

B. Pharm. 2nd Semester Exam., 2018

ADVANCED MATHEMATICS

Time : 3 hours

Full Marks : 70

Instructions :

- (i) All questions carry equal marks.
- (ii) There are **NINE** questions in this paper.
- (iii) Attempt **FIVE** questions in all.
- (iv) Question No 1 is compulsory.

1. Answer the following questions (any seven) :

(a) Define linear differential equation.

(b) State necessary and sufficient condition for a differential equation to be exact.

(c) Calculate PI of the differential equation

$$\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 0.$$

(d) Solve $\frac{dy}{dx} = \frac{y}{x} + \tan \frac{y}{x}$.

(e) Define Laplace transform.

(f) In rolling of two fair dice, what will be the probability of getting odd number on both the dice?

(g) Write the probability distribution function of normal distribution.

(h) Define Bayes' theorem.

(i) For any two events A and B , find $P(\bar{A} \cap B)$ and $P(A \cap \bar{B})$.

(j) Give the relation of absolute measure of skewness with mean, median and quartiles.

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

3. Use convolution theorem to find $L^{-1} \left\{ \frac{P}{(p^2 + 4)^3} \right\}$.

4. Solve $\frac{d^2 x}{dt^2} + 9x = \cos 2t$, if $x(0) = 1$, $x\left(\frac{\pi}{2}\right) = -1$.

5. If A and B are independent events, then show that (i) A and \bar{B} , (ii) \bar{A} and B , (iii) \bar{A} and \bar{B} are also independent.

6. State and prove multiplication theorem of probability and also give the condition of independency.

7. Solve the following differential equations :

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

(b) $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$

8. Fit a Poisson distribution to the following data which gives the number of dodders in a sample of clover seeds :

No. of Dodders (x)	0	1	2	3	4	5	6	7	8
Observed Frequency	55	154	123	88	33	25	7	1	0

9. Lives of two models of refrigerators turned in for new models in recent survey are given in the adjoining table :

Life (in years)	Model A	Model B
0-2	5	2
2-4	16	7
4-6	13	12
6-8	7	19
8-10	5	9
10-12	3	1

What is the average life of each model of these refrigerators? Which model shows more uniformity?
