JHARKHAND Rai University
RANCHI

PRACTICE SET

End Semester (Semester I) Examination, Dec-2025

Program: B. Pharm

Subject: Remedial Mathematics (Theory)

Subject Code: BRB106RMT **Semester: Ist**

Objectives:

Upon completion of the course the student shall be able to:

1. Know the theory and their application in Pharmacy
2. Solve the different types of problems by applying theory
3. Appreciate the important application of mathematics in Pharmacy

UNIT-I

Section: I (5 Marks)

1. Express the following

$(i)\lim_{x\to 1}(x^3+x^2-1)$ $(ii)\lim_{x\to 3}x(x+1)$ $(iii)\lim_{x\to a}(4x^2-6x+7)$ $(iv)\lim_{x\to 3}\frac{x^2-9}{x^1-3}$

(CO1) Understand [LOT]

2. Solve $\frac{2x+3}{x^2-2x-3}$ into partial fraction. (CO1) Apply [LOT]

3. Define proper and improper fraction with example. (CO1) Remember [LOT]

4. Solve for y in term of x, $\log 2^x + \log 2^y = 1$ (CO) Apply [LOT]

5. Calculate $\log 6^{216} + (\log 42 - \log 6)/\log 49$. (CO1) Apply [LOT]

6. Prove the identity:

$$\frac{1-cos\theta}{sin\theta} + \frac{sin\theta}{1-cos\theta} = \sec\theta\cos\theta$$

7. Find the integral: $\int(2x^3 - 5x + 3)dx$

Section: II (10 Marks)

8. Discuss the , if $a^2 + b^2 = 7ab$ Prove that Log {1/3(a +b)} = ½ (Log a +Log b) (CO1) Understand [LOT]

9. Judge that ½ log 9+ 2 log 6+ ¼ log 81- log 12 =3 log3 (CO1)Evaluate [LOT]

10. Analyze the , If $\frac{log\ a}{b-c} = \frac{log\ b}{c-a} = \frac{log\ c}{a-b}$ then Prove that

$a^{b+c} \cdot b^{c+a} \cdot c^{a+b} = 1$ (CO1) Analyze [HOT]

UNIT-II

Section: I (5 Marks)

11. Explain $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix}$ (CO2) Understand [LOT]

12. Define upper and lower triangular matrix with example. (CO2) Remember [LOT]

13. Describe the, If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 1 & 0 \end{bmatrix}$ $find\ (A+B)^2$ (CO2) Understand [LOT]

14. Calculate the, if $\begin{bmatrix} a+b & 2 \\ 5 & ab \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$, find the value of a and b. (CO2) Apply [LOT]

15. Given the matrices

A= $\begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$, B=$\begin{bmatrix} 5 & 1 \\ 2 & 3 \end{bmatrix}$

(a) Find A+B.
(b) Find AB.

16. Solve the following system of equations using matrices (inverse method):

2x+3y=7
4x−y=5

Section: II (10 Marks)

17. Solve the determinant equation $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} = 0$ (CO2) Apply [HOT]

18. Solve the given system of equation, using matrix method (CO2) Apply [HOT]

3x+2y-2z = 3, x+2y+3z = 6 , 2x -y +z = 2

19. Evaluate the by use Cayley Hamilton theorem obtain the inverse of matrix.

$\begin{bmatrix} 1 & 2 & -2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$ (CO2) Evaluate [HOT]

UNIT-III

Section: I (5 Marks)

20. Express the , if

(i) $y = e^{\sqrt{\sin x}}$ find dy/dx (ii) y = log tan (x/2) find dy/dx (CO3) Understand [LOT]

21. Discuss the If $y = e^x \log(\sin 2x)$, find dy/dx (CO3) Understand [LOT]

22. Estimate the, dy/dx when x = a (t + sin t) and y = a (1 – cos t). (CO3) Understand [LOT]

23. Estimate the, If y = (sin x)/(1 +cos x) then find dy/dx (CO3) Understand [LOT]

24. Solve the differentiation $If\ xy = x^3 + y^3\ find\ \frac{dy}{dx}$ (CO3) Apply [LOT]

25. Calculate the If x Cos y = Sin (x+ y), find $\frac{dy}{dx}$ (Co3) Apply [LOT]

Section: II (10 Marks)

26. Explain the, $If\ y = \sqrt{sin\ x + \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \ \ldots\ldots\ldots\infty}}}}\ find\ \frac{dy}{dx}$.

