MIDTERM EXAMINATION

Autumn 2021

Department of Computer Science & Engineering

Independent University, Bangladesh (IUB)

CSE 402: Wireless Networks

Total Marks: 50

Time Allowed: 75 Minutes

- Answer all **four (4)** questions
- Figure in bracket [] next to each question indicates marks for that question

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This question paper has three (3) pages (including cover page).

1. What do the following terms mean? Explain **briefly**.

(a) BTS [5]

(b) MSC [5]

(10 marks) [CO1]

2. Find the area of:

(a) a regular hexagon with a vertex size d; [5]

(b) a regular octagon with a vertex size d. [5]

(Hint: Break the polygons into congruent triangles.)

(You may be surprised by the result!)

(10 marks) [CO1]

3. Suppose GP decides to use a cell planning scheme that endures a worst case SIR of 15dB. Find the optimal value of the **cluster size** N assuming a path loss exponent of 2, for each of the following cases:

(i) omnidirectional antennas;
(ii) 60 degree sectoring;
(iii) 120 degree sectoring.

Which option would you recommend?

(10 marks) [CO1]

4. You have a network with 20 channels and a 2% GoS requirement.

(a) Suppose you run an Erlang B system.

This would give you an offered load of 14E.

If you average 1 call/minute with average duration of 3 minutes, **determine the number of users that can be supported by this system**.

[10]

(b) Suppose you run an Erlang C system.

This would yield a probability of a call initiator being put on wait, to be 0.06.

Determine the probability of the queueing delay exceeding 10s.

(Note that for an Erlang C system, $\Pr[delay > t] = \Pr[delay > 0].e^{-(C-A)t/H}$, where C is the number of channels, A is the load and H is the holding time.)

[10]

(20 marks) [CO1]

THE END