(b)** $Cos(a+b)+(a-b)$

(c) $Sin(a+b)+Sin(a-b)$ **(d)** $Cos(a+b)-(a-b)$

(18) $2 Sin 12^0\ Sin 46^0$ equals:

(a) $Cos 34^0 + Cos 58^0$ **(b)** $Sin 34^0 - Sin 58^0$

(c) $Sin 34^0 + Sin 58^0$ **(d)** $Cos 34^0 - Cos 58^0$

(19) With usual notations for triangle R equals :

(a) $\frac{b}{2Sin a}$ **(b)** $\frac{a}{2Sin b}$

(c) $\frac{c}{2Sin g}$ **(d)** $\frac{\Delta}{5}$

(20) The solution set of $Sin x = 0$ is given by _____ $n \in Z$:

(a) $\{2np\}$ **(b)** $\{p+2np\}$

(c) $\{np\}$ **(d)** $\{3np\}$

Provided and Composed by: Haji Asif ALI (asif.mathematics@gmail.com)

MathCity.org
Merging man and maths

Lahore Board - Annual 2009 Group II
Mathematics Paper-I (Sub) , Time Allowed: 2.30 Hours
Max. Marks: 80 , Available online @ http://www.mathcity.org/fsc

Section – I

Note: *All questions are to be attempted on answer book.*

Q # 2: Write any TWENTY-FIVE short answers of the following questions:

(i) State De-Moivre's theorem.

(ii) Prove that $z\bar{z} = |z|^2, \quad \forall\ z \in C$

(iii) Is there any set which has no proper subset? If so, name that set.

(iv) Define order of a set.

(v) State Commutative and associative property of binary operation.

(vi) Let $p \to p$ be a given conditional logic, then find its converse and inverse.

(vii) Find the inverse of the matrix $\begin{bmatrix} 2 & 1 \\ 6 & 3 \end{bmatrix}$

(viii) Define (i) Consistent system. (ii) Inconsistent system

(ix) If $A^2 = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$, show that $A^2 = I_2$

(x) Show that $\begin{vmatrix} 2 & 3 & 0 \\ 3 & 9 & 6 \\ 2 & 15 & 1 \end{vmatrix} = 9 \begin{vmatrix} 2 & 1 & 0 \\ 1 & 1 & 2 \\ 2 & 5 & 1 \end{vmatrix}$

(xi) Prove that each complex cube root of unity is square of the other.

(xii) Use factor theorem, to prove that $x - a$ is a factor of $x^n - a^n$.

(xiii) If a, b are the roots of $x^2 - px - p - c = 0$ prove that $(1+a)(1+b) = 1-c$

(xiv) Show that the roots of $(p+q)x^2 - px - q = 0$ will be rational.

(xv) If 5 and 8 are the two A.M's between a and b, find a and b.

(xvi) Find two G.M's between 1 and 8.

(xvii) If 5 is H.M, between 2 and b, find b.

(xviii) Find n if ${}^nP_2 = 30$

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

(xx) A fair con is tossed three times. What is the probability that no head appears.

(xxi) A die is thrown, what is the probability the number is prime?

(xxii) Show $\dfrac{5^{2n} - 3^{2n}}{2}$ is an integer for n = 2, 3.

(xxiii) Find 3rd term in the expansion of $\left(2a - \dfrac{x}{a}\right)^7$

(xxiv) Expand up to 3rd term $(1-x)^{-3}$

(xxv) Evaluate $\sqrt{17}$ up to two decimals.

(xxvi) Convert $\left(22\dfrac{1}{2}\right)^0$ to radians using $p = 3.1416$

(xxvii) Show $(\tan q + \cot q)^2 = \sec^2 q \cos ec^2 q$

(xxviii) If a, b, g are the angles of a triangle A B C. Prove that $Cos\left(\dfrac{a+b}{2}\right) Sin\left(\dfrac{g}{2}\right)$

(xxix) Prove that $\tan(45^0 + A).\tan(45^0 - A) = 1$

(xxx) Prove that $\dfrac{Sin3x - Sinx}{Cosx - Cos3x} = Cot\,2x$

(xxxi) Write domain and range of $Cos\,x$.

(xxxii) Find the period of $Sin\frac{x}{3}$

(xxxiii) If $a=3, c=5, and\ a=120^{0,}$ find "*a*" by using law of cosine.

(xxxiv) Find the area of the triangle ABC, when $a=200, b=120, g=150^{0}$

(xxxv) For the triangle ABC, $a=13, b=14, c=15$ find R

(xxxvi) Define trigonometric equation.

(xxxvii) Solve the equation $Cot^2 q=\frac{1}{3}$

Section - II

Note: *Attempt any THREE questions.*

Q # 3 (a) Show that $\begin{vmatrix} x & 1 & 1 & 1 \\ 1 & x & 1 & 1 \\ 1 & 1 & x & 1 \\ 1 & 1 & 1 & x \end{vmatrix} = (x+3)(x-1)^3$

(b) Show that $(1+w)(1+w^2)(1+w^4)(1+w^8)$____ $2n\ factors = 1$

Q # 4 (a) Resolve into partial fractions $\frac{9x-7}{(x^2+1)(x+3)}$

(b) Find n so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be H.M between "a" and "b".

Q # 5 (a) Find the values of n and r when ${}^{n-1}C_{r-1} : {}^nC_r = {}^nC_{r+1} = 3:6:11$

(b) If x is so small that its square and higher powers can be neglected, then show that

$$\frac{(9+7x)^2-(16+3x)^{\frac{1}{4}}}{4+5x}=\frac{1}{4}-\frac{17}{384}x$$

Q # 6 (a) Prove that $Sin^6 q - Cos^6 q = (Sin^2 q - Cos^2 q)(1 - Sin^2 q\ Cos^2 q)$

(b) If a, b, g are the angles of triangle, prove that $\tan a + \tan b + \tan g = \tan a\ \tan b\ \tan g$

Q # 7 (a) Show that $\frac{1}{2rR}=\frac{1}{ab}+\frac{1}{bc}+\frac{1}{ca}$

(b) Prove that $Sin^{-1}A + Sin^{-1}B = Sin^{-1}\left(A\sqrt{1-B^2}+B\sqrt{1-A^2}\right)$

Provided and Composed by: Haji Asif ALI

(asif.mathematics@gmail.com)