Seat No.: _____ Enrolment No._____

(EM-6)

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm. Sem-I Examination December 08/January 09

Elementary (remedial) Mathematics (210006)

DATE: 31 -12-2008,Wednesday TIME: 11.00 am to 2.00 p.m. MAX. MARKS: 80

Instructions:

1. ***Attempt any five questions.***
2. ***Make suitable assumptions wherever necessary.***
3. ***Figures to the right indicate full marks.***

Q.1(a) **Solve the following system of linear equations using Cramer's rule** **(5)**

x + 2y + 3z = 6, 2x + 4y + z = 7 and 3x + 2y + 9z = 14

(b) **Evaluate A(BC) and (AB)C where** **(5)**

$A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 0 & 2 \\ -1 & 2 & 0 \end{bmatrix}$ **and** $C = \begin{bmatrix} 0 \\ -1 \\ 2 \end{bmatrix}$

(c) **If** $A = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \\ 1 & 0 & 1 \end{bmatrix}$ **, then show that** $A^3 - 3A^2 + 2A = 2I$ **(6)**

Q.2(a) **Find the mean deviation and standard deviation for the following distribution of the weights of 250 children** **(8)**

Weights in kg:	**60-61**	**61-62**	**62-63**	**63-64**	**64-65**	**65-66**	**66-67**
Frequency	**10**	**25**	**45**	**55**	**60**	**40**	**15**

(b) **If the probability that an individual suffers a bad reaction from a certain injections is 0.001, determine the probability that out of 2000 individuals (i) exactly 3 (ii) more than 2 individuals will suffer a bad reaction.** **(8)**

Q.3(a) **Find the area of triangle whose vertices are (2, 3), (2, 1), (1, 1)** **(5)**

(b) **Find the equation of the line through the points (4, -3) and (0, 1)** **(5)**

(c) **Find the equation of the locus of points twice as far from (3, 2) as from (1, 1)** **(6)**

Q.4(a) **Differentiate the following functions w.r.t. 'x'** **(8)**

1] $y = e^{ax}.\cos(bx + c)$

2] $x^3 + y^3 + 3x^2 y = a^3$

(b) **Find the nth derivations of the following** **(8)**

1] $y = \sin^3 x$

2] $y = x.\log(1 + x)$

Q.5 **Solve the following differential equations** **(16)**

1] $(1 + x^2)dy = (1 + y^2)dx$

2] $xdy - ydx = \sqrt{x^2 + y^2}\,dx$

3] $(1 + x^2)\frac{dy}{dx} + 2xy - 4x^2 = 0$

4] $\frac{dy}{dx} = \frac{2x(\log x + 1)}{\sin y + y\cos y}$

Q.6(a) **Evaluate the following integrals.** **(6)**

1] $\int \frac{dx}{1 + \sqrt{x+1}}$

2] $\int \frac{\sin 2x}{\sin^4 x + \cos^4 x}dx$

3] $\int \frac{2x}{x^2 - 7x + 12}dx$

4] $\int_0^{\pi/2} \sin^2 x dx$

(b) **Find all t-ratios of** 120° **(6)**

(c) **If** $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$**, show that** $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$ **(4)**

Q.7(a) **In how many ways can 5 boys and 3 girls stand in a raw so that no two girls are together?** **(5)**

(b) **Find the sum of all natural numbers between 200 and 400 which are divisible by 7.** **(5)**

(c) **Using binomial expansion, prove that** $(\sqrt{2}+1)^5 - (\sqrt{2}-1)^5 = 82$ **(6)**