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10EC81

Eighth Semester B.E. Degree Examination, June/July 2016
Wireless Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the various steps in AMPS mobile terminated call. **(10 Marks)**
b. Explain the characteristics of 2G and 3G cellular systems. **(10 Marks)**

2 a. Explain the generation of MSISDN, IMSI and IMEI. **(06 Marks)**
b. Explain the function of HLR and ILR. **(06 Marks)**
c. Explain a mobile originated call in a cellular network with a neat flow diagram. **(08 Marks)**

3 a. A service provider is given license for total bandwidth of 5 MHz and each system subscriber requires 10 kHz bandwidth. Determine the system capacity if the service provider implements a cellular system with 35 transmitter sites and cluster size of 7. **(06 Marks)**
b. Determine frequency reuse distance for a cluster size of 7 and a cell radius of 6 km. **(04 Marks)**
c. Explain mobility management concept. Explain the functions of location management with a figure. **(10 Marks)**

4 a. Explain the GSM signaling model. **(10 Marks)**
b. Explain the steps in call setup in GSM using mobile station roaming number. **(10 Marks)**

PART – B

5 a. List out the ten operations in call setup in GSM system. Explain in detail ciphering mode setting and IMEI check. **(10 Marks)**
b. Explain GSM intra BSC handover operation with a figure. **(10 Marks)**

6 a. Explain the functions of three layers in a network management system. **(10 Marks)**
b. Explain the generation of CDMA paging channel. **(10 Marks)**

7 a. Explain the path loss model for free space propagation. **(05 Marks)**
b. What is the received power in dBm for a signal in free space with a transmitting power of 1 kW, frequency of 1800 MHz and distance from the receiver of 2000 meters if the transmitting antenna and receiving antennas have a gain of 1.6? What is the path loss in dB? **(05 Marks)**
c. Explain frequency hopping and direct sequence spread spectrum techniques. **(10 Marks)**

8 a. Discuss the design issues of IEEE802.11 and explain the working of BSS, DS and ESS network. **(10 Marks)**
b. Explain the details of Bluetooth protocol stack with a figure. **(10 Marks)**

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10EC82

Eighth Semester B.E. Degree Examination, June/July 2016
Digital Switching Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Draw a neat diagram of four-wire circuit and explain its working. **(10 Marks)**

b. A four wire circuit has an overall loss (two-wire to two-wire) of 1 dB and the balance return loss at each end is 6 dB. Find: i) The singing point; ii) The stability margin; iii) The attenuation of talker and listener echo. **(06 Marks)**

c. Write a short note on European pleisochronous digital hierarchy. **(04 Marks)**

2 a. Differentiate between message switching and circuit switching. **(04 Marks)**

b. Explain the functions of electronic switching. **(06 Marks)**

c. With the help of neat diagram, explain the basic types of calls that are usually processed through a DSS. **(10 Marks)**

3 a. Derive the expression for second Erlang's distribution starting from basic principles. **(10 Marks)**

b. Define the following terms:
i) Busy hour ii) Grade of service
iii) Pure chance traffic iv) Statistical equilibrium **(04 Marks)**

c. On an average, one call arrives every 5 seconds. During a period of 10 seconds, what is the probability that:
i) No call arrives? ii) One call arrives?
iii) Two calls arrive? iv) More than two calls arrive? **(06 Marks)**

4 a. What is grading? Explain different types of grading. **(06 Marks)**

b. Derive the expression for grade of service of three stage network. **(08 Marks)**

c. Design a three stage network for 100 incoming trunks and 400 outgoing trunks. **(06 Marks)**

PART – B

5 a. Explain S-T-S switching network with neat diagram. **(06 Marks)**

b. A T-S-T network has 20 incoming and 20 outgoing PCM highway, each conveys 30 channels. The required GOS is 0.01, 0.02, 0.001, 0.005. Find the traffic capacity of network in mode 1 and mode 2. **(08 Marks)**

c. Explain the need for frame alignment in time division switching network. **(06 Marks)**

6 a. Explain in brief basic software architecture of a typical DSS with neat diagram. **(10 Marks)**

b. With a neat diagram, explain digital switching system software classification. **(10 Marks)**

7 a. Explain the organizational interfaces of typical DSS central office. **(10 Marks)**

b. Explain with a neat diagram, a strategy for improving software quality. **(10 Marks)**

