**H.T No**

**Regulations:**

**A18**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 7HC07 Date: 05-Oct-2020 (FN)**

**B.Tech I-Year I-Semester External Examination, October - 2020 (Supplementary)**

**MATHEMATICS - I (CSE, IT and ECM)**

**Time: 2 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.*

**ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 14 MARKS.**

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| 1. | a) | Verify Cauchy’s mean value theorem for the following functions  f(x)= and g(x)=  in [a,b]. | [7M] |
|  | b) | Verify Rolle’s theorem for the function in the interval | [7M] |
|  |  |  |  |
| 2. | a) | Show that the evolute of the cycloid x =a(  y = a(1- cos) is another cycloid. | [7M] |
|  | b) | Show that  = | [7M] |
|  |  |  |  |
| 3. | a) | Solve the equations λx –y -2z -1; 4x +2λy –z -2 =0 ; 6x +6y +λz -3 =0 considering specially the case when λ =2 | [7M] |
|  | b) | Find the rank of the matrix A = by reducing into Echelon form. | [7M] |
|  |  |  |  |
| 4. | a) | Prove that the matrix  satisfies Cayley HamiltonTheorem. | [7M] |
|  | b) | Show that A = is Skew- Hermitian and unitary. Find the Eigen values and Eigen vectors. | [7M] |
|  |  |  |  |
| 5. | a) | Show that intersection of two subspaces of a vector space V  Is a subspace of V | [7M] |
|  | b) | Show that the map T: , T(x, y, z) = (x – y, x + y) is linear. | [7M] |
|  |  |  |  |
| 6. | a) | Verify the set {(1,1,1,),(1,2,-3),(1,-4,3)} is orthogonal or not. | [7M] |
|  | b) | Explain the Gram Schmidt orthogonalization process. | [7M] |
|  |  |  |  |
| 7. | a) | Verify the Lagrange’s Mean Value theorem for the function in [-1,1]. | [7M] |
|  | b) | Show that BTAB is Symmetric or skew-symmetric according as A is Symmetric or Skew-Symmetric. | [7M] |
|  |  |  |  |
| 8. | a) | Diagonalize the matrix. | [7M] |
|  | b) | Find the R(T) ,N(T) for the map T: , T(x, y, z) = (x, y, 0) | [7M] |

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