Seat No.: _____ Enrolment No._____

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) and (2, -2) **06**

(b) Find the value of a, if the point B (a, 0) is at distance 10 units from A (-1, 8), where $a > 0$. **05**

(c) **05**

Let $f(x) = \dfrac{2x^2 + 9x - 9}{3x^2 + 2x + 1}$

Compute $\lim_{x \to \infty} f(x)$ if it exists.

Q.4 (a) The particle size distribution of paracetamol powder yielded the following result where in 50 particles were taken for counting. **06**

Time (in min)	5-9	10-14	15-19	20-24	25-29	30-34	35-39
No. Of paticles	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 $\tan 22\,^{1\circ}/2$

(ii) Evaluate $\tan \frac{13\pi}{12}$

(b) $\text{Cos}\,\theta + \text{Sin}\,\theta = \sqrt{2}\ \text{Cos}\,\theta$, show that $\text{Cos}\,\theta - \text{Sin}\,\theta = \sqrt{2}\ \text{Sin}\,\theta$ **05**

(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**

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

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

Q.7 (a) Solve dy / dx = Cos X CosY – SinX SinY **06**

(b) $\int \text{Sin}^3X\ \text{Cos}^4X\ dx$ **05**

(c) Find the value of n from the following **05**

840 n! = 7!

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