

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

# GUJARAT TECHNOLOGICAL UNIVERSITY

B. Pharmacy Sem-I Remedial Examination 2010

Subject code: 210006

Subject Name: Elementary Mathematics

Date: 06 / 04 / 2010

Time: 11.00 am – 02.00 pm

## Instructions:

Total Marks: 80

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 equations. **06**

1)  $\frac{1}{x+1} + \frac{1}{x+2} = \frac{1}{x+3}$

2)  $\sqrt{3x+1} - \sqrt{x-1} = 2$

(b) Using the properties of the determinant prove that **05**

$$\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = abc(a-b)(b-c)(c-a)$$

(c) Solve the following system of equations using cramer's rule **05**  
 $x + y + z = 6$ ;  $x - y + z = 2$ ;  $2x + y - z = 1$ .

**Q.2** (a) Find the standard deviation for the following data. **06**

Class	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Freq.	3	61	132	153	140	51	2

(b) Calculate the mean deviation from mean for the following data. **05**

Class	0-10	10-20	20-30	30-40	40-50
Frequency	8	15	22	15	8

(c) There are 64 beds in a garden and 5 seeds of a particular variety are sown in each bed. The probability that a seed will germinate is 0.75. Find the number of beds in which all seeds have germinated. **05**

**Q.3** (a) Find the area of the quadrilateral with vertices **06**  
 $A(1, 6), B(5, 2), C(12, 9), D(8, 13)$ .

(b) Do as directed. **05**

1) Simplify:  $\log_3^{84} - \log_3^{28} + \log_3^{27}$

2) If  $\log\left(\frac{a+b}{2}\right) = \frac{1}{2}(\log a + \log b)$ , then prove that  $a = b$ .

(c) Given  $A(2, 4), B(6, 8), C(a+4, 2a+6)$  and  $\overline{CA} \perp \overline{BC}$ , find  $a$ . **05**

- Q.4** (a) Do as directed. **06**
- 1) The 3<sup>rd</sup> term of an A.P. is 10 and its 10<sup>th</sup> term is 31. Find the sum of first 50 terms of this A.P.
  - 2) Find the sum up to 10 terms of the G.P.  $\frac{1}{64}, \frac{1}{32}, \frac{1}{16}, \frac{1}{8}, \dots$
- (b) Find the 7<sup>th</sup> term in the expansion of  $\left(\frac{4x}{5} - \frac{5}{2x}\right)^9$ . **05**
- (c) A club has 10 male and 8 female members. A committee composed of 3 men and 4 women is formed. In how many ways can this be done? **05**
- Q.5** (a) Prove that  $(\sec \theta - \tan \theta) \sqrt{\frac{1 + \sin \theta}{1 - \sin \theta}} = 1$ . **05**
- (b) Evaluate the following expressions. **06**
- 1)  $6 \cos ec^2 \frac{\pi}{3} - 7 \cos^2 \frac{\pi}{2} - 5 \sec^2 \frac{\pi}{4} + 4 \cot^2 \frac{\pi}{6}$
  - 2)  $\cos \frac{3\pi}{2} + \sin \frac{3\pi}{2} + \cos ec \frac{3\pi}{2} + \cot \frac{3\pi}{2}$
- (c) If  $\cos A = \frac{15}{17}$ , then find  $\sin A, \tan A, \cos ec A, \sec A, \cot A$ . **05**
- Q.6** (a) Do as directed. **06**
- 1) If  $y = \frac{x - \cos x}{x + \cos x}$ , find  $\frac{dy}{dx}$ .
  - 2) Given that  $5x^2 - 2y^2 = 302$ , find  $\frac{dy}{dx}$  at (1,1) and (1,-1).
- (b) Evaluate the following integrals. **05**
- 1)  $\int (5x - 7)^3 dx$
  - 2)  $\int \sin^3 x \cos^4 x dx$
- (c) Evaluate  $\int_0^{\frac{\pi}{2}} (3 \cos^2 x - 2 \sin^2 x) dx$  **05**
- Q.7** (a) The rate at which bacteria multiply is proportional to the instantaneous number present. If the original number doubles in 2 hours, in how many hours will it triple? **06**
- (b) Solve the following differential equation. **05**
- 1)  $(1 + x^3) dy = x^2 y dx$
  - 2)  $\frac{dy}{dx} + \frac{4x}{x^2 + 1} y = \frac{1}{(x^2 + 1)^3}$
- (c) Solve:  $\frac{dy}{dx} = \frac{x^2 y}{x^3 + y^3}$  **05**

\*\*\*\*\*