

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

Enrolment

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B. Pharmacy Sem-I Remedial examination March 2009**

**Subject code: 210006**

**Subject Name: Elementary (Remedial) Mathematics**

**Date: 18 / 03 / 2009**

**Time: 02:30pm- 05:30pm**

**Total Marks: 80**

**Instructions:**

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

**Q.1**

**16**

- (a) Solve  $x(x + 5)(x + 7)(x + 12) = -150$
- (b) Solve the following simultaneous equations  
 $x^2 + y^2 = 185$  ;  $x + y = 19$
- (c) Solve the following simultaneous equations using Cramer's Rule.  
 $x + y + z = 4$  ;  $2x - 3y + 4z = 33$  ;  $3x - 2y - 2z = 2$
- (d) If  $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$  then prove that  $A^2 - 5A + 7I = 0$

**Q.2**

**16**

- (a) Expand by SARRUS RULE  

$$\begin{vmatrix} 3 & 4 & 1 \\ 2 & 0 & 7 \\ 1 & -3 & -2 \end{vmatrix}$$
- (b) Using theorems prove that  

$$\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ x^3 & y^3 & z^3 \end{vmatrix} = xyz(x - y)(y - z)(z - x)$$
- (c) If  $A = \begin{bmatrix} 3 & 5 \\ 16 & 27 \end{bmatrix}$  Verify that  $AA^{-1} = A^{-1}A = I$
- (d) Solve by MATRIX INVERSION method.  

$$\begin{aligned} -3x_1 + 6x_2 - 11x_3 &= 14 \\ 3x_1 - 4x_2 + 6x_3 &= -5 \\ 4x_1 - 8x_2 + 13x_3 &= -17 \end{aligned}$$

**Q.3**

**16**

- (a) The number N of bacteria in a culture grew at the rate proportional to N. The value of N was initially 100 and increased to 332 in one hour. What will be the value of N after 1.5 hours ?

- (b) Evaluate : (1)  $\lim_{x \rightarrow \infty} \frac{x^2 - x + 3}{2x^3 + 1}$  (2)  $\lim_{x \rightarrow 0} (1 + 2x)^{1/x}$

(c) Calculate the mean and standard deviation from the following data

Value	90-99	80-89	70-79	60-69	50-59	40-49	30-39
Frequency	2	12	22	20	14	4	1

**Q. 4**

**16**

[ a ]

- (1) In triangle ABC ,  $\cos B = \frac{3}{5}$  Find  $\sin A$  ,  $\cos A$  ,  $\tan A$  ,  $\sin B$  ,  $\tan B$ .
- (2) If  $\cot \theta = \frac{-12}{5}$  and  $\theta$  lies in second quadrant. Find the value of order five trigonometric functions.
- (3) Find the value of the following trigonometric ratio :  
 $\sin (- 1125^\circ )$  ,  $\cot ( 570^\circ )$

(4) Prove that  $2 \cos \frac{\pi}{13} \cdot \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$

(5) Find the value of  $\sin 22\frac{1}{2}^\circ$

[ b ] If  ${}_{2n}P_3 = 14 {}_n P_3$  Find n

**Q. 5**

**16**

[ a ]

(1) If  $y = 3 \cos (\log x) + 4 \sin (\log x)$  Prove that  $x^2 y_2 + x y_1 + y = 0$

(2) If  $y = 500 e^{7x} + 600 e^{-7x}$  . Show that  $\frac{d^2 y}{dx^2} = 49y$

(3) prove that  $\frac{d}{dx} [ 2x \tan^{-1}x - \log ( 1+ x^2 ) ] = 2 \tan^{-1} x$

[ b ] Evaluate the following Differential

(1)  $y = \tan ( e^{2x^2 + 3} )$

(2)  $x^3 + y^3 - 3axy = 0$

**Q. 6**

**16**

[ a ] Solve the following differential equations

(1)  $x y \frac{dy}{dx} = y + 2$  if  $y(1) = 1$

(2)  $2xy \frac{dy}{dx} = x^2 + 3y^2$

(3)  $x \left( \frac{dy}{dx} + y \right) = 1 - y.$

[ b ] Evaluate the following Integration.

(1)  $\int_4^{\tan^3 x} dx$

(2)  $\int_0^{(4-x)^{3/2}} x dx$

**Q. 7**

**16**

- (a) Evaluate  $(998)^{1/3}$  up to five places of decimal.
- (b) Show that the vertices of triangle  $(7, 9), (3, -7), (-3, 3)$  form a right angled isosceles triangle.
- (c) Find the area of the triangle whose vertices are  $(4, 4), (3, -2), (-3, 16)$ .
- (d) In a group of students there are 4 girls and 6 boys. In how many ways a committee of five members can be formed such that
  - I. There are at least 3 girls
  - II. There are at the most 3 boys in the committee.

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