Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **12MA349** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DIFFERENCE EQUATIONS** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Find a solution for the equation | CO1 | 10 |
| b. | Find the equilibirium points and determine their stability for the equation | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Let  be an equilibirium point of the difference equation where f is contiuously differentiable at . Prove that  (i) if , then  is an asymptotically stable point  (ii) if , then  is not stable. | CO1 | 15 |
| b. | Show that | CO1 | 5 |
|  |  |  |  |  |
| 3. | a. | Show that the functions  form a fundamental set of solutions of the third order difference equation. | CO1 | 10 |
| b. | Solve the difference equation | CO1 | 10 |
| **(OR)** | | | | |
| 4. | a. | Prove that the conditions are necessary and sufficient for the equilibirium point of the equation | CO1 | 10 |
| b. | Determine the limiting behavior of solutions of the equation  if (i)  (ii) | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | Prove that a complex number  is a Floquet exponent of if and only if there is a nontrivial solution of the form where is a vector function with for all n. | CO1 | 10 |
| b. | Solve the system , where | CO1 | 10 |
| **(OR)** | | | | |
| 6. | a. | Calculate the solution of the difference system. , where | CO1 | 10 |
| b. | Evaluate  if | CO1 | 10 |
|  |  |  |  |  |
| 7. | a. | Suppose that  Prove that  for some null sequence v(n). | CO1 | 10 |
| b. | Investigate the asymptotic behavior of the solutions of the equation  where  and | CO1 | 10 |
| **(OR)** | | | | |
| 8. | a. | Find asymptotic estimates of fundamental solutions to the difference equation. | CO1 | 10 |
| b. | Show that (i)  (ii)  (iii) | CO1 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | State and prove Sturm Separation Theorem. | CO1 | 15 |
| b. | Find the nonoscillatory and oscillatory solutions of the difference equation . Prove that this equation is not self adjoint. | CO1 | 5 |