SEM(II)
ME / Choice Base / Electronics & Tele Comm / MAY 2018
Modern Digital Communication

Q. P. Code: 40606

(3 Hours) **Total Marks: 80**

N.B: 1) Question number 1 is compulsory.
2) Solve any three from remaining.

Q1 Solve any **Four** 20

(a) Explain coding for Analog sources.
(b) Explain Baye's detection of received signal
(c) Comment on Lempel algorithm LM 77
(d) Explain Average Mutual Information and Entropy.
(e) Explain effects of Imperfect carrier synchronization.

Q2 (a) Explain the optimum detection of M-ary using Matched filters of received message signal. 10

(b) Describe basic concepts of ISI? Design bandlimited signal for controlled ISI. 10

Q3 (a) Design and implement M-ary Non-coherent receiver for equal energy signal in random phase channels. 10

(b) Explain optimum detection in Rayleigh Channels. 10

Q4 (a) A DMS has an alphabets of five letters Xi, i = 1,2….5 with probabilities 0.4, 0.2, 0.2, 0.1, 0.1. Find average length and efficiency of the code. 10

(b) Draw and explain the optimum waveform receiver in colored Gaussian noise using K-L Expansion approach 10

Q5 (a) Explain relevant and irrelevant noise? Also prove that nj and nk are uncorrelated and independent Gaussian random variables.

(b) Explain time-variant nature of the channel in Doppler-shift domain. 10

Q6 Write short note on any **Three** 20

(a) Temporal waveform coding
(b) Small scale fading
(c) MSE criterion for infinite length equalizer
(d) Time and frequency domain characteristics of duobinary signal.

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E/ EXTC/ Sem-II [Choice Based] / Wireless Adhoc & Sensor Networks/ May-18

Q. P. Code: 37776

(3Hours) **(Total marks 80)**

Note: (1) Question No. 1 is compulsory
(2) Solve any three from remaining questions.
(3) Assume suitable data if required.

Q1.(a) Discuss scalability issue in MANET. (5)

(b) Explain multicast AODV with suitable diagram. (5)

(c) Define in band, out of band and back up channel. (5)

(d) What are the challenges posed to TCP over MANETS ? (5)

Q.2 (a) Why there was need of Cognitive Radio? Explain IEEE802.22 reference architecture with suitable diagram. (10)

(b) Explain Zone Routing Protocol (ZRP) with suitable diagram. (10)

Q3. (a) What are the designing considerations for Routing Protocols in WSN. (10)

(b) Name the MAC layer protocols in wireless sensor networks and explain Self Organizing - MAC protocol. (10)

Q.4 (a) Explain the various asymmetry in a TCP based wireless mobile MANET. How these asymmetry problems degrade throughput ? (10)

(b) Explain Voronoi diagram based Geocasting with example. (10)

Q.5 (a) Mention features of Temporarily Ordered Routing Algorithm(TORA)and explain its height metric with suitable example. (10)

(b) Explain the LEACH algorithm/protocol in detail. (10)

Q.6 Write Short Notes on followings:

(a) Adaptive Periodic TEEN (5)

(b) Bluetooth security architecture (5)

(c) Adhoc Multicast Routing Protocol Utilizing Increasing ID numbers (5)

(d) Nano Sensor Networks (5)

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ME / EXTC / Choice Based / SEM II / 17-18 / RF & ME

Q. P. Code: 36806

(3 Hours) **Total Marks: 80**

N.B. : (1) Question number 1 is compulsory.
(2) Attempt any three questions from remaining questions.
(3) Figures to the right indicate full marks.
(4) Assume suitable data wherever necessary and indicate the same.

Q. 1 Write a short note on following. [20]
(a) Coupled Lines
(b) Image Frequency in Mixers
(c) Dielectric Resonator Oscillator
(d) Properties of S-parameters

Q. 2 (a) Explain Hybrid and Monolithic MIC by comparing the two MICs in the following areas Cost, size and weight, Design flexibility , Circuit tweaking and Reliability. [10]

(b) What is interference effects and frequency sharing explain. [10]

Q. 3 (a) Write a short note on Microwave Systems Engineering. [10]

(b) The Triquint T1G6000528 GaN HEMT has the following scattering parameters at 1.9 GHz (Z0 = 50 Ω): [10]

$S11 = 0.869 \angle -159°$
$S12 = 0.031 \angle -9°$
$S21 = 4.250 \angle 61°$
$S22 = 0.507 \angle -117°$

Determine the stability of this transistor by using the K − Δ test and the μ-test, and plot the stability circles on a Smith chart.

