**DAIICT SC531 PROBABILITY & RANDOM VARIABLES**

**FIRST IN-SEMESTER EXAMINATION**

ID NUMBER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

VALUE OF M: \_\_\_\_\_\_

NOTES:

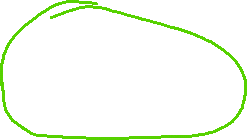
1. The question paper has FOUR questions of 5 marks each. **Time allowed: 60 minutes**.
2. Write your answers in the boxes provided on page 2.
3. ATTACH your rough-work sheet(s) with the filled-in question paper returned.

CALCULATION OF M

Let d1, d2 be the RIGHTMOST TWO DIGITS of your ID number, in that order.

First calculate integer X = 2\*d1 + 3\*d2. Then calculate M = remainder(X/4) + 2

= modulo(X,4) + 2. Enter the value in the box above.



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| **POISSON** | **Rate = 2** |  | **STD NORMAL - CDF** |  |
| i = 0 | 0.13534 |  | 0 | 0.50000 |
| 1 | 0.27067 |  | 0.10 | 0.53983 |
| 2 | 0.27067 |  | 0.20 | 0.57926 |
| 3 | 0.18045 |  | 0.30 | 0.61791 |
| 4 | 0.09022 |  | 0.40 | 0.65542 |
| 5 | 0.03609 |  | 0.50 | 0.69146 |
| 6 | 0.01203 |  | 0.60 | 0.72575 |
| 7 | 0.00344 |  | 0.70 | 0.75804 |
| 8 | 0.00086 |  | 0.80 | 0.78814 |
| 9 | 0.00019 |  | 0.90 | 0.81594 |
| 10 | 0.00004 |  | 1.00 | 0.84134 |
| 11 | 0.00001 |  | 1.10 | 0.86433 |
| 12 | 0.00000 |  | 1.20 | 0.88493 |
| 13 | 0.00000 |  | 1.30 | 0.90320 |
| 14 | 0.00000 |  | 1.40 | 0.91924 |
| 15 | 0.00000 |  | 1.50 | 0.93319 |

Q-1 You have 4 bowls containing 10 balls each, some white and some black. The number of white balls in the 4 bowls are, respectively: M, 10-M, 8 and 2. A bowl is selected at random and then a single ball is drawn from that bowl at random. It is found that the ball drawn is **black**. Find the probability that the drawn **black** ball did NOT come from bowl #1.

pdf of continuous RV X

X = 2\*M X = 20 X axis 🡪

Q-2. Consider the probability density function shown in the diagram above. Find the variance of X, that is Var(X).

Q-3 Wheels are produced on a machine in large numbers. The diameter of a wheel, measured in mm, is a continuous RV having probability distribution N(100,2). What is the probability that the diameter of a randomly selected wheel is within + 0.4\*M of the mean diameter? Use the standard normal table (cdf) given.

Q-4: Busses are arriving at a bus station at an average rate of 2 arrivals per minute, according to Poisson probability distribution. Calculate the probability that M or more busses arrive in a minute. Use the Poisson distribution table given.

|  |  |
| --- | --- |
| **ID NUMBER:** | |
| Enter your answers below | |
| A-1 |  |
| A-2 |  |
| A-3 |  |
| A-4 |  |

