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Eighth Semester B.E. Degree Examination, June/July 2017

GSM

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
2. Use of Erlang's table is permitted.

PART – A

1.
 - a. Draw a neat diagram of a GSM reference model. Explain the various functional entities including the interface used for their interconnection. (08 Marks)
 - b. Explain the general objectives and services of GSM PLMN. (06 Marks)
 - c. What are GSM subsystem? Explain with relevant figure. (06 Marks)

2.
 - a. What are the future techniques available to reduce interference in GSM? Explain. (10 Marks)
 - b. Consider a GSM system with the following data to show the advantage of adaptive array antenna : (10 Marks)
 - i) Coverage area : 60,000 mile²
 - ii) One – way system bandwidth : 12.5MHz
 - iii) Channel spacing : 200 KHz
 - iv) Frequency reuse factors : 4
 - v) MS output power (W) : 800 mW (29dBm)
 - vi) BS antenna gain (hbs) : 20dB
 - vii) Receive cable / connector loss (Lc) : 2dB
 - viii) MS antenna gain (Gm) : 0dB
 - ix) Required S/I ratio : 12dB
 - x) Information rate : 271 kbps
 - xi) Receiver noise figure (F) : 7dB
 - xii) Propagation path – loss exponent γ : 4
 - xiii) One mile path-loss intercept (Io) : 80 dBm.
 - xiv) Lognormal fading margin (fm) : 10dB
 - xv) $KT = -174$ dBm/Hz.
 Calculate i) Minimum received power ii) Maximum allowable path loss
 iii) Cell radius in miles iv) Number of cells required to cover the service area.

3.
 - a. Explain Frame structure of GSM which are allowed logical channel combination. (08 Marks)
 - b. Briefly explain data encryption in GSM. (06 Marks)
 - c. With the help of neat diagram, explain the various bursts that are used in GSM. (06 Marks)

4.
 - a. What are the attributes of a speech codec? Explain. (10 Marks)
 - b. What are vocoders? Explain the working of a full rate vocoder with relevant figure. (10 Marks)

PART – B

5.
 - a. What is Handover? Explain Intra MSC handover using flow diagram. (10 Marks)
 - b. With a neat block diagram, explain the GSM GPRS. (10 Marks)

6.
 - a. What are Wireless security requirements? (08 Marks)
 - b. Explain the file structure of a SIM card. (06 Marks)
 - c. What is Token based challenge? (06 Marks)

- 7 a. Using the following data for a GSM system calculate :
- i) Average busy – hour traffic per subscriber.
 - ii) Traffic capacity per cell.
 - iii) Required number of B S_s per zone and the hexagonal cell radius for the zone.
- Given :
- i) Subscriber usage per month = 120 min.
 - ii) Days per month = 24
 - iii) Busy hours per day = 5.
 - iv) Allocated spectrum = 5MHz
 - v) Frequency reuse plan = 4/12.
 - vi) RF channel width = 200KHz , full rate
 - vii) Capacity of a BTS = 32 Erlangs
 - viii) Subscribers in the zone = 60,000
 - ix) Area of the zone = 500km²
 - x) (Traffic capacity of a sector at 2% GOS for 16 channels = 9.82). (08 Marks)
- b. Explain planning of a wireless network. (06 Marks)
- c. List out the criteria's required for a wireless system design. (06 Marks)
- 8 a. What are the management requirements of a wireless network? (08 Marks)
- b. What are the five TMN layers? Explain the pertinent 3 layers briefly. (12 Marks)