8 Write short notes on:
a. Generic switch software architecture b. Recovery strategy
c. Common characteristics of DSS d. Analysis report for DSS **(20 Marks)**

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10EC832

Eighth Semester B.E. Degree Examination, June/July 2016
Network Security

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With a neat diagram, explain network access security model with gate keeper function. **(05 Marks)**

b. Classify and explain different type of attacks. **(08 Marks)**

c. Using the keyword "ENCRYPT" create playfair matrix and obtain ciphertext for the message "MATCHFIXED". Also write the rules used. **(07 Marks)**

2 a. Explain single round of DES along with the key generation. **(10 Marks)**

b. Explain the working of counter mode of block cipher operation. **(04 Marks)**

c. Discuss the final evaluation criteria of AES. **(06 Marks)**

3 a. Justify how both confidentiality and authentication are obtained in publickey cryprosystems. **(05 Marks)**

b. Write RSA algorithm. **(04 Marks)**

c. In Diffie Hellman key exchange q = 71, its primitive root $\alpha = 7$ A's private key is 5 B's private key is 12. Find: i) A's public key; ii) B's public key, iii) Shared secret key. **(05 Marks)**

d. Explain the distribution of secret key using the public key cryprography with confidentiality and authentication. **(06 Marks)**

4 a. List out the requirements and explain the arbitrated digital signature technique. **(10 Marks)**

b. Compare RSA and DSS approach. **(06 Marks)**

c. Illustrate replay attack with examples. **(04 Marks)**

PART – B

5 a. Explain the key requirements and features of SET. **(10 Marks)**

b. Discuss SSL record in terms of fragment compression and encryption. **(10 Marks)**

6 a. Explain password selection strategies. **(08 Marks)**

b. Describe statistical anomaly detection. **(06 Marks)**

c. Discuss the different categories of intruders. **(06 Marks)**

7 a. Give the taxonomy of malicious programs. Briefly explain all the software threats. **(10 Marks)**

b. Describe digital immune system with diagram. **(06 Marks)**

c. Brief on four generations of Antivirus software. **(04 Marks)**

8 a. What is firewall? Explain the various firewall configurations with relevant diagram. **(10 Marks)**

b. Write short notes on:
i) Data Access Control
ii) Concept of Trusted system **(10 Marks)**

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10EC843

Eighth Semester B.E. Degree Examination, June/July 2016
GSM

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the objectives of GSM PLMN. **(04 Marks)**
b. With neat diagram, explain GSM Reference model. **(08 Marks)**
c. Explain Radio interface (MS to BTS) in GSM interfaces. **(08 Marks)**

2 a. Explain Smart Antenna and give their advantages. **(08 Marks)**
b. Discuss about single level and quality level in GSM. **(04 Marks)**
c. With neat diagram, explain base band frequency hopping in GSM. **(08 Marks)**

3 a. Explain the mobile identification process with flow diagram. **(08 Marks)**
b. Explain GSM Location area and cell area identification process in GSM mobility management. **(04 Marks)**
c. Write a note on synchronization Burst. **(08 Marks)**

4 a. Explain GSM PLMN Bearer services and Teleservices in detail. **(08 Marks)**
b. Explain time domain waveform coding with help of A – Law and μ – Law. **(12 Marks)**

PART – B

5 a. What is hand over? Explain inter MSC hand over. **(08 Marks)**
b. Explain mobile telephone Architecture for data interworking with neat block diagram. **(06 Marks)**
c. Explain pure ALOHA scheme with their throughput. **(06 Marks)**

6 a. Explain various security algorithms for GSM in detail. **(10 Marks)**
b. Explain the privacy Requirements in GSM security. **(10 Marks)**

7 a. Derive an expression for spectral efficiency in terms of voice and non voice transmission. **(10 Marks)**
b. Derive an expression for Received signal strength of a base station Receiver. **(10 Marks)**

8 a. Explain the various TMN Layers in detail. **(08 Marks)**
b. Explain the manager and agent roles in OSI system management. **(08 Marks)**
c. Write short note on SNMP. **(04 Marks)**

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10EC844/TE845

Eighth Semester B.E. Degree Examination, June/July 2016
Ad – Hoc Wireless Networks

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Give any six differences between cellular networks and ad-hoc wireless networks. **(10 Marks)**
b. Explain the wireless sensor networks and the issues related to it. **(10 Marks)**

