

J-6441[N-0507/139]

[2957]



**B.Pharmacy (Semester - 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 x 2 = 30)**

- a) ✓ Define general solution of an ordinary differentiation equation.
- b) ✓ Define a linear differential equation.
- c) ✓ State necessary and sufficient condition for a differential equation to be exact.
- d) If roots  $m_1$  and  $m_2$  of auxiliary equation corresponding to the given differential equation  $C_0 \frac{d^2 y}{dx^2} + C_1 \frac{dy}{dx} + C_2 y = 0$  are of the type  $\alpha \pm i\beta$ , then write its general solution.
- e) ✓ Calculate P.I. of the differential equation  $\frac{d^2 y}{dx^2} + \frac{dy}{dx} - 6y = 0$ .
- f) In rolling two fair dice, what is the probability of obtaining a sum greater than 3 but not exceeding 6.
- g) If A and B are events in a sample space S and  $P(A) \neq 0$ ,  $P(B) \neq 0$ , then  $P(A \cap B) = \dots\dots$
- h) How are mean and variance defined and 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 principal.

**P.T.O.**

k) Define Baye's theorem.

l) Write probability density function of normal distribution.

m) Define Laplace transform.

n) Evaluate  $L^{-1}\left[\frac{1}{(2s+3)^2}\right]$ .

o) If  $L(y) = \bar{y}$  then  $L\left(\frac{d^2y}{dx^2}\right) = \dots\dots\dots$

**Section - B**

(4 x 5 = 20)

Q2) Solve  $(1 + y^2)dx = (\tan^{-1}y - x)dy$ .

Q3) Solve  $\frac{dy}{dx} = \frac{x + 2y - 3}{2x + y - 3}$ .

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

Q5) A certain screw making machine produces on average 2 defective screws out of 100, and packs them in boxes of 500. Find the probability that a box contains 15 defective 15 screws.

Q6) Find the students  $t$  for the following variable values in a sample of eight : -4, -2, -2, 0, 2, 2, 3, 3; taking the mean of the universe zero.

**Section - C**

(3 x 10 = 30)

Q7) Solve the following differential equations

(a)  $\frac{dz}{dx} + \left(\frac{z}{x}\right) \log z = \frac{z}{x} (\log z)^2$

(b)  $(x^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$

$\frac{2}{s^n} = \frac{t^{n-1}}{t^{n-1}}$   
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Solve the following simultaneous equations using L-transform

$$\frac{dy}{dt} + 2x = \sin 2t$$

$$\frac{dx}{dt} - 2y = \cos 2t \quad (t > 0)$$

If at  $t = 0$ ,  $x = 1$  and  $y = 0$ .

**Q9)** Find the coefficient of correlation for the following data and obtain the least square regression line of  $y$  on  $x$ .

$x :$	10	14	18	22	26	30
$y :$	18	12	24	6	30	36

**Q10)** Two random samples are drawn from the two normal populations are as follows :

A	17	27	18	25	27	29	13	17
B	16	16	20	27	26	25	21	

Test whether the samples are drawn from the same normal population.

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