

2019
2nd Sem
B.Tech.

Enroll No.....

Roll No.....

JAMIA HAMDARD
B.Tech Food Technology
Department of Food & Technology (SIST)

Even Semester Examination-2019

Paper Name: Mathematics-II

Paper Code: BFTC-202

Time: 3 Hours

Maximum Marks: 70

Note: Mobile Phones or programmable calculator or any equipment with memory are not allowed inside the examination hall. Follow proper numbering for answering the questions.

Attempt all questions from section A (6*5=30), Any four questions from section B (4*10=40).

Section-A (Attempt all questions 6*5)

Question 1. Evaluate $\int x^2 e^x dx$.

Question 2. If vector $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then show that $\nabla r^n = nr^{n-2} \cdot \vec{r}$.

Question 3. Solve the differential equation by variables separable method $\frac{dy}{dx} = \cos(x+y)$.

Question 4. Find the locus of P when $\left| \frac{z-2}{z+3} \right| = 5$, where P is the point represented by complex number z.

Question 5. Define Mean, Median and Mode with suitable example.

Question 6. If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, show that $\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z} \right)^2 u = -\frac{9}{(x+y+z)^2}$.

Section- B (Attempt any four questions 4*10)

Question 1. Evaluate $\int \frac{x^3 - 6x^2 + 10x - 2}{x^2 - 5x + 6} dx$.

Question 2. Find the value of a, b, c for which the vector $\vec{V} = (x+y+az)\hat{i} + (bx+3y-z)\hat{j} + (3x+cy+z)\hat{k}$ is irrotational.

Question 3. Solve the homogeneous equations $\frac{dy}{dx} = \frac{y^2}{xy - x^2}$

Question 4. Solve the Bernoulli differential equation: $x^2 dy + y(x+y) dx = 0$

Question 5. If $z = f(x, y)$ is homogeneous function of x and y of degree n, then

$$x^2 \frac{\partial^2 z}{\partial x^2} + 2xy \frac{\partial^2 z}{\partial x \partial y} + y^2 \frac{\partial^2 z}{\partial y^2} = n(n-1)z.$$

Question 6. Find the square root of i (Iota).