Seat No.: _____ Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
B.PHARM - SEMESTER– VIII • EXAMINATION – SUMMER-2016

Subject Code:2280017 **Date: 10/05/2016**
Subject Name: Elementary Mathematics
Time: 10:30 AM to 1:30 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**
1. $\sqrt{4x+1} + \sqrt{x+1} = 3$
2. $\frac{1}{x+1} + \frac{1}{x+2} = \frac{1}{x+3}$

(b) Solve the simultaneous equations $x + y = 8$ and $x^2 + 5x + y = 4$. **05**

(c) Give the general forms of quadratic equation. Also show that if the sum of the roots of the equation $\frac{1}{x+a} + \frac{1}{x+b} = \frac{1}{c}$ is zero then the product of the root is $-\frac{1}{2}(a^2 + b^2)$. **05**

Q.2 **(a)** Solve the following simultaneous equations using Cramer's rule: **06**

$x + y + z = 6$
$x - y + z = 2$
$2x + y - z = 2$

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

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

(c) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then prove that $A^2 - 5A + 7I = 0$ **05**

Q.3 **(a)** Find the area of quadrilateral with vertical (3, 2) (-3, 4) (-2, -3) and (2, -2). **06**

(b) Find the equation of line through the points (2, 3) and (5, -2). **05**

(c) Find the sum of first 11 terms of A.P. 2, 6, 10, 14…. **05**

Q.4 **(a)** Find the standared 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) If A, B and C are exhaustive and mutually exclusive events and $2P(A) = 3P(B) = 4P(C)$, then find $P(A \cup C)$. **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)** Find the middle term in the expansion of $(1 + \sqrt{x})^{20}$ **06**

(b) Find the limit if exits **05**

$$\lim_{x \to 3} \frac{\sqrt{x^2 + 7} + \sqrt{3x - 5}}{x + 2}$$

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

Q. 6 **(a)** 1. Prove that **06**

$$\frac{\frac{1}{2}\log 16 - \frac{1}{3}\log 8}{\log 4} = \frac{1}{2}$$

2. In triangle ABC, $\cos A = \frac{3}{5}$ find $\sin A$ and tan A

(b) 1. Prove that **05**

$$\tan 3\theta = \frac{3\tan\theta - \tan^3\theta}{1 - 3\tan^2\theta}$$

2. Evaluate following Integration.

$$\int \frac{1 + \sin x}{1 + \cos x}\, dx$$

(c) Find $\frac{dy}{dx}$ for $x = 3\cos\theta - 2\cos^3\theta$, $y = 3\sin\theta - 2\sin^3\theta$ **05**

Q.7 **(a)** If $x^y = e^{x-y}$, prove that $\frac{dy}{dx} = \frac{\log x}{(1 + \log x)^2}$ **06**

(b) Evaluate the following integrals **05**

$$\int \frac{dx}{1 + \sqrt{x+1}}$$

(c) Differentiate **05**

$\left(\frac{1+x}{1-x}\right)$ w. r. t x

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