**Regulations:**

**A14**



**H.T No**

**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 4H314 Date: 18-Dec-2019 (FN)**

**B.Tech II-Year I-Semester External Examination, Dec-2019/Jan-2020 (Supplementary)**

**Mathematics for Biotechnology - III (BT)**

**Time: 3 Hours Max.Marks:70**

***Note: a****) No additional answer sheets will be provided.*

*b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.*

*c) Missing data can be assumed suitably.*

**Part - A Max.Marks:20**

**Answer all QUESTIONS.**

|  |  |  |
| --- | --- | --- |
| 1. | Find the rank of the matrix | [2M] |
| 2. | Determine  such that the rank of the matrix  is 3. | [2M] |
| 3. | Write any two properties of Eigen values. | [2M] |
| 4. | If *A* =  then find the Eigen values of. | [2M] |
| 5. | Evaluate? | [2M] |
|  |  |  |
| 6. | What are the interpolation formulae to be applied for given data with equal interval and for given data with unequal intervals formula? | [2M] |
| 7. | Write the normal equations to fit a parabola | [2M] |
| 8. | Using Picard’s method of successive approximation obtain a solution upto 2nd approximation of the equation  and y(0)=1 | [2M] |
| 9. | State the Trapezoidal rule of integration. | [2M] |
| 10. | Find  taking | [2M] |

**Part – B Max.Marks:50**

**ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.**

|  |  |  |  |
| --- | --- | --- | --- |
| 11. | a) | Reduce the matrix  to echelon form and hence find its ran | [5M] |
|  | b) | Solve | [5M] |
|  |  |  |  |
| 12. |  | Verify Cayley – Hamilton theorem for  and hence find .  Also find the matrix. | [10M] |
|  |  |  |  |
| 13. | a) | From the difference table for the following data and using it find f(0.5) and f(3.5) using proper interpolation formula     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 0 | 1 | 2 | 3 | 4 | | f(x) | 5 | 3 | 7 | 23 | 57 | | [5M] |
|  | b) | With usual notations show that (i)  (ii) | [5M] |
|  |  |  |  |
| 14. |  | Find the values of  so that  is the best fit to the following data and also estimate .   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 2 | 3 | 4 | |  | 1.7 | 1.8 | 2.3 | 3.2 | | [10M] |
|  |  |  |  |
| 15. | a) | Find the real root of  by the method of false position. | [5M] |
|  | b) | Find  using Newton’s method. | [5M] |
|  |  |  |  |
| 16. | a) | Evaluate dx using (i) Simpson’s  rd rule taking h=(ii) Simpson’s th rule taking h= | [5M] |
|  | b) | Fit a curve of the form  to the data given below.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 12 | 14 | 18 | 19 | |  | 123 | 145 | 160 | 246 | | [5M] |
|  |  |  |  |
| 17. |  | Apply Runge Kutta Method to an approximate value of  for  in steps of 0.1 if, given  when. | [10M] |
|  |  |  |  |
| 18. |  | Solve the initial value problem with step length 0**.2** using Taylor series method of order four. | [10M] |

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