Seat No_____

GANPAT UNIVERSITY
M.Tech. Semester I (CE) Examination
December-2014
3CE101: Advanced Topics in Networks

Max Time : 3 Hour] **[Total Marks : 60**

Instructions:
1. All questions are compulsory
2. Figures to the right indicate full marks.
3. Answer Both Sections in Separate Answer sheets.

SECTION-I

Q-1 **10**

A Compute delivery delay of **Source spray and wait routing** for Random walk mobility model. Area = 400x400 , M =20, K =10 , L = 10.

B Prove theorem: Expected message delivery time for **optimal** algorithm (single copy) **ED_{opt}(mm)** is given by :

$$ED_{opt}^{(mm)} = \frac{H_{M-1}}{(M-1)} EM_{min}.$$

[OR]

Q-1 **10**

A Compute delivery delay of **Binary spray and wait** routing for Random walk mobility model. Area = 500x500 , M =15, K =5 , L = 8

B **Compute expected delay** for direct transmission given random walk mobility model, Network area = 6400, transmission range = 5, no. of nodes = 20

Q-2 **10**

A Compute **Hitting time and Meeting time for random direction** mobility model :

$$\overline{T} = 300,\ \overline{v} = 1,\ \overline{T}_{stop} = 50$$

N= 300 x 300 K=10

B Prove theorem: Let **ED_{opt}** denote the expected message delivery delay of the optimal algorithm. When transmission range K is equal to **zero**

$$ED_{opt} = \frac{cN \log N}{2(M-1)} \cdot H_{M-1}$$

Where,H_n is the harmonic number of order n.

[OR]

Q-2 **10**

A Calculate Hitting time for **(small) community** based random direction model :

Area= 400 x 400 , Pl= 0.5 Pr=0.5, Tl = 160, K =10, $\overline{v} = 1$

B Using taylor series find L_{min} for a =10 and M =90

Q-3 **10**

A Compute pairwise meeting rate p for RD & RWP and packet forwarding rate for n-epidemic routing : Avg. relative speed = 5 m/sec, Area = 400x400, transmission range = 5, battery energy = 2000 units/node, energy consumed =4 unit transmit/receive, number of forwards =4, neighbors=4.

B Show the **classification** of Mobility models. Fill up details in following table in terms of YES / NO with justification.

	Temporal dependency	**Spatial Dependency**	**Geographic restriction**
Random way point			
RPGM			
Freeway			
Manhattan			
Pursue			

SECTION – II

Q-4 **10**

A Analytically compute AER(encounters/min) for random way point mobility model : Communication range= 5 m, Node Density = 18, Average Speed = 10 m/s and time = 5 sec

B **Draw** schematic diagram of **Internet Vs. DTN Routing. Name** the strategy used for information exchange. List the class of service (**CoS**) provided by Bundle layer.

[OR]

Q-4 **10**

A Draw schematic diagram of ONE simulator along with routing and movement package classification.

B Find **AEF**(Average encounter frequency) ,**AER** (Average encounter rate)for set of contact C_n=10, Set of Encounters E_n=14 , T=70s, **ACR**(Average contact rate) =5.

Q.5 **10**

A How to make Encounter based routing protocol **secure**? Discuss **Time stamp protocol** with suitable example & diagram.

B Compute the **delivery predictability** new values for $P_{A,B}$ $P_{B,C}$,$P_{A,C}$

P_{init} =0.85 ,β =0.15

From/To	B	C
A	0.3	0.7
B	0.2	0.8

OR

Q-5 **10**

A Compute EV_A & EV_B for given CWC_A=10, CWC_B=5, ά= 0.75, EV_A=2 & EV_B=4 using encounter based routing. Suppose node A has 10 copies of Message M1 and 5 copies of message M2. How many copies of each **messages** node A transmits to Node B ?

B Write pseudo code for the following buffer management policies:

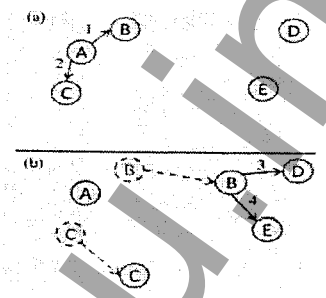
1. Random forwarding
2. E-drop

Q.6 **10**

A Prove expected delay of epidemic routing with d degree is derived using:

$$E^d_{epid} = \frac{1}{\lambda(m-1)} \sum_{p=1}^{m-1} \frac{m-p}{p\, s(p)}.$$

B



Apply **fuzzy spray** technique to figure (a) & (b) for preparing the table showing distribution of **CDM, FTC and HOP** count values. Further compute accuracy of FTC and accuracy of Hop Count. Assume initial value of Hop count and FTC 1.

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