Level: 1st year | Matter: **Scientific Computing with Python** | Duration: 1h30

Final Exam

Solutions :

Part I: Multiple Choice Questions (7.5 pts -- 0.5 each)

Q1- B

Q2 - A

Q3 - B

Q4 - D

Q5 - C

Q6 - B

Q7 - C

Q8 - B

Q9 - B

Q10 - B

Q11 - D

Q12 – B C

Q13 - B

Q14 - C

Q15 – A C

Part 2 : Exercises *(10 points — 5 points each)*

Exercise 1:

```
# Function to calculate the area of a rectangle
def rectangle_area(length, width):
    return length * width

# Function to calculate the perimeter of a rectangle
def rectangle_perimeter(length, width):
    return 2 * (length + width)

# Call the functions
length = 8
width = 5

area = rectangle_area(length, width)
perimeter = rectangle_perimeter(length, width)

# Display the results
print("Area of the rectangle:", area)
print("Perimeter of the rectangle:", perimeter)
```

Exercise 2 :

```
import numpy as np
import matplotlib.pyplot as plt

# Create x values from -5 to 5
x = np.arange(-5, 6, 1)

# Compute f(x) = x^2
y = x**2

# Plot the function
plt.plot(x, y)

# Add title and labels
plt.title("Quadratic Function")
plt.xlabel("x")
plt.ylabel("f(x) = x^2")

# Display the grid
plt.grid(True)

# Show the plot
plt.show()
```

Exercise 3:

```
# Multiplication table program

# Ask the user to enter a number
num = int(input("Enter a number: "))

# Display multiplication table from 1 to 10
print(f"\nMultiplication table of {num}:\n")

for i in range(1, 11):
    print(f"{num} x {i} = {num * i}")
```

Exercise 4:

```
# Initialize variables
total = 0
numbers = []

# Keep asking the user for positive numbers
while total < 100:
num = float(input("Enter a positive number: "))

if num > 0:
numbers.append(num)
total += num
print("Current sum:", total)
else:
print("Please enter a positive number.")

# Display the result
print("\nThe sum has reached or exceeded 100.")
print("Numbers entered:", numbers)
print("Final sum:", total)
```

Exercise 5:

```
# Create the list
grades = [14, 8, 17, 11, 9, 16, 13, 5, 18, 12]

# Display the required elements
print("First element:", grades[0])
print("Last element:", grades[-1])
print("Third element from the end:", grades[-3])
```