

GUJARAT TECHNOLOGICAL UNIVERSITY
B. Pharm. - SEMESTER-1 • EXAMINATION – SUMMER -2018

Subject Code: 210006**Date: 05/05/2018****Subject Name: Elementary (Remedial) Mathematics****Time: 02:30 PM TO 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 $x(x+5)(x+7)(x+12) = -150$ **06**
 (b) Solve the following system of linear equations using Cramer's rule **05**
 $x + y + z = 4$, $2x - 3y + 4z = 33$ and $3x - 2y - 2z = 2$
 (c) Solve the following simultaneous equations **05**
 $x^2 + y^2 = 185$; $x + y = 19$
- Q.2** (a) Solve by Matrix Inversion method. **06**
 $-3x_1 + 6x_2 - 11x_3 = 14$
 $3x_1 - 4x_2 + 6x_3 = -5$
 $4x_1 - 8x_2 + 13x_3 = -17$
 (b) Using theorems prove that **05**

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

 (c) A two digit number is four times the sum and three times the product of its digits. Find the number. **05**
- 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) Calculate the mode and median for the following data. **05**
- | | | | | | |
|-----------|------|-------|-------|-------|-------|
| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| Frequency | 10 | 14 | 19 | 17 | 13 |
- (c) 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? **05**
- Q.4** (a) Do as directed **06**
 (i) Find the value of $\tan 22^{1/2}$ (ii) Evaluate $\tan \frac{13\pi}{12}$
 (b) $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$ **05**
 (c) Prove that $\cos^4 A - \sin^4 A = 1 - 2\sin^2 A$ **05**
- Q.5** (a) If $\sin \alpha = \frac{1}{\sqrt{5}}$ and $\cos \beta = \frac{3}{\sqrt{10}}$ and if $0 < \alpha, \beta < \frac{\pi}{2}$, then prove that $\alpha + \beta = \frac{\pi}{4}$. **06**
 (b) Solve $(xy^2 + x)dx + (yx^2 + y)dy = 0$ **05**
 (c) A population grows at the rate of 8% per year. How long does it take for the population to double? **05**
- Q.6** (a) If $x^y = e^{x-y}$, prove that $dy/dx = \log x / (\log ex)^2$ **06**
 (b) Evaluate: $\int \frac{3x-5}{x^2-x-2}$ **05**

- (c) Solve : $(x^2 - y^2) dy = 2xy dx$ **05**
- Q.7** (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 **06**
- I. There are at least 3 girls
- II. There are at the most 3 boys in the committee.
- (b) Find the equation of the line passing through the points (2, 3) and (5, -2). **05**
- (c) Find the area of the triangle whose vertices are (4, 4), (3, -2), (-3, 16). **05**
