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| **Name.:**<br>**Student Admn. No.: _____** | **Printed Pages:01** |

**School of Computer Science and Engineering**
**Summer Term Examination– July - August 2024**
**[Programme : B. Tech] [Semester: I][Batch: 2023-27]**

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| **Course Title: Engineering Mathematics-I**<br>**Course Code: C1UC122B** | **Max Marks: 100**<br>**Time:3 Hrs.** |

***Instructions:***
1. *All questions are compulsory.*
2. *Assume missing data suitably, if any.*

| | | K Level | COs | Marks |
|---|---|---|---|---|
| | **SECTION-A (15 Marks) 5 Marks each** | | | |
| **1.** | If $A = [1\ 2\ 3\ 0\ 1\ 1\ 1\ 3\ 4\ ]$, then find the rank of A. | KL1 | CO1 | 5 |
| **2.** | Explain the Integral Test for the convergence of an infinite series. | KL1 | CO2 | 5 |
| **3.** | Define beta and gamma function. | KL2 | CO1 | 5 |
| | **SECTION-B(40 Marks) 10 Marks each** | | | |
| **4.** | Check the consistency of following system of linear equations, if consistent then find the solution<br>$x + y + z = 6,$<br>$2x - y + z = 3,$<br>$3x + 2y - z = 4.$ | K2 | CO2 | 10 |
| **5.** | Determine the convergence of the series $\sum\left(\frac{n!}{2^n}\right)$ using the Root Test. | KL3 | CO3 | 10 |
| **6.** | If $f(x,y) = \sqrt{x^2 + y^2}$, then find $\frac{\partial^2 f}{\partial x^2}$ and $\frac{\partial^2 f}{\partial y^2}$. | KL3 | CO2 | 10 |
| **7.** | Find the value of integral $\int_0^1 x^3(1-x)^5 dx$ using beta gamma function. | KL4 | CO3 | 10 |
| | **SECTION-C (45 Marks) 15 Marks each** | | | |
| **8.** | Find the eigen values and corresponding eigen vectors of the matrix $A = [3\ 1\ 4\ 0\ 2\ 6\ 0\ 0\ 5\ ]$ | KL4 | CO4 | 15 |
| **9.** | Find the Fourier sine and cosine series of the function $f(x) = x + x^2$ in the interval $0 < x < \pi$. | KL5 | CO3 | 15 |
| **10** | Evaluate the double integral $\iint_R (4x + 2)\, dxdy$, where R is the region bounded by the curves $y = 2x,\ y = x^2,\ x = 0,\ x = 2.$ | KL5 | CO4 | 15 |