Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. Pharm. – SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject Code: 210006 Date: 17-06-2014

Subject Name: Elementary (Remedial) 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 system of linear equations using Cramer's rule **06**
$2x + 2y + z = 4$, $x + y + 2z = -1$ and $3x + y + z = 2$

(b) Solve the following simultaneous equations **05**
$x^2 + y^2 = 185$; $x + y = 19$

(c) **05**
If $A = \begin{pmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{pmatrix}$ Then prove that $A^3 - 3A^2 - A + 9I = 0$

Q.2 (a) A two digit number is four times the sum and three times the product of its digits. Find the number. **06**

(b) **05**
If $A = \begin{pmatrix} 3 & 7 \\ 2 & 5 \end{pmatrix}$ Find $A + A^T + A^{-1}$

(c) Using theorems prove that **05**

$$\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ x^3 & y^3 & z^3 \end{vmatrix} = xyz\,(x - y)\,(y - z)\,(z - x)$$

Q.3 (a) Calculate the mean and standard deviation from the following data **06**

Age	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No.of members	3	61	132	153	140	51	2

(b) The bacteria in a culture grows by 7% in the first hour, decreases by 6% in the second hour and again increase by 5% in the third hour. If at the end of third hour the count of bacteria is 11270000, find the original count of bacteria in the sample. **05**

(c) Calculate the mean deviation from median for the following data **05**

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

Q.4 (a) Prove that **06**
$\tan^{-1} 1/3 + \tan^{-1} 1/5 + \tan^{-1} 1/7 + \tan^{-1} 1/8 = \pi/4$

(b) Prove that $\cos^4 A - \sin^4 A = 1 - 2\sin^2 A$ **05**

(c) In triangle ABC, $\cos A = 3/5$, Find $\sin A$, $\tan A$ (a lies in first quadrant) **05**

Q.5	(a)	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.	**06**
	(b)	Find the equation of line through the points (2, 3) and (5, -2)	**05**
	(c)	Find the area of triangle whose vertices are (4, 4), (3, -2), (-3, 16)	**05**
Q. 6	(a)	If A, B and C are exhaustive and mutually exclusive events and $2P(A) = 3P(B) = 4P(C)$, then find $P(A \cup C)$	**06**
	(b)	The 3rd term of an arithmetic progression (A.P) is 10 & its 10th term is 31. Find the sum of first 25 terms of this A.P	**05**
	(c)	A club has 14 male and 16 female members. A committee composed of 3 men and 3 women is formed. In how many ways can this be done?	**05**
Q.7	(a)	If $x^y = e^{x-y}$, prove that $dy/dx = \log x / (\log ex)^2$	**06**
	(b)	Evaluate the following integrals $\int (3x - 17)^{10}\, dx$ $\int \sin^3 x \cos^4 x\, dx$	**05**
	(c)	Solve : $(x^2 - y^2)\, dy = 2xydx$	**05**

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