**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DHARWAD**

**END-TERM EXAMINATION EVEN SEMESTER 2020-21**

**DS101 MATHEMATICS FOR DATA SCIENCE**

**Date: 18-03-2021**      Duration: 90 minutes   Max. Marks: 40      Reg. No.:

**Note:**

- *Clearly mention the assumptions made (if any) in derivations or solving problems.*
- *Answer all questions, briefly to the point.*

1. Explain the steps to conduct hypothesis testing.  **(5M)**

2. An unbiased coin is tossed six times. Find the probability of obtaining (i) exactly 3 heads (ii) less than 3 heads (iii) more than 3 heads (iv) at most 3 heads (v) at least 3 heads. Use suitable probability mass function.  **(5M)**

3. A call centre receives, on average, 4 calls per hour on its toll-free number. For any given hour, find the probability that it will receive the at most 4 calls. Use suitable probability mass function.  **(5M)**

4. Define the pdf of Normal distribution. Write its properties  **(5M)**

5. Define and fit an exponential distribution for the following data.  **(10M)**

| Age | 0-4 | 4-8 | 8-12 | 12-16 | 16-20 |
|---|---|---|---|---|---|
| No. of cases | 180 | 90 | 45 | 36 | 9 |

6. Define the correlation co-efficient and calculate correlation coefficient for the data obtained in a study on the temperatures (in degrees Fahrenheit) and precipitation (in inches). The data are shown. Is there a relationship between them?   Find the equation of the regression line for the data, and graph the line on the scatter plot. Find the ŷ when x=80F.  **(10M)**

| Day | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|---|---|---|---|---|---|---|---|
| Temp. | 86 | 81 | 83 | 89 | 80 | 74 | 64 |
| Prec. | 3.4 | 1.8 | 3.5 | 3.6 | 3.7 | 1.5 | 0.2 |