

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE – 27
M.SC BDA – I SEMESTER
MID-SEMESTER TEST – AUGUST 2016
BDA 1216: Probability & Stochastic Process

Time: 1 1/2hrs

Max marks:35

Section – A

I Answer any FIVE of the following **5 x 2= 10**

1. Give classical definition of probability
2. What is sample space? Give one examples
3. Define Binomial distribution with an example
4. Explain Union and Intersection of event with an example.
5. Write a short note on probability distribution function.
6. Define mathematical expectation.

SECTION – B

II Answer any ONE of the following: **1x 10 = 10**

7. A) State addition theorem of probability. (2)
 - B) A fair coin is tossed twice. Find the probability that the tosses result in (2)
 - i) Iwo heads
 - ii) atleast one head
 - C) What do you mean by random experiment? Give two examples (2)
 - D) Briefly explain principle of inclusion and exclusion. (4)
8. A) Let X is a random variable and a and b are two constants. Then show that
- i) $E(a)=a$ ii) $E(aX)=aE(X)$ iii) $E(aX+b)=aE(X)+biv$ $var(aX)=a^2var(X)$ (4)
 - B) Define i) Random variable with example. (3)
 - ii) probability mass function.
 - iii) probability density function.
 - C) Prove that sum of two independent Poisson variates is also Poisson variate. (3)

SECTION – C

III Answer any ONE of the following: **1 x 15 = 15**

9. A) Explain Birthday Paradox. (4)
- B) State and proof Bayes Theorem. (4)
- C) Two random variables X and Y have the following joint pdf (7)

$$f(x, y) = \begin{cases} K(6 - x - y), & 0 \leq x \leq 2, 0 \leq y \leq 4 \\ 0, & \text{otherwise} \end{cases}$$
 Find i) Constant K ii) Var(X)

10. A) Define Geometric Distribution and obtain the moment generating function of Geometric Distribution and hence find its mean and variance. (7)
- B) Find mean and variance of Hyper-Geometric distribution. (5)
- C) Under what conditions the sum of two independent binomial variates with parameter (n_1, p_1) and (n_2, p_2) is a binomial variate. (3)