**kiitlogo AUTUMN MIDSEM EXAMINATION-2019**

**Subject: Probability and statistics Subject Code: MA-2011**

**Time: 1hr 30 minutes Full Marks: 20**

***Answer any 4 questions including question No.1 which is compulsory.***

***The figures in the margin indicate full marks.***

***The symbols have their usual meaning.***

***Candidates are required to give their answers in their own words as far as practicable and***

***all parts of a question should be answered at one place only.***

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| 1. Answer all Questions.  **[1x5]** 2. A coin is tossed 5 times. Find the probability of getting at least one head. 3. For any events and with , show that 4. Find the suitable value of , for which the function represents a probability mass function. 5. Let be a probability mass function with and . Can have any further positive values? (Justify) 6. What is the probability that in group of 5 players (no twins) at least two have the same birthday. |
| 1. (a) A computer consulting firm presently has bids out on three projects. [**3**]   Let for and suppose that , , , , , , . Express in words each of the following events, and compute the probability of each event:  (b) For any events , show that **[2**] |
| 1. A box contains 12 RH and 8 LH screws. Three screws are drawn at random without replacement. Let be the number of RH screws drawn. Find   . **[5**] |
| 1. **(a) BAG I** contains 5 white and 3 black ball whereas **BAG II** contains 4 white and 6 black balls. A bag is selected at random and two balls drawn is found to be black. Find the probability that **BAG I** was selected. **[3]**   (b) Prove that where is mean of . **[2]** |
| 1. (a) A motor dives an electric generator. During a month, the motor needs repairs with probability 8% and the generator needs repair with probability 4%. What is the probability that during a given period the entire apparatus will need repair? **[3]**   (b) Show that the mean and the variance for Poisson’s distributions are same  **[2]** |
| 1. (a) Find the mean and variance of the random variable . Given that probability mass function corresponds to random variable is . **[3]**   (b) We draw cards repeatedly without replacement from a packet 100 cards, 60 of which refer to male and 40 to female person. What is the probability of obtaining second **Female** card before the third **Male**  card? **[2]** |