

Roll No.....

Total No. of Questions : 10]

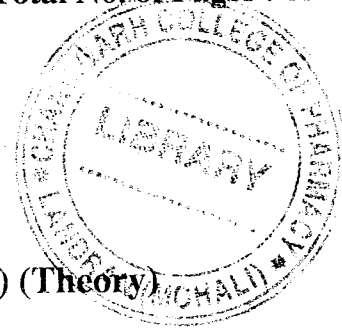
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## Paper ID [PH122]

(Please fill this Paper ID in OMR Sheet)

B.Pharmacy (Sem. - 2<sup>nd</sup>)

ADVANCED MATHEMATICS (PHM - 1.2.2) (Theory)



Time : 03 Hours

Maximum Marks : 80

Instruction to Candidates:

- 1) Section - A is Compulsory.
- 2) Attempt any Four questions from Section - B.
- 3) Attempt any Three questions from Section - C.

### Section - A

Q1)

(15 × 2 = 30)

- a) Define order and degree of a differential equation.
- b) Which of the following differential equation is linear?

(i)  $(1 + y) \frac{dy}{dx} + xy = \sin x$

(ii)  $y \frac{dy}{dx} + x = 0$

(iii)  $(1 + y) \frac{dy}{dx} + \sin x = x$

(iv)  $\frac{d^2 y}{dx^2} + x^3 \frac{dy}{dx} + (1 + x)^2 y = \sin x + e^x$ .

- c) Define an exact differential equation.
- d) If the roots of the auxiliary equation corresponding to the given differential

equation  $a_0 \frac{d^2 y}{dx^2} + a_1 \frac{dy}{dx} + a_2 y = 0$  are of the type  $\alpha \pm i\beta$ . Then write its general solution.

- e) Calculate particular integral of  $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 6y = 0$ .
- f) In rolling a dice, what is the probability of obtaining a sum not exceeding 10.
- g) For events A and B in Sample space S  
 $P(A \cup B) = \dots$
- h) Define Mean and variance. What properties of a probability distribution do they characterize?
- i) Why are interval estimates in most cases more useful than point estimates.
- j) Define least square principle.
- k) Define Baye's theorem.
- l) Write probability distribution function of Poisson distribution.
- m) Define shifting property of Laplace transform.
- n) If  $L[f(t)] = \bar{f}(s)$ , then write  $L\left[\frac{d^2f(t)}{dt^2}\right]$ .
- o) Evaluate  $L^{-1}\left[\frac{s}{(2s+3)^2}\right]$ .

### Section - B

(4 x 5 = 20)

**Q2)** Solve  $(xy^3+y)dx+2(x^2y^2+x+y^4)dy = 0$

**Q3)** Solve  $xy(1+xy^2)\frac{dy}{dx} = 1$

**Q4)** Evaluate  $L^{-1}\frac{s}{(s^2+1)(s^2+4)}$

**Q5)** A manufacturer knows that the condensers he makes contains on the average one percent defectives. He packs them in boxes of 100. What is the probability that a box picked at random will contain 3 or more faulty condensers.

- Q6) Find the student's  $t$  for the following variable values in a sample of 8:  
-4, -2, -2, 0, 2, 2, 3, 3; taking the mean of the universe to be zero.

**Section - C**

(3 x 10 = 30)

- Q7) Solve the following differential equations

(a)  $\frac{dy}{dx} = \frac{y \cos x + \sin y + y}{\sin x + x \cos y + x}$

(b)  $(x^3y^2+x)dy+(x^2y^3-y)dx = 0.$

- Q8) Solve the differential equation using Laplace transform.

$$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - 3y = \sin t, \quad y = \frac{dy}{dt} = 0 \text{ when } t = 0$$

- Q9) Find out co-efficient of dispersion and a measure of skewness from the following table giving the wages of 230 persons:

Wages(in Rs)	No. of persons
70-80	12
80-90	18
90-100	35
100-110	42
110-120	50
120-130	45
130-140	20
140-150	8

- Q10) Ten students got the following percentage of marks in Principles of Economics and Statistics.

Roll Nos :	1	2	3	4	5	6	7	8	9	10
Marks in Economics	78	36	98	25	75	82	90	62	65	39
Marks in Statistics	84	51	91	60	68	62	86	58	53	47

Calculate the coefficient of correlation.

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