Started on	Tuesday, 29 March 2022, 11:41 AM
State	Finished
Completed on	Tuesday, 29 March 2022, 11:46 AM
Time taken	5 mins 3 secs

Question 1

Complete

Marked out of 6.00

A continuous Markov chain with states {1, 2, 3 } has the generator matrix

Q=

	1	2	3
1	-1	1	0
2	1	-2	1
3	2	2	-4

Find (i) tpm of the embedded Markov chain (ii) Average holding time in each state.

Match the values accordingly

The holding time parameter for state 3 — 4

Elements of tpm of the embedded Markov chain p(3, 3) — 0

Elements of tpm of the embedded Markov chain p(2,3) — 0.5

The holding time parameter for state 1 — 1

The holding time parameter for state 2 — 2

Elements of tpm of the embedded Markov chain p(1,2) — 1

Question 2

Complete

Marked out of 2.00

Cars arrive at toll booth according to Poisson process at the rare of two cars per minute. The time taken by the attendant to collect the toll is exponentially distributed with mean 20 seconds. Find the long run (i) average number of cars in line at tool booth i.e. in the system (ii) probability of more than three cars at the toll booth i.e. in the system.

Select the correct option given in pairs for (i, ii)

Select one:

- a. (2, 0.2962)
- b. (1.33, 0.44)
- c. (1.33, 0.44)
- d. (3, 0.2962)

Question 3

Complete

Marked out of 2.00

A continuous Markov chain with states {1, 2, 3 } has the generator matrix

Q=

	1	2	3
1	-4	4	0
2	1	-7	6
3	6	2	-8

Find the stationary distribution.

π_1 = 0.44

$\pi 2$ = 0.32

Question 4

Complete

Marked out of 2.00

Suppose that the arrival pattern for a renewal process is Poisson with mean 3. Let S_5 denote the waiting time for the 5th renewal.Then

- $E(S_5)$ 5/3
- which distribution S_5 follows Gamma

Question 5

Complete

Marked out of 2.00

If the mean-value function of the renewal process {N(t), t ≥ 0} is given by m(t)=t/4, t ≥0, then P(N(2)=0) =

Select one:

- a. 0.7065
- b. 0.7665
- c. 0.9871
- d. 0.3935
- e. 0.3081
- f. 0.6065
- g. 0.0003
- h. 0.6665
- i. 0.7649

Question 6

Complete

Marked out of 2.00

Consider the pseudo random number (PRN) generator $X_i=(4X_{i-1}+1) \bmod 8$, with seed $X_0=0$. Then PRN U_3 is

(write answer upto three decimal places)

Answer: 0.625

Question 7

Complete

Marked out of 2.00

Suppose that {Y(t), t ≥ 0}, is a Geometric Brownian motion (GBM) with drift parameter μ = 0.02 and volatility parameter σ = 0.2.

If E(Y (0)) = 100, then E[Y (10)] is

(write answer upto three decimal places)

Answer: 149.182

Question 8

Complete

Marked out of 2.00

In a branching process, an individual has no descendants(in the next generation) with probability 1/3, 1 descendant with probability 1/3 and 3 descendants with probability 1/3. The process starts with a single individual at generation 0. Compute the expected population size of the third generation.

(write answer upto three decimal places)

Answer: 2.370

GET IN TOUCH WITH US

Address : Ground floor of Kalidas Auditorium, IIT Khargpur 721302

Email : moodle.helpdeskiitkgp@gmail.com

Desk Phone : +91 (03222) 281 070/072

MOODLE WEBSITE OF IIT KGP

Moodle is a highly flexible open-source learning platform, with complete, customization and secure learning management features to create a private website filled with dynamic courses that extend e-learning education anytime, anywhere.