MATHEMATICS 2014

Time: 30 minutes **Max. Marks: 20**

SECTION 'A' MULTIPLE CHOICE QUESTION

1. Choose the correct answer for each from the given options: (20)

(1) {0,1,2,3, ------} is the set of:
(a) Prime No. (b) Integer (c) Whole No. (d) Even No.
(2) The natural logarithm has the base:
(a) π (b) e (c) 10 (d) None of these
(3) $8^{1/3} \times 36^{1/2}$ =: (a) 48 (b) 12 (c) 16 (d) None of these
(4) If $\log_a 16 = 4$, a =: (a) 3 (b) 4 (c) 2 (d) 16
(5) The degree of given Polynomial $x^4y + y + y^2 + y^3$ is:
(a) 3 (b) 4 (c) 5 (d) 2
(6) If the determinant of matrix is Zero, the matrix is called a/an:
(a) Identity matrix (b) Null matrix
(c) Singular matrix (d) Non Singular matrix
(7) The sub duplicate ration of a : b is:
(a) $a^2 : b^2$ (b) $a^{1/2} : b^{1/2}$ (c) $a^3 : b^3$ (d) None of these
(8) The H.C.F. of 8x3y2 and 12x2y is:
(a) $4x^3y$ (b) $8x^2y$ (c) $16x^2y$ (d) $4x^2y$
(9) Line segment joining the vertex and to the mid point of the opposite side of a triangle is called:
(a) altitude (b) hypotenuse (c) Median (d) None of these
(10) A quadrilateral having opposite sides parallel is called:
(a) Trapezium (b) Parallelogram (c) Rhombus (d) Triangle
(11) If x is eliminated from the equations x + b = 0 and x + c = 0 the relation becomes:
(a) b = c (b) b + c = 0 (c) bc = 0 (d) b/c + 1 = 0
(12) Half of the diameter is called:
(a) Perpendicular (b) Radius (c) chord (d) Secant
(13) $\sqrt{1-\cos^2\varphi}$ =:
(a) $\sin\phi$ (b) $\tan\phi$ (c) $\sec\phi$ (d) $\text{cosec}\,\phi$
(14) $\tan 60^\circ$ = : (a) $1/\sqrt{3}$ (b) $\sqrt{3}$ (c) 1 (d) None of these
(15) The simplest form of $\frac{a^5b-ab^5}{a^3b+ab^3}$ is:
(a) a^2+b^2 (b) a^2-b^2 (c) a + b (d) a − b
(16) The Transpose matrix of $\begin{bmatrix}5 & 3\\1 & 6\end{bmatrix}$ is:
(a) $\begin{bmatrix}5 & 1\\3 & 6\end{bmatrix}$ (b) $\begin{bmatrix}6 & 3\\1 & 5\end{bmatrix}$ (c) $\begin{bmatrix}1 & 6\\5 & 3\end{bmatrix}$ (d) $\begin{bmatrix}3 & 5\\1 & 6\end{bmatrix}$
(17) $\cos 20^\circ$ = :
(a) Cosec 70° (b) Tan 70° (c) Sin 70° (d) Cot 70°
(18) A circle which touches all the three sides of a triangle is called:
(a) Incribed circle (b) Escribed circle
(c) Circum circle (d) None of these
(19) The Set A = {1,3,5,7 ----} is closed with respect to:
(a) Multiplication (b) Addition
(c) Subtraction (d) Division
(20) Solution Set of $\sqrt{2y-3} = \sqrt{3y+4}$ is:
(a) 1 (b) 7 (c) −7 (d) 5

MATHEMATICS 2014

Time: 2 ½ Hours **Max. Marks: 80**

SECTION "B" (SHORT-ANSWER QUESTIONS)

Note: Answer any 10 questions from this section. (50)

(2) If U = {1,2,3,4,5,6,7} , A = {1,3,5,7} and B = {3,4,5,6}; Prove that $A' \cup B' = (A \cap B)'$
(3) Simplify: $\left(\frac{(125)^2 \times 8}{(64)^2}\right)^{1/3}$
(4) If a + b = 7 and ab = 11, find the value of (a − b).
(5) Find the value of $\frac{85.7 \times 2.47}{8.89}$ with the help of logrithmetic table
(6) Factors. $r^2(s-t) + s^2(t-r) + t^2(r-s)$
(7) Solve the following equations with the help of matrix:
$5x - 2y = 1,\ 2x - y = 0$
(8) If one pair of opposite sides of a quadrilateral are congruent and parallel, it is a parallelogram. Prove it.
(9) Solve the equation $2b^2 - 7b + 5 = 0$ using quadratic formula.
(10) If a transversal intersects two coplanar lines, such that the pair of alternate angles are congruent, prove that the lines are parallel.
(11) If a : b = c : d, prove that $\frac{a^2+b^2}{a^2-b^2} = \frac{ac+bd}{ac-bd}$
(12) Prove that $\frac{1-\sin\varphi}{\cos\varphi} = \frac{\cos\varphi}{1+\sin\varphi}$
(13) For what value of a and b, $x^4 + 4x^3 + 10x^2 + ax + b$ is a perfect square?
(14) Eliminate x from the following equations:
$$x+\frac{1}{x}=2p,\ x-\frac{1}{x}=2q+1$$
(15) Prove that the sum of the three angles of a triangle is equal to 180°.
(16) Find the values of the trigonometric ratios of an anglr of 30°.

SECTION 'C' (DETAILED – ANSWER QUESTION)

NOTE: Attempt 3 questions from this section. Including Q.no.19 which is compulsory. (30)

(17) Factorize the following:
(i) $a^3 - a^2 + 2$ (ii) $8a^3 + b^3 + 27c^3 - 18abc$
(iii) $5x^2 - 13x - 6$ (iv) $x^3 - 64y^3$
(18) Find the solution set of the following equations graphically: (Find four ordered pairs for each equation.)
$x - 2y = -3$
$2x + y = 14$
(19) In any correspondence of two triangles, if one side and any two angles of one triangles are congruent to the corresponding side and two angles of the other, the two triangles are congruent. Prove it.
(20) (a) Find the variance from the following information:
$\bar{x} = 19.5,\ n = 10,\ \sum x^2 = 5555$
(b) Factorize the following with the help of remainder theorem: $x^3 + 8x^2 + 19x + 12$
(21) Draw a circle of radius 2.5 cm. Take a point B at a distance of 6.5cm from the centre of the circle and draw two tangents to the circle passing through B. Find the lengths of the segments of the tangents by measuring them. Verify your measurement with the help of Pythagoras Theorem.