

GUJARAT TECHNOLOGICAL UNIVERSITY
BPHARM – SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 210006**Date: 08-01-2013****Subject Name: Elementary Mathematics****Time: 02:30 pm – 05:30 pm****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** (a) Solve the following equations **06**
 (i) $3x^2 + 5\sqrt{2}x - 2 = 0$
 (ii) $(x + 4)(x + 5) = 3(x + 1)(x + 2) + 2x$
- (b) Solve by Cramer's rule **05**
 $5x + 3y = -6$
 $3x + 5y = -18$
- (c) Find the sum of first 11 terms of A.P. 2, 6, 10, 14.... **05**
- Q.2** (a) Solve the following simultaneous equations using Cramer's rules **06**
 $a + 2b + 3c = 5$; $2a - 3b - c = 3$; $-3a + 4b + 5c = 3$
- (b) If $A = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 4 & 1 \\ 0 & 0 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 3 & 1 \\ 2 & 4 & 1 \\ 0 & 1 & 0 \end{pmatrix}$ **05**
 Then, Verify the $(A + B)^T = A^T + B^T$
- (c) Prove that the following **05**

$$\begin{vmatrix} X^2 & Y^2 & Z^2 \\ X & Y & Z \\ 1 & 1 & 1 \end{vmatrix} = -(X - Y)(Y - Z)(Z - X)$$
- Q.3** (a) Find the area of the quadrilateral with vertices (3, 2), (-3, 4), (-2, -3) **06**
 and (2, -2)
- (b) Find the value of a, if the point B (a, 0) is at distance 10 units from **05**
 A (-1, 8), where $a > 0$.
- (c) **05**
 Let $f(x) = \frac{2x^2 + 9x - 9}{3x^2 + 2x + 1}$
 Compute $\lim_{x \rightarrow \infty} f(x)$ if it exists.

The particle size distribution of paracetamol powder yielded the following result where in 50 particles were taken for counting.

Q.4 (a)	Time (in min)	5-9	10-14	15-19	20-24	25-29	30-34	35-39	06
	No. Of particles	2	8	12	10	8	7	3	

Calculate mean and Standard deviation.

- (b) The bacteria in a culture grows by 8% in the first hour, decreases by 8% in the second hour and increase by 7% in the third hour. If at the end of the third hour the count of bacteria is 12170000, find the original count of bacteria in the sample. (Antilog is 11450000) **05**

- (c) Find the term independent of X in the following **05**

in the expansion of $\left(\frac{3X^2}{5} - \frac{1}{2X}\right)^9$

- Q.5** (a) Do as directed **06**
 (i) Find the value of $\tan 22^\circ/2$
 (ii) Evaluate $\tan \frac{13\pi}{12}$

$\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$ **05**

- (b)
 (c) From a pack of 52 cards two are drawn at random. Find the chance that one is a knave and other an ace. **05**

- Q. 6** (a) If $x^y = e^{x-y}$, prove that $\frac{dy}{dx} = \frac{\log x}{(1 + \log x)^2}$ **06**

Let $y = (\log X)^3$ **05**

- (b)
 (c) Differentiate $(X - 2)(X - 3)$ w.r.t. X **05**

- Q.7** (a) Solve $dy / dx = \cos X \cos Y - \sin X \sin Y$ **06**
 $\int \sin^3 X \cos^4 X dx$ **05**

- (b)
 (c) Find the value of n from the following **05**
 $840 n! = 7!$