2 a. Discuss the issues and design goals of a MAC protocol for Ad- hoc wireless networks. **(10 Marks)**
b. Explain Five Phase Reservation Protocol (FPRP). **(10 Marks)**

3 a. Explain Distributed Wireless Ordering MAC protocol. **(10 Marks)**
b. Briefly describe Directional Busy Tone Based MAC protocol along with relevant diagrams. **(10 Marks)**

4 a. With an example, explain the process of Route establishment in Wireless Routing Protocol. **(06 Marks)**
b. Explain Location Aided Routing Protocol with LAR – 1 algorithm. Also, mention its advantages and disadvantages. **(10 Marks)**
c. Both Associativity Based Routing (ABR) and Signal Stability Based Adaptive Routing Protocol (SSA) use stability information for routing. How do they differ in using the stability information? **(04 Marks)**

PART – B

5 a. Explain Zone Routing Protocol. **(10 Marks)**
b. Discuss the various Power Aware Routing metrices. **(10 Marks)**

6 a. Discuss any five reasons for throughput degradation of TCP when used in ad – hoc wireless networks. **(10 Marks)**
b. Explain Split TCP protocol. Also mention its advantages and disadvantages. **(10 Marks)**

7 a. Discuss the various Network Security Requirements for ad – hoc wireless networks. **(04 Marks)**
b. Briefly explain Threshold Cryptography strategy for key management. **(06 Marks)**
c. Explain Security – Aware Ad – hoc routing protocol. **(10 Marks)**

8 a. Briefly explain any five issues and challenges faced in providing QOS in ad – hoc wireless networks. **(10 Marks)**
b. Explain ticket based QOS routing protocol to support network layer QOS. **(10 Marks)**

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10TE81

Eighth Semester B.E. Degree Examination, June/July 2016
Optical Networking

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With the help of a diagram, explain the different parts of a public networks. **(06 Marks)**
b. Explain fixed and statistical TDM. **(06 Marks)**
c. Describe the self phase modulation and cross phase modulation. **(08 Marks)**

2 a. What are isolators and circulators? Explain a polarization independent isolator. **(10 Marks)**
b. Describe different architectural approaches to construct high channel count de-multiplexers. Explain multistage banding with diagram. **(10 Marks)**

3 a. Realize strict-sense nonblocking 1024 × 1024 switch using 32 × 64 and 32 × 32 switches interconnected in a three-stage clos architecture. **(10 Marks)**
b. What are wavelength converters? Explain how wavelength conversion is done by optoelectronic approach. **(10 Marks)**

4 a. Explain in brief the following:
i) Power penalty
ii) Transmitter
iii) Receiver **(06 Marks)**
b. Explain with a figure the gain equalization in Erbium doped fiber amplifiers. **(06 Marks)**
c. Describe in detail the intrachennel and interchannel crosstalk. **(08 Marks)**

PART – B

5 a. Explain the hierarchical multiplexing structure employed in SONET and SDH. **(10 Marks)**
b. Discuss in detail the elements of SONET/SDH infrastructure. **(10 Marks)**

6 a. What are different types of wavelength conversion technique? Explain limited wavelength conversion and full wavelength conversion with a neat sketch. **(10 Marks)**
b. In a wavelength routing networks, what are architectural variations? **(10 Marks)**

7 a. Explain combined SONET/WDM network design problem. **(10 Marks)**
b. Explain network management function. **(10 Marks)**

8 a. Explain the following:
i) Hybrid fiber Coax (HFC) approach
ii) LARNET WRPON architecture **(14 Marks)**
b. Explain Synchronization. **(06 Marks)**

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10TE82

Eighth Semester B.E. Degree Examination, June/July 2016
GSM

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Calculate the number of physical channels available in GSM 900 MHz, 1800 MHz and 1900 MHz frequency bands. **(03 Marks)**

b. What are the GSM PLMN services and objectives? **(07 Marks)**

c. With a neat diagram, explain the mapping of GSM onto OSI layers. **(07 Marks)**

d. Write a short note on MS subsystem. **(03 Marks)**

2 a. Describe dynamic power control method. **(04 Marks)**

b. With a neat flow-chart, describe the hopping algorithm used in GSM. **(06 Marks)**

c. Consider a GSM system with the following data:
Coverage area = 9,75,000 mile^2
One-way system bandwidth = 12.5 MHz
Channel spacing = 200 kHz
Frequency reuse factor = 4
MS output power (W) = 600 mW
BS antenna gain (G_{bs}) = 20 dBi
Receive cable/connector loss (L_c) = 3 dB
MS antenna gain (G_m) = 0 dB
Required S/I ratio = 12 dB
Information rate = 271 kbps
Receiver noise figure = 5 dB
Propagation path loss intercept (I_o) = 60 dBm
Log normal fading margin = 8 dB
KT = -174 dBm/Hz
Calculate:
i) Minimum received power
ii) Maximum allowable pathloss
iii) Cell radius in miles
iv) Number of cells required to cover the service area for different number of antenna elements (i.e. for 1, 2, 4 and 6)
v) Infer the result. **(10 Marks)**

