

GUJARAT TECHNOLOGICAL UNIVERSITY**Pharm D-1st Year • EXAMINATION – SUMMER - 2017****Subject Code: 818807****Date: 09/06/2017****Subject Name: Remedial Mathematics****Time: 10.30 AM to 01.30 PM****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Show that a triangle having sides equal to 3,5,7 is an obtuse angled triangle and determine the measure of the obtuse angle. **06**
- (b) Without Expanding the determinant, Prove that $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ y+z & z+x & x+y \end{vmatrix} = 0$ **04**
- (c) Find the points of trisection of the line segment joining the points P(3,5) and Q(12,14). **04**
- Q.2** (a) Find $\lim_{x \rightarrow 2} \frac{x^3 - 8}{\sqrt{x^2 + x + 2} - \sqrt{3x + 2}}$. **06**
- (b) If matrix $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ then find $A^2 - 5A$. **04**
- (c) If the angles of a triangle are in the ratio 1:2:3, find the ratio of sides opposite to these angles. **04**
- Q.3** (a) Find the measure of the angle between the lines $3x + y + 5 = 0$ and $x + 2y + 7 = 0$ **06**
- (b) Find derivative of $y = \frac{a + b \sin x}{c + d \sin x}$ with respect to 'x' **04**
- (c) Find the laplace transforms of $\sin(at + b)$. **04**
- Q.4** (a) Obtain the integration of $\frac{(2x+1)^3}{\sqrt{x}}$; $x > 0$. **06**
- (b) Find $\frac{dy}{dx}$ for $y = (x + 1)^2(x + 2)^3(x + 3)^4$. **04**
- (c) Solve the differential equation $x(1+y^2)dx - y(1+x^2)dy = 0$ by using variable separable method. **04**
- Q.5** (a) Solve differential equation, $\frac{dy}{dx} = y \tan x + e^x$. **06**
- (b) Obtain the integration of $x^2 \cdot 2^x$ by using integration by parts. **04**
- (c) Find the laplace transforms of $2t^3 + e^{-2t} + t^{\frac{4}{3}}$. **04**

Q. 6 (a) Find $\frac{dy}{dx}$ (wherever y is defined as a function of x and $\frac{dx}{dt} \neq 0$) for $x = a(\cos t + \log \tan \frac{t}{2})$, $y = a \sin t$. **06**

(b) Suppose $A = \begin{bmatrix} 3 & 1 & 1 \\ -12 & -3 & 0 \\ -9 & -1 & -12 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & -4 \\ 5 & 1 & 9 \end{bmatrix}$ and $3A + 4B - X = 0$, **04**
find the matrix 'X'.

(c) Prove that: $\sin^2 A + \sin^2 B + \cos^2 (A+B) + 2\sin A \sin B \cos(A+B) = 1$ **04**

Q.7 (a) Find definite integration of $\int_0^{\pi/2} \frac{dx}{2\cos x + 4\sin x}$. **06**

(b) If $\begin{vmatrix} 5 & 4 & 8 \\ x-3 & -8 & -16 \\ 3 & 9 & 4 \end{vmatrix} = 0$, determine the value of x. **04**

(c) Obtain the order and degree of differential equation $\frac{d^2y}{dx^2} = \sqrt[3]{1 + \left(\frac{dy}{dx}\right)^2}$. **04**

