Pokhara University

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| Level: Bachelor | Semester – Fall | Year : 2012 |
| Programme: BE | | Full Marks: 100 |
| Course: Engineering Mathematics IV | | Pass Marks: 45 |
| Time : 3hrs. |

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| *Candidates are required to give their answers in their own words as far as practicable.* |
| *The figures in the margin indicate full marks.* |
| Attempt all the questions. |

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|  | 1. State Cauchy Riemann equations. Using these equations, show that the function is everywhere analytic. 2. Write the wave equation for vibrating circular membrane together with its initial and boundary conditions and solve it.   **OR**  State and prove Cauchy's integral theorem. | 8  7  7 |
|  | 1. Obtain the Fourier integral formula from the Fourier series assuming the required conditions.   **OR**  Show that:   1. Find the Fourier transform of | 8  7 |
|  | 1. State and prove first shifting theorem of Z – transform and hence find Z(cosat) and Z(sinat). 2. Solve the difference equation by using Z – transform   yn+2-4yn+1+4yn = 2n  where y0 = 0, y1 = 1 | 8  7 |
|  | 1. Derive the one dimensional wave equation 2. Find the temperature in a laterally insulated bar of length whose ends are kept at temperature 0, assuming that the initial temperature,is | 8  7 |
|  | 1. Solve the following linear programming problem by using simplex method.   Minimize z = 4x1+3x2 subjected to 2x1+3x2≥1, 3x1+x2≥4, x1≥0, x2≥0.   1. Using the method of separation of variable find the solution of the partial differential equation | 8  7 |
|  | 1. Find the tangent vector to the curve =2cost , 0). Also find the tangent at the given point. 2. Define Z- transform of a function f(t) and by using the definition find the Z- transform of (i) (ii) 3. Write a short note on Linear Programming. | 5  5  5 |
|  | Attempt all the questions:   1. Express f(z) = sinz in the form u + iv. 2. Evaluate  where c is the unit disk . 3. Show that , where stand for Fourier sine transform. 4. Find the parametric representation of the surface x2 + 4y2 = 9, z = 3. | 2.5×4 |