Seat No_____

GANPATUNIVERSITY
M.Tech. Semester I Examination
December-2013
3CE101: Advanced Topics in Networks

Max Time:3 Hour] **[Total Marks:70**

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 **12**

[A] Prove theorem: Expected message delivery time for **optimal** algorithm (single copy) $\mathbf{ED_{opt}(mm)}$ is given by **6**

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

Where H_k is the k^{th} Harmonic Number.

[B] Compute delivery delay of **Binary spray and wait** routing for Random walk mobility model. Area = 500x500 , Nodes =15, communication range =5 , message copies = 8 **6**

[OR]

Q-1 **12**

[A] Calculate the delay of **Randomize routing** for area =2500,transmission range = 5, no. of nodes = 16, P= 0.4 **6**

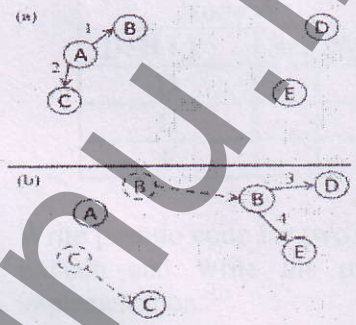
[B] Prove **lemma** that following upper bound holds for expected delay of **Spray and Wait** : **6**

$$ED_{sw} \le (H_{M-1} - H_{M-L}) EM_{mm} + \frac{M-L}{M-1} EW,$$

where H_k is the k^{th} harmonic number.

Q-2 **11**

[A] **6**



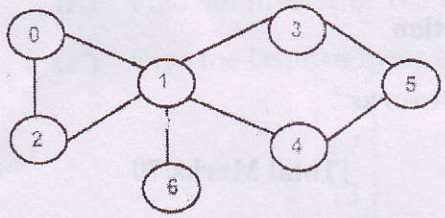
Apply **fuzzy spray** technique to figure (a) & (b) for preparing the table showing distribution of **CDM,FTCand** HOPcount values. Further compute accuracy of FTC and accuracy of Hop Count. Assume initial value of Hop count and FTC 1.

[B] Prepare table of comparison for Spray & Wait variants. **5**

[OR]

Q-2 **11**

[A] **5**

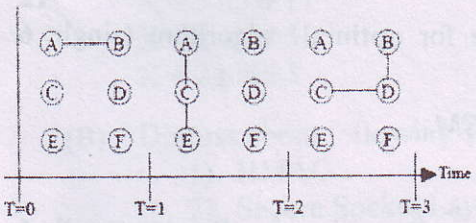


Find **articulation points** of given graph and derive different sub-graphs. Write pseudo code for **ANBR** protocol.

[B] Analytically compute AER(encounters/min) for random way point mobility model : Communication range= 100m, Node Density = 50, Average Speed = 30 m/s and time = 10 sec **6**

Q-3 **12**

[A] **4**



Compute temporal distance and show steps of matrix building matrix. Consider w = 300.

[B] **Compute Quality of Node** Q for : **2**
Smoothing factor =0.15, Q_{old}= 1 , k1=100, k2=150, T=3600, Δt=2000

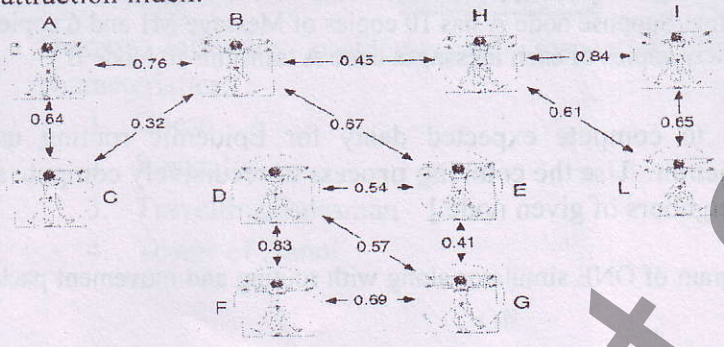
[C] **Compute expected delay** for direct transmission given RWP, Network area = 6400, transmission range = 10, no. of nodes = 15 **3**

[D] Find **Encounter rate**, **Contact rate&AEF** for set of Contact C_n=10, Set of Encounters E_n=14 , T=70s. **3**

SECTION – II

Q-4 12

[A] Prepare interaction and connectivity metric for threshold =0.34 . Identify at least two communities from connectivity metric and write an equation to compute social attraction index. 6



[B] Show the algorithmic steps to implement n-Epidemic routing. 6

[OR]

Q-4 12

[A] Show the classification chart of mobility models and Identify the mobility model type for each scenario presented below with short justification: 6

1.Police officers attempting to catch escaped criminal
2.Group of children walking in single line to their classroom
3.Cellular network
4.Class of student touring an art museum

[B] Write pseudo code for QoN based spray and wait. 6

Q.5 11

[A] Following table shows the current message vectors for Node A and Node B respectively. Show respective message vector's contents after encounter with each other for epidemic routing. 6

Node A	
Dest Id	**Seq.No**
D	1
G	1
F	1

Node B	
Dest ID	**Seq No**
D	0
E	0
F	0
F	1

Write pseudo code for two hop routing protocol.

[B] Explain and Write the pseudo code for N-drop and TSMF forward policy implementation. 5

[OR]

Q-5 11

[A] Write pseudo code to implement :MOFO drop and COIN forwarding policy. 6

[B] Compute the **delivery predictability** new values for $P_{A,B}$ $P_{B,C}$,$P_{A,C}$ 5
P_{init} =0.75 ,β =0.25

From/To	B	C
A	0.7	0.3
B	0.5	0.5

Q.6 **12**

[A] Compute EV_A&EV_B for given CWC_A=8, CWC_B=10, ά= 0.85, EV_A=2&EV_B=4 using encounter based routing. Suppose node A has 10 copies of Message M1 and 6 copies of message M2. How many copies of each **messages** node A transmits to Node B ? **4**

[B] Write an equation to compute expected delay for Epidemic routing using **accordion phenomenon**. Use the **coloring process** to recursively compute **s(p)** [i.e. Aggregated neighbors of given node.] **4**

[C] Draw schematic diagram of ONE simulator along with routing and movement package classification. **4**

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