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Total No. of Pages : 03

Total No. of Questions : 10

B.Pharmacy (Sem.–2,4)

ADVANCED MATH

Subject Code : PHM-122

M.Code : 46015

Time : 3 Hrs. Max. Marks : 80

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of FIFTEEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains FOUR questions carrying TEN marks each and students have to attempt any THREE questions.**

SECTION-A

1. Do as Directed :

a) Find the differential equation of all circles touching the axis of y as the origin and centres on the axis of x.

b) Solve the given differential equation $(x + y)\,dx + (y - x)\,dy = 0$

c) Solve the given differential equation $\frac{dy}{dx} = \frac{6x-4y+3}{3x-2y+1}$.

d) Eliminate the arbitrary constants and obtain a differential equation from $y = A + Bx + Cx^2$.

e) Find Laplace Transform of t^n, where n is a positive integer.

f) Find Laplace Transform of $e^{-2t} \sin 4t$.

g) Find inverse Laplace Transform of $\frac{2s+6}{s^2+4}$.

h) Find inverse Laplace Transform of $\log\frac{s+1}{s-1}$.

i) Find Laplace Transform of $t\sin^2 3t$.

j) Find inverse Laplace Transform of $\frac{3(s^2-1)^2}{2s^5}$.

k) The mean of 200 items was 50. Later on it was discovered that two items were misread as 92 and 8 instead of 192 and 88 respectively. Find the correct mean.

l) Compute the arithmetic mean from the given data

Height (in cm) :	219	216	213	210	207	207	201	198
No. of Persons :	2	4	6	10	11	7	5	4

m) A bag contains 7 white, 6 red and 5 black balls. Two balls are drawn at random. Find the probability that they will both be white.

n) If the variance of the Poisson distribution is 2, find the probabilities for r = 1, 2, 3, 4 from the recurrence relation of the Poisson distribution.

o) Define critical region.

SECTION-B

2. Solve $y - x\frac{dy}{dx} = a\left(y^2 + \frac{dy}{dx}\right)$.

3. State and prove First Shifting theorem for Laplace Transformation.

4. Using Laplace Transformation, solve $\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 5x = e^{-t}\sin t$, where $x(0) = 0$ and $x'(0) = 1$.

5. Find mean and standard deviation of the following :

Series	**Frequency**	**Series**	**Frequency**
15-20	2	45-50	20
20-25	5	50-55	17
25-30	8	55-60	16
30-35	11	60-65	13
35-40	15	65-70	11
40-45	20	70-75	5

6. The odds that a book will be favourably received by three independent critics are 5 to 2, 4 to 3 and 3 to 4, respectively. What is the probability that, of the three reviews, majority will be favourable ?

SECTION-C

7. a) Solve $(3y + 2x + 4)\,dx - (4x + 6y + 5)\,dy = 0$.

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

8. a) Find inverse Laplace Transform of $\frac{2s^2 - 1}{(s^2 + 1)(s^2 + 4)}$.

b) Using Laplace transform, solve the simultaneous equations

$\frac{dx}{dt} - 2x + 3y = 0$, $\frac{dy}{dt} + 2x - y = 0$, where $x(0) = 8$, $y(0) = 3$.

9. a) Calculate the first four moments about mean for the following data :

Variate :	1	2	3	4	5	6	7	8	9
Frequency :	1	6	13	25	30	22	9	5	2

b) Goals scored by two teams A and B in a football season were as below :

No. of Goals Scored	**No. of Matches**	
	A	**B**
0	27	17
1	9	9
2	8	6
3	5	5
4	4	3

Find out which team is more consistent.

10. a) The mean height of 500 male students in a certain college is 151 cm and the standard deviation is 15 cm. Assuming the heights are normally distributed, find how many students have heights between 120 cm and 155 cm ?

b) A random sample of size 16 has 53 as mean. The sum of squares of the deviation from mean is 135. Can this sample be regarded as taken from the population having 56 as mean.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.