Q. 4 Design an amplifier to have a gain of 11 dB at 4.0 GHz. Plot constant-gain circle for [20]

GS = 2 and 3 dB, and *GL* = 0 and 1 dB. Calculate and plot the input return loss and overall amplifier gain from 3 to 5 GHz. The transistor has the following scattering parameters (Z0 = 50 Ω):

f (GHz)	*S*11	*S*12	*S*21	*S*22
3	$0.80\angle -90°$	0	$2.8\angle 100°$	$0.66\angle -50°$
4	$0.75\angle -120°$	0	$2.5\angle 80°$	$0.60\angle -70°$
5	$0.71\angle -140°$	0	$2.3\angle 60°$	$0.58\angle -85$

Q. 5 (a) For a load impedance $Z_L = 60 - j80\ \Omega$, design single-stub (short circuit) shunt tuning networks to match this load to a 50 Ω line. Assuming that the load is matched at 2 GHz. [10]

(b) How is Vector Network Analyzer used to measure periodic large signal waveform with all harmonics. [10]

Q. 6 (a) Draw and explain in detail Single-Ended Diode Mixer. [10]

(b) Show that the reflection coefficient is larger than 1 for a load of negative resistance. Justify you answer using I2R relation. [10]

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E/EXTC/Sem-II [CHOICE BASED]/Network & cyber Security/
May - 2018

Q.P. Code: 27203

[3 Hour] [80 Marks]

N.B.

(a) Question No.1 is compulsory
(b) Total 4 questions need to be solved
(c) Attempt any three questions from remaining five questions.
(d) Assume suitable data wherever necessary, justify the same

Q.1:

(a) Can be hacking ethical? Justify [5]
(b) Differentiate between firewall and IDS. [5]
(c) What are the security risks associated the cloud? [5]
(d) List the security attacks that threaten security goals. (Confidentiality, Integrity and Availability) [5]

Q.2:

(a) Compare between Symmetric and Asymmetric cryptography. [10]
(b) List the steps involved in Data Encryption Standard (DES) Algorithm with brief description. [10]

Q3:

(a) How does Antivirus work? List and explain the generations of Antivirus approaches. [10]
(b) Classify the cybercriminals and how cybercriminal plan the attack. [10]

Q4:

(a) Explain the need for incident detection and analysis. [10]
(b) Differentiate between SSL and SET. [10]

Q5:

(a) What is Biometric security? Describe advantages the Biometric authentication. [10]
(b) List and describe the types of firewall. [10]

Q.6:

(a) What is risk management? Describe the risk control strategies. [10]
(b) Explain Intellectual Property and Cyber Law. [10]

ME / Choice Based / SEM II / All Branches / MAY 2018

Q. P. Code: 24774

(3 hours) **[Total Marks-80]**

N.B. (1) Attempt any four questions out of six questions
(2) Assume any additional data if necessary and state it clearly
(3) Explain answers with neat sketches wherever necessary

1 a) How Principle Research method different from Methodology? Give example to justify the difference. **[10]**

b) Show the classification of research characteristics and discuss at least two classified characteristics with suitable example. **[10]**

2 a) Are quantitative and qualitative research types inter-related with each other? Justify your answer. **[10]**

b) What are the methods for analyzing date in quantitative research? **[10]**

3 a) Show the significance of Sample design and describe essential steps to achieve good sampling design. **[10]**

b) A car manufacturer claims that his cars will run for an average of 20,000 miles before needing their first repair. To prove this claim, you have tracked a test where you took random sample of 21 cars. It found that the sample average number of miles before repair was 18,700, with a standard deviation of 8,600 miles. If you have been asked to draw the random sample test analysis for this manufacturer what significant test limitations you can suggest or recommend to manufacturer while taking random sample of cars? **[10]**

4 a) There are various stages of scientific research process. Suppose you will have the opportunity to learn how to negotiate solutions to open engineering design problem using systematic design methods. What stages of scientific research process you will follow? Briefly discuss every stage that you like to consider. **[10]**

b) What is the characteristic of Good Hypothesis? Explain type I and II errors, level of significance and variables in hypothesis. **[10]**

5 a) Identify any research area you are interested in. What procedural steps you will follow to formulate any research problem in this research area. Be specific to steps you follow and provide relevant description. **[10]**

b) Summarize the difference between qualitative and quantitative two data collection methods. **[10]**

6 a) Discuss the validity of research thoroughly. **[10]**

b) "Ethics in research is the need of the hour". Justify the statement. **[10]**
