

FACULTY OF PHARMACY
Pharm. D. I Year (Instant) Examination, January 2014**Subject: Remedial Mathematics****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part A. Answer any five questions from Part B.****PART – A (10 x 2 = 20 Marks)**

- 1 If $A = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$ write A^2 .
- 2 If $\begin{bmatrix} 2 & 3 \\ 3 & 0 \end{bmatrix} = \begin{bmatrix} x & y^2 \\ 3 & 0 \end{bmatrix}$, Find the values of x and y.
- 3 Eliminate 'θ' from the equations $x = a \sec^n \theta$, $y = b \tan^n \theta$.
- 4 Find the equation to the line passing through (2, 4) and parallel to x-axis.
- 5 Find the equation to the circle whose one end point is (2, 4) and mid point is (0,0).
- 6 Find the integral of $\int \frac{x^2}{1+x^2} dx$.
- 7 Define the order and degree of the differential equation and hence find the order and degree from the d.e. $\frac{d^3 y}{dx^3} + \left(\frac{d^2 y}{dx^2}\right)^2 + \frac{dy}{dx} + y = 0$
- 8 Evaluate $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$.
- 9 Find the Laplace transform $\sin at$.
- 10 If $u = \log(x^2 - y^2)$ then find $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$.

PART – B (5 x 10 = 50 Marks)

- 11 (a) If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} x & 1 \\ y & -1 \end{bmatrix}$ and $(A+B)^2 = A^2 + B^2$. Find x and y.
(b) If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then show that $A^2 - (a+d)A = (bc - ad)I$.
- 12 (a) If $\tan 20^\circ = K$, show that $\frac{\tan 250^\circ + \tan 340^\circ}{\tan 200^\circ - \tan 110^\circ} = \frac{1-K^2}{1+K^2}$.
(b) Prove that $\frac{1}{\cos 290^\circ} + \frac{1}{\sqrt{3} \sin 250^\circ} = \frac{4}{\sqrt{3}}$.
- 13 (a) Show that $\lim_{\theta \rightarrow 0} \frac{\tan a\theta}{\sin b\theta} = \frac{a}{b}$.
(b) If $u = \tan^{-1} \left(\frac{x^2 + y^2}{x + y} \right)$ then prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \frac{1}{2} \sin 2u$.

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- 14 (a) Evaluate $\int_0^a \frac{dx}{1+\sqrt{x}}$
(b) Evaluate $\int \sqrt{a^2 - x^2} dx$.
- 15 (a) Solve $e^x \tan y dx + (1-e^x) \sec^2 y dy = 0$.
(b) Solve $(D^2+1)y = e^x + \sin x + x^2$.
- 16 (a) If $L[F(t)] = F(s)$ then prove that $L(e^{at}F(t)) = F(s-a)$.
(b) Find the Laplace transform of $e^{2t} + t^2 + t \sin t$.
- 17 (a) Verify $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$ when z is equal to $x^3 + y^3 - 3axy$.
(b) Solve $(xy^2 + x) dx + (yx^2 + y) dy = 0$.
- 18 (a) Find the equation to the circle which passes through the point (4,1), (6,5) and has the centre on the line $4x + y - 16 = 0$.
(b) Find the equation of the ellipse whose focus is (0,3), eccentricity is $\frac{3}{5}$ and directrix is $3y-25=0$.
