**Regulations:**

**A15**



**H.T No**

**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 5H111 Date: 07-Jan-2020 (FN)**

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

**ENGINEERING MATHEMATICS-I (Common to All Except BT)**

**Time: 3 Hours Max.Marks:75**

***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:25**

**Answer all QUESTIONS.**

|  |  |  |
| --- | --- | --- |
| 1. | State Lagrange’s mean value theorem. | [3M] |
| 2. | Test for Exactness for differential equation. | [3M] |
| 3. | Find Particular integral for differential equation . | [3M] |
| 4. | Write the polar coordinate form for the integral | [3M] |
| 5. | An electrostatic potential is given by, then find | [3M] |
| 6. | State Gauss-Divergence theorem. | [2M] |
| 7. | If x = u(1-v), y = uv , then find J(x,y)? | [2M] |
| 8. | Evaluate | [2M] |
| 9. | Find the work done in moving a particle in the force field along the line from (0,0,0) to (2,1,3). | [2M] |
| 10. | Solve (D2 +4D+3) y = 0. | [2M] |

**Part – B Max.Marks:50**

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

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| 11. | a) | Prove that the relations u = x+y+z, v = xy+yz+zx and w = x2 + y2 + z2 are functionally dependent and find their relation between them. | [5M] |
|  | b) | Prove that if 0<a<b<1, then . | [5M] |
|  |  |  |  |
| 12. | a) | Solve :*( x2y2 + x y + 1) y dx + (x2 y2 + xy + 1) x dy = 0.* | [5M] |
|  | b) | A bacterial culture growing exponentially increases from 200 to 500 g in the period from 6a.m. to 9 a.m. How many grams will be present at noon? | [5M] |
|  |  |  |  |
| 13. | a) | Solve: (D2 + 1) y = cot x by the method of variation of parameters? | [5M] |
|  | b) | Solve: (D3-6D2+11D-6) y = e-2x. | [5M] |
|  |  |  |  |
| 14. | a) | By change of order of integration, Evaluate | [5M] |
|  | b) | Evaluate  over the volume bounded by the surfaces x2+ y2 = a2,  x2+ y2 = z2 and z =0 . | [5M] |
|  |  |  |  |
| 15. | a) | Find the directional derivative of the scalar point function at the  point A(1,2,3) in the direction of the line AB where B = (5,0,4). | [5M] |
|  | b) | Show that the vector field is  irrotational. Find its scalar potential function. | [5M] |
|  |  |  |  |
| 16. | a) | Find the circulation of  if , round the curve C where C is the circle x2+y2 = 1, z = 0. | [5M] |
|  | b) | Using Green’s theorem, Evaluate where C is the closed curve of the region bounded by y = x2 and x = y2. | [5M] |
|  |  |  |  |
| 17. | a) | Find the minimum value of *x2 + y2 + z2* given that *ax + by + cz = p.* | [5M] |
|  | b) | Solve: *xy (1 + xy2) dy/dx = 1.* | [5M] |
|  |  |  |  |
| 18. | a) | Show that, where is a constant vector. | [5M] |
|  | b) | By transforming the triple integral, evaluate  where  S is the closed surface consisting of the cylinder *x2 +y2 = a2* and circular discs *z = 0*  to *z = b*. | [5M] |

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