3 a. Describe the various GSM logical channels used in GSM. **(08 Marks)**

b. With neat diagram, explain the various bursts used in GSM. **(08 Marks)**

c. With the flow diagram, describe the mobile identification process. **(04 Marks)**

4 a. Explain the attributes of speech coder. **(06 Marks)**

b. Describe LPAS. **(06 Marks)**

c. With neat diagram, explain GSM full-rate LPC-RPE vocoders. **(08 Marks)**

PART – B

5 a. Explain inter-MSC handover using a flow diagram. **(08 Marks)**

b. With neat block diagram, explain GSM-GPRS network architecture along with protocol stack. **(08 Marks)**

c. Explain the message flow diagram for call release-mobile initiated. **(04 Marks)**

6 a. List out the mechanisms used in GSM system to provide privacy and security. **(04 Marks)**

b. Describe the file structure of SIM card. **(04 Marks)**

c. Explain the security algorithms used in GSM. **(06 Marks)**

d. Explain the call flow for token based registration. **(06 Marks)**

7 a. Consider the GSM system with the following data:

Subscriber usage per month = 180 minutes
Days per month = 28
Busy hours per day = 6
Allocated spectrum = 5 MHz
Frequency reuse plan = 4/12
RF channel width = 200 kHz, full rate
Capacity of a BTS = 32 Erlangs
Subscribers in the zone = 75000
Area of the zone = 550 km^2
Traffic capacity of a sector at 2% GOS = 9.82 Erlangs

Calculate:

i) Average busy-hour traffic per subscriber.
ii) Traffic capacity per cell.
iii) Required number of BSS per zone and the hexagonal cell radius for the zone. **(08 Marks)**

b. List out the methods which are used to improve spectral efficiency of a wireless system, and define spectral efficiency of a mobile communication system for voice and non-voice transmission services. **(04 Marks)**

c. Design a TDMA frame for a cellular system to support variable bit rates from 8 kbps to 128 kbps. A user can be assigned multiple carriers (not more than 2). Assume GMSK modulation, a coding rate of R_c = one-half, frame efficiency of 75%, and the symbol rate of the SACCH-a_j = 0.1 R_s. The cell radius is limited to 5 km and maximum processing delay to 90 ms. **(08 Marks)**

8 a. Explain the management requirements for wireless networks. **(04 Marks)**

b. Explain SNMP and OSI systems management. **(08 Marks)**

c. Explain with neat diagram, NM architecture and interfaces. **(08 Marks)**

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10TE836

Eighth Semester B.E. Degree Examination, June/July 2016
Fuzzy Logic

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Explain with examples : i) Uncertainty and impression ii) Sets as points in hyper cubes. **(10 Marks)**

b. For given sets 'A' & 'B' of universe X = {0, 1, 2, 3, 4, 5, 6, 7, 8}.

$$A = \left\{\frac{0.0}{0.0} + \frac{0.5}{1.0} + \frac{1.0}{2.0} + \frac{0.5}{3.0} + \frac{0.0}{4.0}\right\} \; ; \quad B = \left\{\frac{0.0}{2.0} + \frac{0.5}{3.0} + \frac{1.0}{4.0} + \frac{0.5}{5.0} + \frac{0.0}{6.0}\right\}$$

Find i) $\overline{A}$ ii) $\overline{B}$ iii) $A \cup B$ iv) $A \cap B$ v) A/B. **(10 Marks)**

2 a. For given relation matrix R. **(10 Marks)**

$$R = \begin{array}{c} \\ a \\ b \\ c \\ d \\ e \end{array} \begin{array}{c} \begin{array}{ccccc} a & b & c & d & e \end{array} \\ \begin{bmatrix} 1 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 & 1 \end{bmatrix} \end{array}$$

i) Obtain Sagital diagram.
ii) Check for tolerance and equivalence.
iii) Obtain its equivalence matrix.

b. We have A= $\left\{\frac{1}{LS} + \frac{0.4}{MS} + \frac{0.2}{HS}\right\}$, B = $\left\{\frac{1}{SPR} + \frac{0.5}{MPR} + \frac{0.25}{FPR}\right\}$ and C = $\left\{\frac{0}{LS} + \frac{1}{MS} + \frac{0}{HS}\right\}$.

