Odd Semester Examination, 2021

Sem-5   PHSA   Paper : CC-12-P

Full Marks : 30   Time : 2 hours

Answer all questions.

1. (a) What is meant by linear correlation between two variables x and y? Given a set of n pairs of samples $x = \{x_1, x_2, \cdots x_n\}$ and $y = \{y_1, y_2, \cdots y_n\}$, how is it possible to measure the linear correlation between x and y ?   1+2

   (b) Write down and explain the output of the following script   1+2

   ```
   import random
   for i in range(5):
       x=random.random()
       print x
   print x
   ```

2. (a) What is autocorrelation of a variable x ?   2

   (b) Explain the working of the following script and its output.   2+2

   ```
   import random
   i=0
   while i<10:
       x=random.randint(2,8)
   print x
   ```

3. (a) Briefly explain why is a random number generated by a computer is said to be a pseudo random number.   2

   (b) Write a python script that
       i. creates a list of floats from 0 to 49.   1
       ii. randomly selects twenty five of the numbers.   2
       iii. returnss a list of the selected numbers.   1

4. (a) What is a random sequence ? Under what condition a random sequence is uniform one ?   1 + 2

   (b) A particle is allowed to take discrete steps at random in the vertical direction. Briefly explain how to simulate the motion of the particle.   3

5. (a) A coin is tossed 1000 times. Briefly explain how to simulate the process.   2

   (b) Write a python function that realizes the tossing of a coin 100 times and simulates the process.   2 + 2