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| | **SESSIONAL-II June 2023**<br>Programme: BTech, Branch: CSE<br>**Course Code: BTMAT119B, Course Title: Mathematics-II** | Semester: II<br>Time: 1 Hour<br>Max Marks: 20 |
| Q1. | The diameter, say $X$, of an electric cable, is assumed to be a continuous random variable with probability density function: $f(x) = 6x(1-x), 0 \le x \le 1$<br>(i) Check that the above is a probability density function.<br>(ii) Determine the number $k$ such that $P(X < k) = P(X > k)$. | **5 Marks** |
| Q2. | The fraction X of male runners and the fraction Y of female runners who compete in marathon races are described by the joint density function<br>$f(x,y) = \begin{cases} 8xy, & 0 \le y \le x \le 1, \\ 0, & elsewhere \end{cases}$<br>Find the covariance of X and Y. | **5 Marks** |
| Q3. | Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal, are same against that they are not, at 5% level. | **5 Marks** |
| Q4. | In a distribution exactly normal, 31% of the items are under 45 and 8% of the items are over 64. What are the mean and standard deviation of the distribution? | **5 Marks** |