BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: IMSc **SEMESTER : II**
BRANCH: QEDS **SESSION : SP/2025**

SUBJECT: ED24113 STATISTICAL METHODS II

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1	Consider a pdf given by $f(x) = \alpha x^{\alpha-1} e^{-(x)^{\alpha}}$, $x \geq 0$, $\alpha > 0$. Find the inverse of the CDF and write the steps for generating samples using inverse transformation method.	[5]	C01	I
Q.2	Consider density function $f(x) = 20x(1-x)^3$, $0<x<1$ and $g(x) = 1$, $0<x<1$. Use the rejection method and write the steps to generate a random sample from $f(x)$.	[5]	C01	I
Q.3	Find the MLE for the parameter λ of a Poisson distribution on the basis of a sample of size n.	[5]	C02	III
Q.4	Let $X_1, X_2, \ldots, X_n$ be a random sample of size n from a population X with probability density function $f(x;\theta) = \begin{cases} \theta x^{\theta-1} & if\ 0 < x < 1 \\ 0 & otherwise \end{cases}$ where $0<\theta<\infty$ is an unknown parameter. Using the method of moment find an estimator of θ. If $x_1 = 0.2$, $x_2 = 0.6$, $x_3 = 0.5$ and $x_4 = 0.3$ is a random sample of size 4, then what is the estimate of θ?	[5]	C02	III
Q.5	Estimate the production of wheat for the year 2020 based on the data given below. Calculate the trend values and fit a linear trend by the least square method.	[5]	C02	III

Year	2010	2012	2014	2016	2018
Production	18	21	23	27	16

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