Lahore Board - Annual 2009 Group I

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 (ü) the correct answer.

(1) If $z = x + iy \quad ; x, y \in R$ then $|z|$ equals:

(a) $x^2 + y^2$ **(b)** $\sqrt{x^2 + y^2}$

(c) $\sqrt{x^2 - y^2}$ **(d)** $\sqrt{x + y}$

(2) If U is the universal set and $A \subseteq U$ then $A \cup A'$ equals:

(a) A **(b)** U

(c) $A \cap A'$ **(d)** A'

(3) Which of the following is unary operation:

(a) Addition **(b)** Multiplication

(c) Square root **(d)** Division

(4) If A and B are non-singular matrices then $(AB)^{-1}$ equals:

(a) $A^{-1} B^{-1}$ **(b)** $\frac{1}{AB}$

(c) $B^{-1} A^{-1}$ **(d)** $(BA)^{-1}$

(5) The trivial solution of homogeneous linear equations is

(a) $(0,0,0)$ **(b)** $(1,0,0)$

(c) $(0,1,0)$ **(d)** $(0,0,1)$

(6) Let $f(x) = x^3 + 4x^2 - 2x + 5$ is divided by $x - 1$ then remainder equals:

(a) 0 **(b)** 6

(c) 7 **(d)** 8

(7) The product of all fourth root of unity equals:

(a) 1 **(b)** 0

(c) -1 **(d)** 2

(8) The harmonic mean between a and b equals:

(a) $\frac{a+b}{2}$ **(b)** $\pm\sqrt{ab}$

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

(9) No term of the G.P can equals:

(a) 1 **(b)** 2

(c) 0 **(d)** -1

(10) ${}^nC_r + {}^nC_{r-1}$ equals:

(a) ${}^nC_r$ **(b)** ${}^{n-1}C_r$

(c) ${}^{n+1}C_{r+1}$ **(d)** ${}^{n-1}C_{r-1}$

(11) For an event E which one is true:

(a) $0 \le P(E) \le 1$ **(b)** $1 \le P(E) \le 2$

(c) $0 \ge P(E) \le 1$ **(d)** $-1 \le P(E) \le 1$

(12) If n is a positive integer then 3 + 6 + 9 + _____ + 3n equals :

(a) $3n(n+1)$ (b) $\frac{3n(n+1)}{2}$

(c) $\frac{3n(n+1)}{3}$ (d) $\frac{3n(n+1)}{4}$

(13) The number of terms in the expansion of $(a+b)^9$ equals:

(a) 10 **(b)** 11

(c) 12 **(d)** 5

(14) The first three terms in the expansion of $(1-x)$ are :

(a) $1+3x+6x^2$ **(b)** $1-3x+6x^2$

(c) $1-3x-3x^2$ **(d)** $1-3x-6x^2$

(15) $Co\sec^2 q - Cot^2 q$ equals :

(a) 1 **(b)** 0

(c) 2 **(d)** – 1

(16) $Cos\left(\frac{p}{2}+q\right)$ equals :

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

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

(17) $2\,Sin12^0\,Sin46^0$ equals:

(a) $Cos34^0 + Cos58^0$ **(b)** $Sin34^0 - Sin58^0$

(c) $Sin34^0 + Sin58^0$ **(d)** $Cos34^0 - Cos58^0$

(18) If the ΔABC is the right angled triangle then the law of cosines reduces to:

(a) Law of Sines **(b)** Law of Cosines

(c) Law of Tangent **(d)** Pythagoras theorem

(19) With usual notation $r : R : r_1$:

(a) 1 : 2 : 4 **(b)** 1 : 3 : 2

(c) 1 : 2 : 3 **(d)** 2 : 3 : 4

(20) The reference angle of $Tanq = -1$ equals:

(a) $\frac{p}{4}$ **(b)** $-\frac{p}{4}$

(c) $-p$ **(d)** p

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Lahore Board - Annual 2009 Group I
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) Show that $\sqrt{3}$ is an irrational number.

(ii) Simplify $(i)^{101}$

(iii) Is there any set which has no proper set?

(iv) Define an on-to function.

