INDIAN STATISTICAL INSTITUTE
THIRD SEMESTER EXAMINATION, 2024/26 SESSION
PAPER - 11: INFORMATION RETRIEVAL
(MASTER IN LIBRARY INFORMATION SCIENCE)
07th November 2025 (10:00-13:00) (3 Hours)

This Question paper consists of ONE page, and is for 60 Marks. **Attempt Questions or Sub-Questions to score maximum marks**. Please print all your answers in the Answer Booklet provided. Scientific Calculator is allowed.

Explain with supporting equations, illustrations, and demonstrations via the data of your choice wherever required, and their relevance in **Library Information (Science) Retrieval**.

QUESTION 1. Write briefly about the following.

(i) Role of information retrieval in Library Information Science. **[04 Marks]**
(ii) *K*-Mixture Model in document summarization **[04 Marks]**
(iii) Hit-Or-Miss Transformation (HMT) in music Information retrieval **[04 Marks]**
(iv) Application of Moran's Index in information retrieval. **[04 Marks]**
(v) Modified gravity model in spatial interaction between (X^i) and (X^j). **[04 Marks]**

QUESTION 2. Convert the random data, $f(x,y)$, providing values in the range between 0 and 15, into binary form by choosing the median of $f(x,y)$ as a single threshold value. **[08 Marks]**

QUESTION 3. Rectangular Granulometries is a quantitative approach for document summarization. First pages of articles appearing in technical periodicals possess unique geometry of delimiter spaces. Let delimiter-space (A) and text (A^c) represent respectively foreground (in white shade) and background (in black shade). Explain how the geometry of A could be quantitatively characterized via rectangular granulometries. **[08 Marks]**

QUESTION 4. $f(\alpha)$-Spectra also known as multifractal spectra provide many dimensions, and one of which is information dimension. Explain the computation of $f(\alpha)$-Spectra for the data of relevance to information science or library information science. **[08 Marks]**

QUESTION 5. Write briefly about Boolean and Vector Space Information Retrieval (IR) Models, and explain the evaluation of such IR Models. **[10 Marks]**

QUESTION 6. What are grayscale erosion and dilation distances between $f(x,y)$ and $f(x,y)$. Explain the process of computing the ranks for a pair of images $f(x,y)$ and $f(x,y)$. **[08 Marks]**

QUESTION 7. Three morphological interpolations include Skeletonization by Influence Zones (SKIZ), Binary Morphological Interpolation (BMI), and Grayscale Morphological Interpolations (GMI). Explain SKIZ, BMI and GMI with cases relevant to information retrieval. **[10 Marks]**

QUESTION 8. Explain how the Mahalanobis Distance also known as Quadratic Distance can be employed to cluster the data of relevance to Library Information Science. **[08 Marks]**

END OF PAPER