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FACULTY OF ENGINEERING & TECHNOLOGY

M.E.(CSE/SE) Examination – DEC – 2014

Computer Network Protocol Design (Revised)

[Time: Three Hours] **[Max. Marks: 80]**

"Please check whether you have got the right question paper."

N.B
1) Solve any two questions from each section.
2) Assume suitable data wherever required.
3) Use of calculator is allowed.
4) Be specific to every answer.

SECTION A

Q.1 A) Write kindle's notation for following queries. 08
i) $M^m|M|'|B$ ii) $M^m|m^m|J|B$ iii) $M|M|I$ iv) $M|M|I|B$
Also write example of each.

B) Draw the state transition diagram for discrete time $M|M|I$ queue also write the transition matrix. 08

C) Write any four properties of Markova matrix. 04

Q.2 A) What is reducible Markov chain? Explain closed and transient state and transition matrix of reducible Markov chain. 08

B) Probability density function is used to predict the life computer node in hours in a computer network is given by 08

$$f(x) = \begin{cases} \frac{100}{x^2} & for\ x \geq 100 \\ 0 & for\ x < 100 \end{cases}$$

Find i) the distribution function ii) Find probability that a node will last for 150 hours.

C) What is hold time in Markov chain? How it is decided in discrete time Markov chain and continuous time Markov chain? 04

Q.3 A) Find Eigen value λ and vector v such that AV = λV where 08

$$A = \begin{bmatrix} 3/2 & 1/2 \\ 1/2 & 3/2 \end{bmatrix}$$

B) Model the $M^m|M|I|B$ queue also write transition matrix of the same 08

C) What is ergodic process & stationary process describe in brief. 04

SECTION B

Q.4 A) Describe max-min fairness scheduling algorithm. 08

B) Assume an outgoing line is being shared among 5 channels. The system parameters (in units of mbps) are as follows. 08
C =155
$\lambda_1 = 10$
$\lambda_2 = 20$
$\lambda_3 = 60$
$\lambda_4 = 80$
$\lambda_5 = 80$
Find the rate assigned to each flow according to max min algorithm.

C) What is difference between weighted round robin and Round robin scheduler? 04

Q.5 A) Derive average duration of the active period, silent period and average data rate of on off model. 08

B) What is Markov modulated poission process? Also explain auto regressive models in computer network traffic. 08

C) What is flow traffic model? Also explain modulated Poission's process in brief. 04

Q.6 A) Model the token Bucket algorithm 08

B) Model the Go back N ARQ protocol. 08

C) Describe in brief stop and wait ARQ protocol working 04

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