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

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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)**

$$A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 0 & 2 \\ -1 & 2 & 0 \end{bmatrix} \text{ and } C = \begin{bmatrix} 0 \\ -1 \\ 2 \end{bmatrix}$$
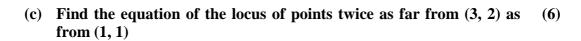
(c)   **(6)**

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

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

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

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

1] $\displaystyle\int \dfrac{dx}{1+\sqrt{x+1}}$

2] $\displaystyle\int \dfrac{\sin 2x}{\sin^4 x + \cos^4 x}\,dx$

3] $\displaystyle\int \dfrac{2x}{x^2 - 7x + 12}\,dx$

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

(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 $\left(\sqrt{2}+1\right)^5 - \left(\sqrt{2}-1\right)^5 = 82$ **(6)**

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