

Roll No .....

**PY-201****B.Pharmacy II Semester**

Examination, June 2017

**Advanced Mathematics****Time : Three Hours****Maximum Marks : 70**

- Note:** i) Answer any five questions out of Eight questions.  
 ii) All questions carry equal marks.

1. a) Show that  $y = ae^x + be^{-x}$  is a solution of the differential equation  $\frac{d^2y}{dx^2} - y = 0$ , where  $a$  and  $b$  are arbitrary constants.

b) Solve the differential equation  $\frac{dy}{dx} = \frac{e^x + x^2}{e^y}$

2. a) Solve the linear equation  $\frac{dy}{dx} + ay = e^x$

b) Solve the differential equation  $(D^2 + 2D + 1)y = 0$ .

3. a) Find Laplace transform of the followings :

i)  $2t^3 - 5$

ii)  $te^{-t} \sin t$

b) Find Inverse Laplace transform of the followings :

i)  $\frac{s+3}{s^2+8s+5}$

ii)  $\frac{1}{s^2+25}$

4. a) Using Convolution theorem, evaluate  $L^{-1} \left\{ \frac{s}{(s^2+a^2)^2} \right\}$

b) Using Laplace transform, solve the following differential equation :

$(D^2 + 6D + 9)y = \sin x$ , given that  $y(0) = 1$  and  $y'(0) = 1$

5. a) Compute Arithmetic mean from the following table :

$x$	11	12	13	14	15	16
$f$	8	12	9	5	7	9

b) Find standard deviation for the series :

20, 22, 27, 30, 31, 32, 35, 40, 45, 48.

6. a) A card is drawn from a pack of 52 cards. What is the probability that it is a spade card or a king?
- b) A question of mathematics is given to three students A, B and C. The probability that they solve the question is  $\frac{1}{2}$ ,  $\frac{1}{3}$  and  $\frac{1}{4}$  respectively. If they all try to solve the question then what is the probability that the question will be solved?

7. a) In an electronic laboratory, it is found that 10% of transistors are defective. A random sample of 20 transistors are taken for inspection. What is the probability that all are good? What is the probability that at most three are defective?
- b) If the probability that an individual suffers a bad reaction from a certain injection is 0.001. Use Poisson distribution to determine the probability that out of 2000 individuals.
- i) Exactly 3 and
- ii) More than 2 individuals individual will suffer a bad reaction.

8. a) Fit a straight line to the following data :

x	1	3	5	7	9
y	6	5	7	8	12

- b) Find the student's t-statistic for the following variable values in a sample:

-4, -2, -2, 0, 2, 2, 3, 3

taking the mean of the universe to be zero

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