Find i) R = AXB ii) S = BXC iii) T = ROS using max – min composition
iv) T^1 = ROS using max – product composition. **(10 Marks)**

3 a. Describe Angular Fuzzy sets and Intuition types of membership assignment with examples. **(10 Marks)**

b. Using the Inference method, find the membership values for each of the triangular shapes
i) $\underset{\sim}{I}$ ii) $\underset{\sim}{R}$ iii) $\underset{\sim}{IR}$ iv) $\underset{\sim}{E}$ v) $\underset{\sim}{T}$.
Given for the set of angles in a triangle are $A = 80^0$, $B = 75^0$ and $C = 25^0$. **(10 Marks)**

4 a. For the given fig. Q4(a), find defuzzified value Z^x using. **(10 Marks)**

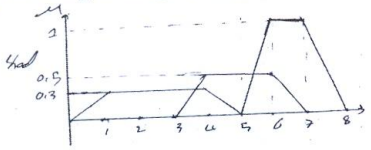

Fig.Q4(a)

i) Min – max method.
ii) Weighted average method.
iii) Centre of largest area

b. We have two fuzzy sets $\underset{\sim}{A}$ and $\underset{\sim}{B}$, each defined on two identical but different universes

$U_1 = U_2 = \{1, 2, \ldots..10)$

$\underset{\sim}{A} = \underset{\sim}{2} = \left\{\frac{0.6}{1} + \frac{1}{2} + \frac{0.8}{3}\right\}$, $\underset{\sim}{B} = 6 = \left\{\frac{0.8}{5} + \frac{1}{6} + \frac{0.7}{7}\right\}$.

Determine the membership values for the algebraic product mapping. **(06 Marks)**

c. Mention properties of Lambda cuts on fuzzy relations. **(04 Marks)**

PART – B

5 a. Explain different logical connectives used in Fuzzy logic. **(08 Marks)**

b. Prove the following statements are tautologies for classical and Quasi tautology for fuzzy using Truth table.

i) $(A \wedge (A \rightarrow B) \rightarrow B$ ii) $(\overline{B} \wedge (A \rightarrow B)) \rightarrow \overline{A}$. **(12 Marks)**

6 a. What are Linguistic Hedges? Explain the following using graphs :

i) Concentration ii) Dilation iii) Intensification. **(12 Marks)**

b. Explain Aggregation of Fuzzy Rules. **(08 Marks)**

7 a. Given $I_1 = \left\{\frac{1}{3} + \frac{0.8}{7}\right\}$, $I_2 = \left\{\frac{0.7}{4} + \frac{1.0}{6}\right\}$ and $I_3 = \left\{\frac{0.8}{2} + \frac{1}{4} + \frac{0.5}{8}\right\}$.

Assess the truth value of the inequality.

i) $I_1 \geq I_2$ ii) $I_2 \geq I_3$ iii) $I_3 \geq I_2$ iv) $I_2 \geq I_1$ v) $I_3 \geq I_1$. **(10 Marks)**

b. In reference to car speed we have linguistic variable "fast" as

$$\text{"fast"} = \left\{\frac{0}{0} + \frac{0.1}{10} + \frac{0.2}{20} + \frac{0.3}{30} + \frac{0.4}{40} + \frac{0.5}{50} + \frac{0.6}{60} + \frac{0.7}{70} + \frac{0.8}{80} + \frac{0.9}{90} + \frac{1.0}{100}\right\}.$$

Compute the membership function for the following linguistic terms :

i) Very fast ii) Very very fast iii) Highly fast = minus (very, very fast)

iv) Plus very fast = $\{[\text{very fast}]^{1.25}\}$ v) Fairly fast = $\{[\text{fast}]^{2/3}\}$. **(10 Marks)**

8 a. Explain Fuzzy C – means (FCM) with suitable example. **(10 Marks)**

b. Explain Hard C – means (HCM) with suitable example. **(10 Marks)**

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