

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
07 THRISSUR CLUSTER
SEMESTER M.TECH DEGREE EXAMINATION , DECEMBER 2017
ELECTRONICS AND COMMUNICATION ENGINEERING
07EC 6219 MODELLING AND QUEUEING THEORY

Time :3 hours.

Max marks :60

Answer all six questions Part 'a' of each question is compulsory
Answer either part 'b' or part 'c' of each question

MODULE 1

1.a .Is it true for renewal process that

i) $N(t) < n$ if and only if $S_n > t$.

ii) $N(t) > n$ if and only if $S_n < t$.

(4 marks)

Answer b OR c

b. Write a short note on Poisson Processes.

(5 marks)

c. Write a short note on Regenerative Processes.

(5 marks)

MODULE 2

2. a. The probability that it rains tomorrow if today is rainy is 0.4 and the probability that it rains tomorrow if today is sunny is 0.6. If May 1st is sunny find the probability that May 3rd is sunny but May 5th is rainy.

(4 marks)

Answer b OR c

b. Find $\lim_{n \rightarrow \infty} P^n$ if $P = \begin{bmatrix} a & 1-a \\ b & 1-b \end{bmatrix}$

(5 marks)

c. Prove that in a Markov chain, if i communicates with j and j communicates with k, then i communicates with k.

(5 marks)

MODULE 3

3.a. Write a short note on Birth-Death Processes.

(4marks)

Answer b OR c

b. Find the distribution of time T that the number of occurrences in a Poisson Process exceeds n.

(5marks)

c. Define Semi Markov Process and embedded Markov Chain.

(5 marks)

MODULE 4

4. Write the infinitesimal generator of M/M/1 Queue.

(4 marks)

Answer b OR c

b. Write a short note on M/G/1 Queue.

(5 marks)

c. A Queue with infinite servers is always stable. Prove or disprove.

(5 marks)

(PTO)

MODULE 5

5. a. Write a short note on Erlang service time distributions. (5 marks)

Answer b OR c

- b. Find the steady state distribution of an open network. (7 marks)
- c. Find the stability condition for a two priority queuing system with priority arrivals according to Poisson rates λ_1 and λ_2 , where λ_1 is the high priority rate and service at exponential rate μ . (7 marks)

MODULE 6

6. a. Find the average waiting time in an M/M/1 Queue. (5 marks)

Answer b OR c

- b. Find the blocking probability in a two node open network. (7 marks)
- c. Find the stability condition for an M/M/1 Queue that is fed by another M/M/1 Queue. (7 marks)