

SEMESTER EXAMINATION-2021

CLASS: B.Pharm-I

SUBJECT: Remedial Mathematics

PAPER CODE: BP106RMT

Time: 3 hour

Max. Marks 70

Min. Pass: 40%

Note: Question Paper is divided into two sections: A and B. Attempt both the sections as per given instructions.

SECTION-A (SHORT ANSWER TYPE QUESTIONS)

Instructions: Answer any five questions in about 150 words each. Each question carries six marks. (5 X 6 = 30 Marks)

Question-1: Define the followings with examples:

- Rational Functions
- Proper Rational Functions
- Improper Rational Functions

Question-2: Define Square matrices of order n with examples. What do you understand about the Diagonal Matrix? Write down the Identity matrix of order 3.

Question-3: Expand the following Logarithms

- Expand the Logarithm $\log_e \left(\frac{x^3 y^{1/2}}{z^6} \right)$
- Find the value of $\log_{10} 2$, If the value of $\log_{10} 64$ is 1.8061.

Question-4: Find first three successive derivatives for $f(x) = x^4 + e^x \sin(x)$

Question-5: Define order and degree of differential equation. Find order and degree of the following differential equations:-

1) $\frac{d^4 y}{dx^4} + \left(\frac{d^2 y}{dx^2} \right)^2 - 3 \frac{dy}{dx} + y = 9$

Question-6: Find the Determinants of the following:-

- $\begin{vmatrix} 2 & 5 \\ 4 & 1 \end{vmatrix}$

$$\begin{array}{l} \text{b) } |3 \quad -1 \quad -2| \\ \quad |0 \quad 0 \quad -1| \\ \quad |3 \quad -5 \quad -0| \end{array}$$

Question-7: Find the inverse of Matrix A = $\begin{pmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{pmatrix}$

Question-8: Find $\frac{dy}{dx}$. If

$$\text{a) } y = e^x + \frac{1}{4}x^4 + \cos(x) + 2\log x.$$

$$\text{b) } y = \sin(x^2 + 3x + 2) + e^{x^2} + 3.$$

Question-9: Find the integration of $\tan(x)$

Question-10: Find the equation of a straight line L making intercepts -3 and 2 with y and x axis respectively.

SECTION-B (LONG ANSWER TYPE QUESTIONS)

Instructions: Answer any FOUR questions in detail. Each question carries 10 marks.
(4 X 10 = 40 Marks)

Question-11: Solve the following differential equation:-

$$\text{a) } \frac{dy}{dx} + \frac{y}{x} = x^2$$

$$\text{b) } \frac{dy}{dx} = \frac{1+y^2}{1+x^2}$$

Question-12: Use Cramer rule to solve the system.

$$x_1 - 2x_2 + x_3 = 3$$

$$2x_1 + x_2 + x_3 = 5$$

$$3x_1 - x_2 + 2x_3 = 12$$

Question-13: Solve the Integration $\int \frac{dx}{x^2 - a^2}$.

Question-14: Find the local maxima and local minima for the given function and also find the local maximum and local minimum.

$$f(x) = x^3 - 6x^2 + 9x + 15$$

Question-15: Solve:-

- Define Laplace and Inverse Laplace Transformation.
- Find the Laplace Transform of $f(t) = \sin(2t) \cos(2t)$.
- Find the inverse Laplace Transform of $F(s) = \frac{1}{(s+1)(s^2-1)}$

Question-16: Solve:-

- Find the distance between the points (0,1) and (-3,7)
- Find the slope of line L, when L is perpendicular to $y = 3x + 9$.
- Find the slope of the line passing through (3,4) and (6,9).
- Given a line L makes an angle of 45 degree and cuts the intercept of unit 2 on the x-axis. Find the equation of L.

Question-17: State Cayley - Hamilton theorem. Verify the theorem for the matrix $A = \begin{matrix} 1 & 2 & 0 \\ 5 & 0 & 9 \\ 10 & 1 & 3 \end{matrix}$

Question-18: Resolve into partial fractions.

a) $\frac{3x + 3}{(x+1)(x+2)}$

b) $\frac{x^2 - 1}{(x+1)(x^2+3)}$