```
#%%
import numpy as np

def y(X):
    if X == 1:
        return -1
    elif X == 2:
        return 0
    elif X == 3:
        return 1

def mc_integral(T, num_samples):
    pi = np.array([1/3, 1/3, 1/3]) # stationary distribution
    X_t = np.random.choice(3, num_samples, p=pi)+1 # initialize X_t
with stationary distribution
    integral_sum = 0
    for t in range(num_samples):
        X_tau = np.random.choice(3, num_samples, p=pi)+1 # sample
X_tau from stationary distribution
        integral_sum += y(X_t[t]) * y(X_tau[t])
    return integral_sum / num_samples

T = 10000
num_samples = 10000
result = mc_integral(T, num_samples)
print("The Monte Carlo estimate of the integral is:", result)

# %%
```