Question Paper Code: 92003

B.E./B.Tech. DEGREE EXAMINATION, AUGUST 2021

Second Semester

19UMA203- Statistical Methods

Common to Computer Science Engineering & Information technology

(Regulation 2019)

Duration: 1.45 hrs   Maximum: 50 Marks

PART A   (Answer Any Ten)   10*2 = 20 Marks

1. Calculate Particular integral of $(D^2 + 4D + 8)y = e^{2x}$ CO1 – App

2. Solve $\dfrac{1}{D^2}(\cos x)$ CO1 – App

3. Solve Complementary function of $(x^2 D^2 - 3xD - 5)y = 0$ CO1 – App

4. Evaluate $\nabla\left(\dfrac{1}{r}\right)$ CO2 – App

5. Calculate unit normal vector to the surface $x^2 + xy + y^2 + xyz$ at $(1, -2, 1)$ CO2 – App

6. Prove that the vector $\vec{F} = z\vec{i} + x\vec{j} + y\vec{k}$ is solenoidal   CO2 – App

7. Calculate the conjugate harmonic of $u = x^2 - y^2$ CO3 –App

8. Find the fixed point of the mapping $f(z) = \dfrac{z}{z - 2}$ CO3 –App

9. Calculate the critical points of the transformation $w = z + \dfrac{1}{z}$ CO3 –App

10. Calculate the residue of $f(z) = \dfrac{e^{2z}}{z + 1}$ as its pole   CO4 – App

11. Find the pole of $f(z) = \dfrac{\cos 2z}{(z^2 + 1)^2 (z^2 + 16)^2}$ CO4 – App

12. Define Removable singularity   CO6 – App

13. Classify $4u_{xx} + 4u_{xy} + u_{yy} - 6u_x - 8u_y - 16u = 0$ CO6 – App

14   Find the partial differential equation by eliminating the arbitrary function from   CO6 – App
z = f(my-lx)

15   Write the three Possible solutions of the one dimensional wave equations   CO6 – App

PART B (Answer Any Three) $3*10 = 30$ Marks

16.   A colony of bacteria is growing an exponentially. At time t=0 it has 10   CO1App   (10)
bacteria in it and at time t=4 it has 2000. At what time it have 1,00,000
bacteria?

17   Verify Divergence theorem for $\vec{F} = (x^2 - yz)\vec{i} + (y^2 - xz)\vec{j} + (z^2 - xy)\vec{k}$ over the   CO2-App   (10)
rectangular parallelepiped $x = 0$, $x = 1$, $y = 0$, $y = 2$, $z = 0$, $z = 3$.

18   Find the image of $|z - 3i| = 3$ under the transformation $w = \dfrac{1}{z}$ CO3- App   (10)

19   Evaluate $f(z) = \displaystyle\int_C \dfrac{\cos \pi z^2 + \sin \pi z^2}{(z+1)(z+2)} dz$ by using Cauchy's Integral formula   CO4- App   (10)

where C is $|z| = 3$

20   Solve $(mz - ny)p + (nx - lz)q = ly - mx$ CO5- App   (10)