**18MA004**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **July, 2021** | **Common to ECE & EIE** | | |
| **Fourth Semester** | **Complex Variables & Special Functions** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | Write the real part of | CO1 | |  |
|  | b) | Determine the principle value of | CO1 | |  |
|  | c) | Check the analyticity of a function | CO1 | |  |
|  | d) | Write Maclaurin’s series expansion for a function | CO2 | |  |
|  | e) | State Cauchy Residue theorem | CO2 | |  |
|  | f) | Find the residue of at | CO2 | |  |
|  | g) | State Fourier integral theorem. | CO3 | |  |
|  | h) | Find the Fourier sine transform of | CO3 | |  |
|  | i) | What are the singular points of | CO4 | |  |
|  | j) | State orthogonality relation of Bessel’s functions. | CO4 | |  |
| **Unit - I** | | | | | |
| 2. | a) | Find all the roots of | CO1 | **5M** | |
|  | b) | Find the analytic function whose real part is | CO1 | **5M** | |
|  |  | **OR** |  |  | |
| 3. | a) | State and prove Cauchy’s integral Theorem. | CO1 | **5M** | |
|  | b) | Evaluate along the path | CO1 | **5M** | |
| **Unit - II** | | | | | |
| 4. | a) | Evaluate where is the circle . | CO2 | **5M** | |
|  | b) | Find the Laurent’s expansion of in the region | CO2 | **5M** | |
|  |  | **OR** |  |  | |
| 5. | a) | Expand in Taylor’s series expansion about the point | CO2 | **5M** | |
|  | b) | Evaluate | CO2 | **5M** | |
| **Unit - III** | | | | | |
| 6. | a) | Find Fourier transform of | CO3 | **5M** | |
|  | b) | Find the Fourier sine transform of | CO3 | **5M** | |
|  |  | **OR** |  |  | |
| 7. | a) | Express the function as a Fourier integral. Hence evaluate . | CO3 | **5M** | |
|  | b) | Find the Fourier cosine transform of | CO3 | **5M** | |
| **Unit - IV** | | | | | |
| 8. |  | Solve in series the equation | CO4 | **10M** | |
|  |  | **OR** |  |  | |
| 9. | a) | Prove that . | CO4 | **5M** | |
|  | b) | Show that | CO4 | **5M** | |

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