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Roll No.: _____

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- May 2018

M.Tech II Semester

COURSE CODE: 11M1WCI432 MAX. MARKS: 35

COURSE NAME: Performance Evaluation of Networks

COURSE CREDITS: 3 MAX. TIME: 2 Hrs

Note: All questions are compulsory and carrying equal marks. Carrying of mobile phone during examinations will be treated as case of unfair means.

Que.1: ***[CO5; CO6; 8 Marks]*** Consider an M/M/1 queueing system with arrival rate λ and service rate μ .

a) Derive the formula for the average number of customers in the system

$$N = \frac{\rho}{1-\rho}$$

b) Find the average waiting time W if the service rate is μ = 12 customers per minute and the average number of customers is N =5.

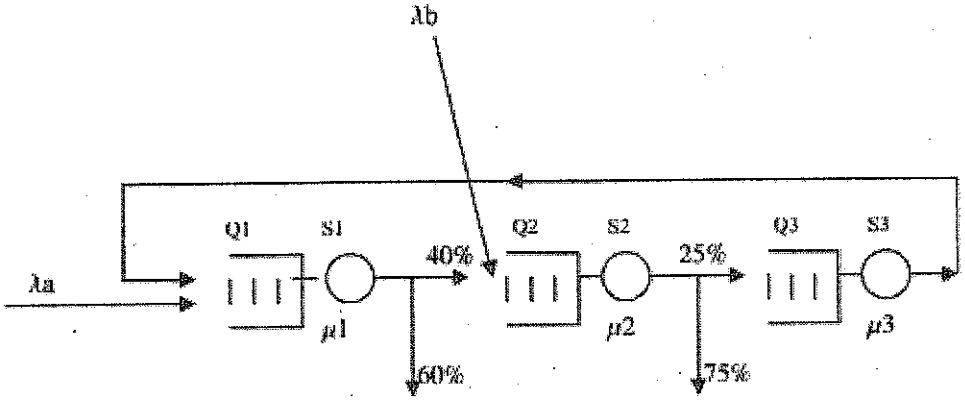

Figure-1

Que.2: ***[CO5; CO6; 8 Marks]*** We consider a queueing net with three M/M/1 queues as shown in Figure 1. Three servers S1, S2 and S3 work with service rates m1 =90 programs /min, m2 =72 programs/min, respective m3 =27 programs /min. New programs (customers) arrive at the servers S1 and S2, as Poisson processes of rates λa = 36 and λb = 18 programs per minute. A program that comes to S1 spends an exponentially distributed service time in the server S1. At the end of service time, the program execution is complete (and the program leave the system)

with the probability of 60% or it requires additional service from the second server (marked S2 in Figure-1) with probability of 40 %. After the service in the second server the job (programs arrived from S1and from the λb) is finished with the probability of 75% or it enter the third server with probability of 25 % and thereafter it goes back to the server S1. We assume that each queue behaves as an M/M/1 system.

a) Find the average number of the programs in the queueing net (N=N1+N2+N3).

Que.3: (A) ***[CO7; CO8; 2.5 Marks]*** What is hidden station problem and exposed station problem in wireless networks?

(B) ***[CO7; CO8; 2.5 Marks]*** Explain CSMA/CA with details. How it is different from CSMA/CD?

Que.4: (A) ***[CO9; 3 Marks]*** Provide the Types of Monitoring Tools. Also give one example of each type with description.

(B) ***[CO9; 3 Marks]*** What are the possible Comparison metrics for Performance Monitoring Tool? Show some sample possible values of each metrics.

Que.4: ***[CO1; CO2; 8 Marks]*** Explain the following Terms-

A. Stream Cipher
B. Asymmetric Encryption
C. Active Monitoring
D. Self Configuring Network Monitor