**20EC401/20EI401**

**Hall Ticket Number:**

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| |  |  |  |  | | --- | --- | --- | --- | | **II/IV B.Tech (Regular\Supplementary) DEGREE EXAMINATION** | | | | | **July/August, 2023** | **Common to ECE & EIE branches** | | | | **Fourth Semester** | **Complex Variables & Special Functions** | | | | **Time:** Three Hours | | **Maximum:** 70 Marks | | | ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** | | ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  | CO | BL | M | | 1 | a) | Find principle value of (1+ i√3) | CO1 | L2 | 1M | |  | b) | Find derivative of f(z) = z3-2z | CO1 | L2 | 1M | |  | c) | Check the analyticity of the function | CO1 | L2 | 1M | |  | d) | Define harmonic function. | CO2 | L1 | 1M | |  | e) | Find value of k such that  is analytic. | CO2 | L2 | 1M | |  | f) | What type of singularity have the function | CO2 | L2 | 1M | |  | g) | State Taylor’s series. | CO3 | L1 | 1M | |  | h) | State Cauchy Integral Formula. | CO3 | L1 | 1M | |  | i) | Define Removable singularity. | CO4 | L1 | 1M | |  | j) | Determine the poles of | CO4 | L2 | 1M | |  | k) | State shifting property in Fourier transforms. | CO1 | L1 | 1M | |  | l) | State convolution theorem. | CO1 | L1 | 1M | |  | m) | Define regular point. | CO1 | L1 | 1M | |  | n) | Define Bessel’s function. | CO2 | L1 | 1M | | **Unit-I** | | | | | | | 2 | a) | Determine the analytic function whose real part is x33xy2+3x23y2 . | CO1 | L2 | 7M | |  | b) | Evaluate around a rectangle with vertices | CO1 | L3 | 7M | |  |  | **(OR)** |  |  |  | | 3 | a) | State and prove Cauchy’s Integral theorem. | CO1 | L3 | 7M | |  | b) | Evaluate where C is the circle | CO1 | L4 | 7M | | **Unit-II** | | | | | | | 4 | a) | Expand in the region | CO2 | L3 | 7M | |  | b) | Determine the poles of and the residues at each pole. | CO2 | L3 | 7M | | **(OR)** | | | | | | | 5 | a) | Find the Laurent’s expansion of in the region | CO2 | L4 | 7M | |  | b) | Evaluate where C is using Residue theorem. | CO2 | L4 | 7M | | **P.T.O**  **20EC401/20EI401**  **Unit-III** | | | | | | | 6 | a) | Find the Fourier transform of and hence evaluate dx | CO3 | L4 | 7M | |  | b) | Find the Fourier cosine transform of | CO3 | L4 | 7M | | **(OR)** | | | | | | | 7 | a) | Find the Fourier cosine integral of the function | CO3 | L4 | 7M | |  | b) | Find the Fourier sine transform of | CO3 | L4 | 7M | | **Unit-IV** | | | | | | | 8 | a) | Solve in series | CO4 | L4 | 14M | | **(OR)** | | | | | | | 9 | a) | Prove that | CO4 | L5 | 7M | |  | b) | Prove that | CO4 | L5 | 7M | |  |
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