(CO3) Analyzes [HOT]

27 Discuss the f(x) = $x^4 + 3x^2$ -6 find f ' (2) and f ''(2) (CO3) Understand [LOT]

28. Differentiate the if y = (sin x + cos x) / (sin x – cos x) the find dy/dx (CO3) Analyze [HOT]

29. Differentiate the, If $x^3 + y^3 = sin\,(x + y), find\ \frac{dy}{dx}$ (CO3) Analyzes [HOT]

UNIT-IV

Section: I (5 Marks)

30. Discuss the line joining the point (2, – 5) and (– 2, 5) is perpendicular to the line joining the points (6, 3) and (1, 1). (CO4) Understand [LOT]

31. Evaluate $\int(3\sin x - 4\,cosx + 5sec^2x - 2cosec^2x)\,dx$ (CO4) Remember [LOT]

32. Explain the equation of a line passing through the points (–1, 1) and (2, – 4).

(CO4) Understand [LOT]

33. Evaluate $\int(5x^2 + 2x^{-5} - 7x + \frac{1}{\sqrt{x}} + \frac{5}{x})dx$ (CO4) Remember [LOT]

34. Express the equation of the line passing through the point (–2, – 4) and perpendicular to the line 3x – y + 5 = 0. (CO4) Understand [LOT]

Section: II (10 Marks)

35. Sketch the equation of the line passing through the intersection of the lines x + 2y + 3 = 0 and 3x + 4y + 7 = 0, and parallel to the line x – y = 8. (CO4) Apply [LOT]

36. Explain the equation of the lines which cut off intercepts on the axes whose sum and product are 1 and – 6 respectively. (CO4) Analyze [HOT]

37. Evaluate $\int(\frac{x-1}{(x+1)(x-2)}\,dx$ (CO4) Evaluate [HOT}

38. Evaluate the following definite integral and explain each step:

$\int_0^{\pi/2} sin^2x\,dx$

39. Solve the trigonometric equation completely for $0° \leq x \leq 360°$:

$2\sin^2 x - 3\sin x + 1 = 0$

UNIT-V

Section: I (5 Marks)

40. Estimate that $(5x^4 + 3x^2y^2 - 2xy^3)dx + (2x^3y - 3x^2y^2 - 5y^4)dy = 0$ is exact.

(CO3) Understand [LOT]

41. Solve: $(x+1)\, dx/dy - y = e^x (x+1)^2$ (CO4) Apply [LOT]

42. List of the order and degree of differential equation $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$

(CO2) Remember [LOT]

43. Solve the Laplace Transform of $(t^5 + \sin t + e^{3t})$ (CO4) Apply [LOT]

44. Differentiate using chain rule:

$Y = \sqrt{4x^2 + 3x + 1}$

45. Using trigonometric identities, simplify:

$$\frac{\sin\theta + \sin 3\theta}{\cos\theta + \cos 3\theta}$$

Section: II (10 Marks)

46. Solve: $(x^2 + y^2)dx - 2xydy = 0$ (CO3) Apply [HOT]

47. Solve the given equation by variable separable

$(xy^2 + x)\, dx + (yx^2 + y)\, dy = 0$ (CO4) Apply [HOT]

48. Calculate the inverse Laplace transform of $\left(\frac{2s+1}{(s-1)(s-2)(s-3)}\right)$ (CO3) Analyze [HOT]

49. Determine the inverse Laplace transform:

$$L^{-1}\left\{\frac{s+2}{(s+1)^2+4}\right\}$$

(Hint: Convert the numerator into a standard form.)

50. Sketch the line passing through the point of intersection of

$3x + y - 7 = 0$ and $x - 2y + 1 = 0$,

and parallel to the line

$3x - 4y = 12$.

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Course Outcome

Upon completion of the course the student shall be able to:

1. Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences.

2. Create, use and analyze mathematical representations and mathematical relationships.

3. Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy.

4. Perform abstract mathematical reasoning.

Summary Sheet
CO Wise

CO	Q. No.	Marks
CO1	1,2,3,4,5, 6,7,8,9,10	65
CO2	11,12,13,14,15,16,17,18.19	60
CO3	20,21,22,23,24,25, 26,27,28,29	70
CO4	30,31,32,33,34,35,37,39,41,42,43,44,45,46,47,48,49,50	155
	Total =	**350**

Unit Wise

Unit	Q. No.	Marks
Unit 1	**1,2,3,4,5,6,7,8,9,10**	**65**

Unit 2	**11,12,13,14,15,16,17,18,19**	**60**
Unit 3	**20,21,22,23,24,25,26,27,28,29**	**70**
Unit 4	**30,31,32,33,34,35,36,38,39**	**75**
Unit 5	**40,41,42,43,44,45,46,47,48,49,50**	**80**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No.	Marks
LOT	1,2,3,4,5,6,7,9,10,11,12,16,17,18,19,20,21,,23,26,27,28.30,31.34,35,36,37,	145
HOT	8,13,14,15,22,24,25,32,33,38,39,40	120
	Total	**265**

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Disclaimer: -This is a Practice Set. The Question in End term examination will differ from the Practice Set. This Practice Set is meant for practice only.