

1.A)

Code:

```
import random
class Environment:
    def __init__(self):
        self.state=0
    def reset(self):
        self.state=0
        return self.state
    def step(self,action):
        self.state += action
        if self.state==5:
            reward=10
            done=True
        else:
            reward=0
            done=False
        return self.state, reward, done
    class Agent:
        def __init__(self):
            self.actions=[-1,+1]
        def select_action(self):
            return random.choice(self.actions)

env= Environment()
agent= Agent()
state=
env.reset()
done=
False
step_count= 0

print("starting episodes...")
while not done:
    action= agent.select_action()
    next_state,
    reward, done = env.step(action)
    print(f"Step{step_count}:State{state},Action{action},Next
State{next_state}, Reward{reward}")
    state= next_state
    step_count +=1
    print("episode finished")
```

output:

```
starting episodes...
```

```
Step0:State0,Action1,Next State1, Reward0
Step1:State1,Action1,Next State2, Reward0
Step2:State2,Action1,Next State3, Reward0
Step3:State3,Action1,Next State4, Reward0
Step4:State4,Action1,Next State5, Reward10
episode finished
```

1.B)

CODE:

```
import random as rn

class Environment:
    def __init__(self):
        self.state = 0

    def reset(self):
        self.state = 0
        return self.state

    def step(self, action):
        self.state += action
        if self.state == 10:
            reward = 20
            done = True
        elif self.state == 5:
            reward = -5
            done = False
        else:
            reward = 0
            done = False
        return self.state, reward, done

class Agent:
    def __init__(self):
        self.action = [-1, 1]

    def select_action(self):
        return rn.choice(self.action)

env = Environment()
agent = Agent()

state = env.reset()
done = False
step_count = 0
```

```

print("Starting Episode...")

while not done:
    action = agent.select_action()
    next_state, reward, done =
env.step(action)
    print(f"Step {step_count} State:
{state}, Reward: {reward}, Done: {done}")
    state = next_state
    step_count += 1

print("Episode Finished!")

```

Starting Episode...

Step 0 State: 0, Reward: 0, Done: False
Step 1 State: -1, Reward: 0, Done: False
Step 2 State: 0, Reward: 0, Done: False
Step 3 State: -1, Reward: 0, Done: False
Step 4 State: -2, Reward: 0, Done: False
Step 5 State: -1, Reward: 0, Done: False
Step 6 State: -2, Reward: 0, Done: False
Step 7 State: -3, Reward: 0, Done: False
Step 8 State: -4, Reward: 0, Done: False
Step 9 State: -5, Reward: 0, Done: False
Step 10 State: -6, Reward: 0, Done: False
Step 11 State: -7, Reward: 0, Done: False
Step 12 State: -6, Reward: 0, Done: False
Step 13 State: -7, Reward: 0, Done: False
Step 14 State: -8, Reward: 0, Done: False
Step 15 State: -7, Reward: 0, Done: False
Step 16 State: -8, Reward: 0, Done: False
Step 17 State: -7, Reward: 0, Done: False
Step 18 State: -6, Reward: 0, Done: False
Step 19 State: -5, Reward: 0, Done: False
Step 20 State: -6, Reward: 0, Done: False
Step 21 State: -5, Reward: 0, Done: False
Step 22 State: -4, Reward: 0, Done: False
Step 23 State: -5, Reward: 0, Done: False
Step 24 State: -4, Reward: 0, Done: False
Step 25 State: -5, Reward: 0, Done: False
Step 26 State: -4, Reward: 0, Done: False
Step 27 State: -3, Reward: 0, Done: False
Step 28 State: -4, Reward: 0, Done: False
Step 29 State: -3, Reward: 0, Done: False
Step 30 State: -4, Reward: 0, Done: False
Step 31 State: -5, Reward: 0, Done: False
Step 32 State: -4, Reward: 0, Done: False
Step 33 State: -5, Reward: 0, Done: False
Step 34 State: -4, Reward: 0, Done: False
Step 35 State: -3, Reward: 0, Done: False
Step 36 State: -2, Reward: 0, Done: False
Step 37 State: -1, Reward: 0, Done: False

```
Step 38 State: 0, Reward: 0, Done: False
Step 39 State: 1, Reward: 0, Done: False
Step 40 State: 2, Reward: 0, Done: False
Step 41 State: 3, Reward: 0, Done: False
Step 42 State: 2, Reward: 0, Done: False
Step 43 State: 3, Reward: 0, Done: False
Step 44 State: 4, Reward: -5, Done: False
Step 45 State: 5, Reward: 0, Done: False
Step 46 State: 6, Reward: 0, Done: False
Step 47 State: 7, Reward: 0, Done: False
Step 48 State: 8, Reward: 0, Done: False
Step 49 State: 7, Reward: 0, Done: False
Step 50 State: 8, Reward: 0, Done: False
Step 51 State: 9, Reward: 20, Done: True
Episode Finished!
```