(v) Show that addition is not a binary operation on $A=\{1,2,3,...,10\}$

(vi) Show that $p \to p \vee q$ is a tautology.

(vii) If $A=\begin{bmatrix}1 & 2\\ a & b\end{bmatrix}$ and $A^2=\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$, find values of a and b.

(viii) If A is symmetric or skew symmetric, show that A^2 is symmetric.

(ix) If $B=\begin{bmatrix}5 & -2 & 5\\ 1 & -1 & 4\\ -2 & 1 & -2\end{bmatrix}$; find B_{21}

(x) If A is square matrix has two identical rows show that $|A|=0$

(xi) Prove that $\left(-1+\sqrt{-3}\right)^4+\left(-1-\sqrt{-3}\right)^4=-1$

(xii) Show that $x+a$ is a factor of x^n+a^n where n is odd positive integer.

(xiii) Find the equation whose roots are 2 and 3.

(xiv) Discuss the nature of roots of the quadratic equation $2x^2+5x-1=0$

(xv) Find the next two terms of the sequence 1,6, 20, 56, ___, ___,

(xvi) If $\frac{1}{a},\frac{1}{b},\frac{1}{c}$ are in G.P, show that common ratio is $\pm\sqrt{\frac{a}{c}}$

(xvii) Find H.M between -2 and -8.

(xviii) Find n, when ${}^{11}P_n=11\times10\times9$

(xix) Define circular Permutation.

(xx) A dice is rolled. Find the probability that top shows 3 or 4.

(xxi) There are 5 green and 3 red balls in a box, one ball is taken out, what is the probability that ball is green?

(xxii) State principal of mathematical induction.

(xxiii) If "x" is so small that its square and higher powers may be neglected, show that $\frac{1-x}{\sqrt{1-x}}\approx1-\frac{3}{2}N$.

(xxiv) State binomial series.

(xxv) What are binomial co-efficient in the expansion of $(a+x)^n$.

(xxvi) Convert 21.56^0 to the $D^0\,M'S''$ form.

(xxvii) Derive the fundamental identity $Sin^2q+Cos^2q=1$

(xxviii) Prove that $Cos(270^0+q)=Sinq$

(xxix) Show $Sin\left(q+\frac{p}{6}\right)+Cos\left(q+\frac{p}{3}\right)=Cosq$

(xxx) Write $Cos(7q)-Cosq$ as product.

(xxxi) Write the domain and range of the function $y=Cos(x)$

(xxxii) Find the period of the function $Tan\left(\frac{x}{2}\right)$

(xxxiii) State law of cosines in solution of triangles

(xxxiv) Find the area of Δ whose sides are $a=18, b=24, c=30$

(xxxv) For a $\Delta ABC\ a=13, b=14, c=15$ find circum radius R.

(xxxvi) Show that $Cos^{-1}\left(\frac{12}{13}\right)=Sin^{-1}\left(\frac{5}{13}\right)$

(xxxvii) Find the general solution of $Cos(2x)=\frac{\sqrt{3}}{2}$

Section - II

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

Q # 3 (a) Solve the system of linear equation by Cramer's rule.

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

(b) For what value of m, the root of the equation $x^2-2(1+3m)x+7(3+2m)=0$ will be equal.

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

(b) Sum the series 3 + 5 – 7 + 9 + 11 – 13 + 15 + 17 – 19 + … to 3n terms.

Q # 5 (a) Prove that ${}^nP_r={}^{n-1}P_{r+r}.{}^{n-1}P_{r-1}$

(b) If x is very nearly equal to 1, then prove that $px^p-qx^q=(p-q)x^{p+q}$

Q # 6 (a) If $Cotq=\frac{5}{2}$ and terminal arm of angle is in the 1st quadrant, find the value of

$$\frac{3Sinq+4Cosq}{Cosq-Sinq}$$

(b) Prove that $\frac{Cos8^0-Sin8^0}{Cos8^0+Sin8^0}=Tan37^0$

Q # 7 (a) Prove that $r_1r_2+r_2r_3+r_3r_1=S^2$

(b) Prove that $Sin^{-1}\frac{77}{85}-Sin^{-1}\frac{3}{5}=Cos^{-1}\frac{15}{17}$

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