Mid Semester Examination

Max. Marks: 30	Duration: 1hr 30 min
Class: FYMCA	Semester: II
Course Code: MCA25	Date: 16/3/2018
Subject: Probability and Statistics	Time: 9:30 to 11

Instructions:
  (1) All questions are compulsory.
  (2) Use of scientific calculator is allowed.
  (3) Assume any necessary data but justify the same.

Q. No.	Question	Max. Marks	CO
Q.1 A	State and prove Baye's theorem of probability.	5	CO3
Q. 1 B	The probability that a certain film gets award for its story is 0.23, it will get award for its music is 0.15 and it will get award for both is 0.07. What is the probability that film will get award for (a) at least one of the two. (b) exactly one of the two. OR What is the probability that 4 S's come consecutively in the arrangement of the letters in the word 'MISSISSIPPI'.	5	CO3
Q. 2A	The joint distribution function (CDF) of X and Y is given by $F_{XY}(x,y) = 1 - e^{-x} - e^{-y} + e^{-(x+y)}$, $x \geq 0$, $y \geq 0$ $= 0$, otherwise Find the marginal density functions of X and Y. Are X and Y independent?	5	CO4
Q. 2B	Let X be a random variable with probability distribution as follows. <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>f(x)</td><td>1/3</td><td>1/2</td><td>0</td><td>1/6</td></tr></table> Find the expectation value of $Y = (x-1)^2$.	5	CO4
Q. 3A	It is given that 2% of the electric bulbs manufactured by a company are defective. Using Poisson distribution, find the probability that a sample of 200 bulbs will contain (i) no defective bulbs (ii) at least 3 defective bulbs.	5	CO5

Q. 3B	If 'm' things are distributed among 'a' men and 'b' women, show that the probability that the number of things received by men is odd, is $$\frac{1}{2}\left[\frac{(b+a)^m-(b-a)^m}{(b+a)^m}\right]$$ OR Prove that Geometric distribution is memoryless.	5	CO5