```python
import random

def fitness_function(x):
    return -x ** 2

class Particle:
    def __init__(self, min_x, max_x):
        self.position = random.uniform(min_x, max_x)
        self.velocity = random.uniform(-1, 1)
        self.best_position = self.position
        self.best_fitness = fitness_function(self.position)

    def update_velocity(self, global_best_position, inertia, cognitive, social):
        r1, r2 = random.random(), random.random()
        cognitive_velocity = cognitive * r1 * (self.best_position - self.position)
        social_velocity = social * r2 * (global_best_position - self.position)
        self.velocity = inertia * self.velocity + cognitive_velocity + social_velocity

    def update_position(self, min_x, max_x):
        self.position += self.velocity
        self.position = max(min(self.position, max_x), min_x)
        fitness = fitness_function(self.position)
        if fitness > self.best_fitness:
            self.best_position = self.position
            self.best_fitness = fitness

def particle_swarm_optimization(pop_size, min_x, max_x, inertia, cognitive, social, iterations):
    swarm = [Particle(min_x, max_x) for _ in range(pop_size)]
    global_best_position = max(swarm, key=lambda p: p.best_fitness).best_position

    for iteration in range(iterations):
        for particle in swarm:
            particle.update_velocity(global_best_position, inertia, cognitive, social)
            particle.update_position(min_x, max_x)
            if fitness_function(particle.position) > fitness_function(global_best_position):
                global_best_position = particle.position

        print(f"Iteration {iteration + 1}: Global best = {global_best_position}, Fitness = {fitness_function(global_best_position)}")

    return global_best_position

print("StudentName: Adikar Charvi Sree Teja")
print("USN: 1BM22CS012")

population_size = 30
min_value = -10
max_value = 10
inertia_weight = 0.5
cognitive_constant = 1.5
social_constant = 1.5
num_iterations = 5

best_solution = particle_swarm_optimization(population_size, min_value, max_value, inertia_weight, cognitive_constant, social_constant, n
print(f"Best solution found: {best_solution}, Fitness: {fitness_function(best_solution)}")
```

```
StudentName: Adikar Charvi Sree Teja
USN: 1BM22CS012
Iteration 1: Global best = -0.09161579274465215, Fitness = -0.008393453480231057
Iteration 2: Global best = -0.07518326069626954, Fitness = -0.005652522688923285
Iteration 3: Global best = -0.02056424674010071, Fitness = -0.0004228882439877427
Iteration 4: Global best = -0.001056043358084846, Fitness = -1.1152275741551184e-06
Iteration 5: Global best = -0.001056043358084846, Fitness = -1.1152275741551184e-06
Best solution found: -0.001056043358084846, Fitness: -1.1152275741551184e-06
```