

MODEL PAPER "MATHEMATICS"**Intermediate Part - I Examination, 2007****(Academic session 2006 - 2008)**

Roll No.

In Figures _____

In Words _____

OBJECTIVE**Time : 30 Minutes****Marks = 20****Note : Write your Roll No. in the space provided. Cutting, overwriting, erasing, using lead pencil will have no credit.****Q.No. 1 Each question has four possible answers. Select the correct answer and encircle it.**

- (i) The no. $\frac{2}{3}$ is called a
- (a) rational no. (b) irrational no.
(c) integer (d) none of these
- (ii) The set $\{(a, b)\}$ is called
- (a) infinite set (b) singleton set
(c) set with two elements (d) empty set
- (iii) A square matrix A is a skew hermitoan if $(\bar{A})^t$ is
- (a) A (b) -A (c) \bar{A} (d) A^t
- (iv) If the matrices A and B are conformable for multiplication, then $(AB)^t =$
- (a) AB (b) BA (c) $A^t B^t$ (d) $B^t A^t$
- (v) If the roots of the quad. equation $ax^2 + bx + c = 0$ are real and irrational then
- (a) $b^2 - 4ac > 0$ (b) $b^2 - 4ac = 0$
(c) $b^2 - 4ac < 0$ (d) none of these
- (vi) The product of the four fourth roots of unity is
- (a) 0 (b) 1 (c) -1 (d) i
- (vii) Partial fraction of $\frac{1}{(x+1)(x^2-1)}$ will be of the form
- (a) $\frac{A}{x+1} + \frac{Bx+c}{x^2-1}$ (b) $\frac{A}{x+1} + \frac{B}{x^2-1}$
(c) $\frac{A}{x-1} + \frac{B}{x+1} + \frac{C}{(x+1)^2}$ (d) none of these
- (viii) Arithmetic mean between 2a and 2b is
- (a) $\frac{a+b}{2}$ (b) a+b (c) $\frac{2ab}{a+b}$ (d) none of these

- (ix) The sum of an infinite geometric series exists if
 (a) $|r| < 1$ (b) $|r| > 1$ (c) $r = 1$ (d) $r = -1$
- (x) $\sum_{k=1}^n K^2$
 (a) $\frac{n(n+1)}{2}$ (b) $\frac{n^2(n+1)^2}{4}$
 (c) $\frac{n(n+1)(2n+1)}{6}$ (d) none of these
- (xi) If A and B are disjoint events then $P(A \cup B) =$
 (a) $P(A) + P(B)$ (b) $P(A) - P(B)$
 (c) $P(A) + P(B) - P(A \cap B)$ (d) none of these
- (xii) If ${}^nC_8 = {}^nC_{12}$, then $n =$
 (a) 4 (b) 8 (c) 20 (d) 12
- (xiii) The expansion of $(1 + 2x)^{-2}$ is valid if
 (a) $|x| < \frac{1}{2}$ (b) $|x| < 1$ (c) $|x| < 2$ (d) none of these
- (xiv) In one hour, the hour hand of a clock turns through
 (a) $\frac{\pi}{8}$ radians (b) $\frac{\pi}{4}$ radians (c) $\frac{\pi}{6}$ radians (d) $\frac{\pi}{2}$ radians
- (xv) $\sin(2\theta) =$
 (a) $\frac{2 \tan \theta}{1 - \tan^2 \theta}$ (b) $\frac{2 \tan \theta}{1 + \tan^2 \theta}$ (c) $\frac{1 - \tan^2 \theta}{1 + \tan^2 \theta}$ (d) $\frac{1 + \tan^2 \theta}{1 - \tan^2 \theta}$
- (xvi) Period of $\sin \frac{x}{3}$ is
 (a) π (b) 3π (c) $\frac{2\pi}{3}$ (d) 6π
- (xvii) If ΔABC is right angle triangle, then the law of cosines reduces to
 (a) The law of sines (b) The law of tangents
 (c) The pythagorus theorem (d) none of these
- (xviii) Radius of escribed circle opposite to the vertex A is
 (a) $\frac{\Delta}{a}$ (b) $\frac{\Delta}{b}$ (c) $\frac{\Delta}{s-a}$ (d) none of these
- (xix) The domain of the principal tan function is
 (a) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ (b) $(0, \pi)$ (c) \mathbb{R} (d) none of these
- (xx) The solution of the equation $\tan x = \frac{1}{\sqrt{3}}$ is in
 (a) I and II quadrants (b) I and III quadrants
 (c) II and IV quadrants (d) none of these

MODEL PAPER "MATHEMATICS"**Intermediate Part - I Examination, 2007****(Academic session 2006 - 2008)****SUBJECTIVE**

Time : 2.30 Hours

Marks = 80

SECTION - I

Note : Attempt any "TWENTY FIVE" questions from Section - I and THREE questions from Section - II.

Q.No. 2 Write short answers to any twenty five of the following questions.

25 × 2 = 50

- (i) Find the multiplicative inverse of $(-4, 7)$
- (ii) Define a complex No.
- (iii) Define a semi group.
- (iv) Show that the statement $(p \wedge q) \rightarrow p$ is a tautology.
- (v) Show $B - A$ by venn diagram when A and B are overlapping acts?
- (vi) If $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 2 & -1 \\ -1 & 3 & 2 \end{bmatrix}$ show that $A + A^t$ is symmetric.
- (vii) Without expansion verify that $\begin{vmatrix} \alpha & \beta + \gamma & 1 \\ \beta & \gamma + \alpha & 1 \\ \gamma & \alpha + \beta & 1 \end{vmatrix} = 0$
- (viii) Define the rank of a matrix.
- (ix) Define a polynomial function and degree of a polynomial.
- (x) Show that $1 + w^{37} + w^{38} = 0$
- (xi) When polynomial $x^3 + 2x^2 + kx + 4$ is divided by $x - 2$, the remainder is 14. Find the value of k.
- (xii) If α, β are the roots of $5x^2 - x - 2 = 0$, form the equation whose roots are $\frac{3}{\alpha}, \frac{3}{\beta}$
- (xiii) Resolve $\frac{2}{x^2 - 1}$ into partial fractions.
- (xiv) What is a proper rational fraction?
- (xv) Which term of the A.P. 5, 2, -1, is - 85.
- (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) If $a_{n-3} = 2n - 5$, find the n-th term of the sequence.
- (xviii) How many terms of the series $-9 - 6 - 3 + 0 + \dots$ amount to 66.
- (xix) If 5 is the H.M. between 2 and b then find b.
- (xx) Find the No. of diagonals of a six sided figure.
- (xxi) How many arrangements of the letters of the word PAKPATTAN taken all at a time can be made?