SEMESTER-IV HONOURS PRACTICAL EXAMINATION,2021

FULL MARKS : 30 **PAPER : CC 8** **TIME : 2Hrs**

ANSWER *ANY FIVE* OF THE FOLLOWING QUESTIONS.

1. Define improper integral with two examples . 5

2. Consider the following integral

$$\frac{1}{\sigma\sqrt{2\pi}}\int_{-\infty}^{\infty} exp\left(-(x-\mu)^2/(2\sigma^2)\right) dx$$

Calculate the integral for $\mu, \sigma = 5.0, 1.0$ using quad module in python and calculate the same using a) $\mu, \sigma = 5.0, 0.005$ and

b) $\mu, \sigma = 5.0, 0.001$ and explain the cause of discrepancy in result graphically 5

3. What is the technique to find out solution of the above integral for very small σ 5

4. Write a python code to verify the following integral

$$\int_{-\infty}^{\infty} \delta(x-a)g(x)dx = g(a)$$

With $g(x) = x^2 + 5 \quad and \quad a = 2$ 5

5. An one dimensional metallic rod of length 1 unit is maintained at 0° celcius at both ends and initially the temperature of the middle point of the rod is 50° celcius . Identify boundary conditions and initial conditions of this problem and write a python code to find out the temperature distribution along the rod after t = 500 units

Use the following partial differential equation to solve the problem.

$$\frac{\partial u}{\partial t} = D^2 \frac{\partial^2 u}{\partial x^2}$$

Where the symbols have their usual meaning. 5

6.) $p'_{n+1}(x) - xp'_n(x) = (n+1)p_n(x)$

Write a python to verify the above relation graphically.
Symbols have their usual meaning 5