

FACULTY OF PHARMACY
Pharm. D (6 YDC) I-Year (Main) Examination, July 2017

Subject : Remedial Mathematics

Time : 3 Hours
Max. Marks: 70

Note: Answer all questions from Part - A and answer any five questions from Part-B.

PART – A (10 x 2 = 20 Marks)

- 1 If $A = \begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -1 \\ 2 & 3 \end{bmatrix}$ then find AB^{-1} .
- 2 Find the slope of the line joining points (2, 5) and (-4, 6).
- 3 If $\cos A = \frac{12}{13}$ then find $\cot A$.
- 4 If $y = (3x^2 + 2x + 1)^{1/3}$ find $\frac{dy}{dx}$.
- 5 Find $\int_0^{\pi/2} \cos^2 x dx$.
- 6 Find order and degree of the differential equation

$$\frac{d^3 y}{dx^3} + \frac{d^2 y}{dx^2} + \left(\frac{dy}{dx}\right)^3 + y = 0.$$
- 7 Find the Laplace transform of $\cos^2 t$.
- 8 Find the center and radius of the circle $x^2 + y^2 + 2x - 4y + 5 = 0$.
- 9 Find $\lim_{x \rightarrow -7} \frac{2x^2 - 98}{x + 7}$.
- 10 If $u = 3xy - y^3 + (y^2 - 2x)^{3/2}$ then find $\frac{\partial^2 u}{\partial x^2}$.

PART – B (5 x 10 = 50 Marks)

- 11 (a) Show that $\begin{vmatrix} 1 & a & a^2 - bc \\ 1 & b & b^2 - ca \\ 1 & c & c^2 - ab \end{vmatrix} = 0.$
 (b) If $A = \begin{bmatrix} 2 & 3 & 1 \\ 6 & -1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & -1 \\ 0 & -1 & 3 \end{bmatrix}$
 Then find C such that $A + B - C = 0$.
- 12 (a) $\sin A = 8/17$ then find $\cos (A + B)$.
 (b) Simplify $\sqrt{\frac{1 + \tan^2 A}{1 + \cot^2 A}}$
- 13 (a) Find the equation of the circle passing through (1, 1), (2, 1) and (3, 2).
 (b) Find the value of k if the line $2y = 5x + k$ is a tangent the parabola $y^2 = 6x$.

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14 (a) $\lim_{x \rightarrow 2} (2x^2 + 3a + 5) = 3$ then find 'a'.

(b) If $z = \log(\tan x + \tan y)$ then show that

$$\sin 2x \frac{\partial z}{\partial x} + \sin 2y \frac{\partial z}{\partial y} = 2$$

15 (a) Evaluate $\int \frac{\cot x}{\log(\sin x)} dx$.

(b) Evaluate $\int_0^4 \frac{x^2}{1+x} dx$.

16 (a) Solve $(x^2 + y^3)dx = 2xydy$

(b) Solve $\frac{dy}{dx} - \frac{2y}{1+x} = (1+x)^3$.

17 (a) Find the Laplace transform of $e^t \sin^2 t$.

(b) Find the Laplace transform of $t^6 + e^{-t} \sin t + e^t \cos t$

18 (a) If $u = \tan^{-1}\left(\frac{y}{x}\right) + e^{\frac{x}{y}}$ then find $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$.

(b) Solve $\frac{dy}{dx} = \frac{y^2}{x^2}$.
