

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)

$$x + 2y + 3z = 6, 2x + 4y + z = 7 \text{ and } 3x + 2y + 9z = 14$$

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

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

(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 (8)
distribution of the weights of 250 children

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 (8)
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.

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] $y = e^{ax} \cdot \cos(bx + c)$
 2] $x^3 + y^3 + 3x^2y = a^3$

(b) Find the n^{th} derivations of the following (8)

- 1] $y = \sin^3 x$
 2] $y = x \cdot \log(1 + x)$

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 row 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)
