Time: 3 Hours Maximum Marks 80

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

Q1 Solve any **Five** 20

(a) Explain various parameters associated with Eye Pattern.
(b) Distinguish between relevant and irrelevant noise.
(c) Explain the concept of excess bandwidth and roll of factor.
(d) Explain frequency offset, Phase jitter and Impulse Noise.
(e) What is the significance of signal matrix in receiver in colored WGN?
(f) What is Convergence of receiver? Explain.

Q2 (a) Draw the duobinary encoder with precoder. The four level sequence 0013120332010 is the input. Construct a table showing precoded sequence, transmitted amplitude levels, received signals and decoded sequence. 10

(b) State and prove Nyquist criteria that gives the necessary and sufficient condition for the spectrum X(f) of pulse X(t) that yields zero ISI 10

Q3 (a) Design and implement Matched filter receivers with proper diagram. 10

(b) What are the problems associated with colored Gaussian noise? Derive and explain optimum waveform receiver in colored Gaussian noise with K-L Expansion Approach. 10

Q4 (a) Explain the Mean Square Error criteria for Equalizer. 10

(b) Explain LMS Algorithm for Adaptive Equalizer. 10

Q5 (a) Explain Non-Coherent Receiver in Random Phase Channels 10

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

Q6 Write short note on any **Three** 20
(a) Baye's detection of received signal
(b) Small scale fading
(c) Average mutual information and Entropy
(d) Time Dispersion Parameters, coherence bandwidth and Doppler spread coherence time parameter.

M.E. SEM II | Extc | Choice Based. May 2019

Paper / Subject Code: 34002 / Wireless Adhoc & Sensor Networks

[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

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

Q.1 (a) Compare MANET and WASN. (5)

(b) Explain Hybrid Routing Protocol with an Example. (5)

(c) Compare Broadcast and Geocast. (5)

(d) Explain the working of UDP protocol. (5)

Q.2 (a) Draw the protocol stack and explain integration of MANET and cell networks. (10)

(b) Explain AODV routing protocol with diagram. (10)

Q.3 (a) Explain Cognitive Radio Based Wireless Sensor Networks with its Challenges. (10)

(b) Explain any two variations in TCP Protocol with their advantages and short comings. (10)

Q.4 (a) What is Multicast? Explain any one application of Multicast in detail. (10)
(b) What are the designing considerations for MAC Protocol in WSN. (10)

Q.5 (a) What is broadcast storm problem ? How to avoid this problem? Explain any two methods. (10)

(b) How to integrate IP with WSN? Explain with Diagram (10)

Q.6 Write Short Notes on Following:

(a) DSR Protocol (5)

(b) S-MAC (5)

(c) Nano WSN (5)

(d) Components of Sensor Node (5)

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(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) Hybrid MICs versus Monolithic MICs.
(b) Coupled Lines.
(c) Dielectric Resonator Oscillator.
(d) Noise correlation matrix.

Q.2 (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) Draw and explain in detail Single-Ended Diode Mixer. [10]

Q.3 (a) What is phase noise in oscillators? Give a mathematical analysis of phase noise. [10]
(b) How is Vector Network Analyzer used to measure periodic large signal waveform with all harmonics. [10]

Q.4 Design an amplifier to have a gain of 11 dB at 4.0 GHz. Plot constant-gain circle for G_S = 2 and 3 dB, and G_L = 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): [20]

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

Q.5 (a) The s parameters for the HP HFET-102 FET at 2 GHZ with a bias voltage V_{gs}=0 are given as follows (Z_0=50 Ω) [10]

$$S_{11} = 0.894\angle -60.6^o$$
$$S_{21} = 3.122\angle 123.6^o$$
$$S_{12} = 0.020\angle 62.4^o$$
$$S_{22} = 0.781\angle -27.6^o$$

Determine the stability of this transistor by K- delta test and plot the stability circles on smith chart.
(b) Explain nonlinear measurements of microwave circuits with reference to load and source pull. [10]

Q.6 (a) Show that the reflection coefficient is larger than 1 for a load of negative resistance. Justify you answer using I2R relation. (10)
(b) Write a short note on Field Surveys. [10]

TC/SEM II/Paper / Subject Code: 34005 / Elective I : Network & Cyber Security/ MAY 2019

Choice Based

Q.P. Code: 27204

Duration: 3 hours **Max marks: 80**

Note the following instructions.

(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

1.a	What are the advantages of SET Protocol for Internet payment compared to SSL?	[5]
1.b	Distinguish between Vulnerability, threat and control.	[5]
1.c	Discuss the strength and limitations of IDS	[5]
1.d	Ethical hacking is necessary, Justify.	[5]
2.a	Explain Advanced Encryption Standard (AES).	[10]
2.b	Explain how IPSec provides data security at the IP packet level.	[10]
3.a	Explain with diagram how Confidentiality, Authentication and both are provided by public key cryptosystem.	[10]
3.b	What is cybercrime? With examples explain various tools and methods used for cybercrime.	[10]
4.a	Explain deployment and the performance analysis of the Firewall.	[10]
4.b	What do yo mean by intellectual property. Describe in detail.	[10]
5.a	Explain the entire processes of cyber incident preparation and investigation.	[10]
5.b	Discuss the security issues in Cloud, Wi-Fi and Mobile.	[10]
6.a	What is Risk management and Risk Analysis? Explain why it is important to identify both the threat and the vulnerability when determining risk.	[10]
6.b	Explain Digital Immune System.	[10]

Sem-II / Paper / Subject Code: 34414 / ElectiveII: Research Methodology. / May-2019

e based / EXTC / INFT / INST & CONT.

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

Instructions:

- Attempt any four questions out of six questions
- Assume suitable data wherever necessary
- Figures to the right indicate full marks.

Q.1 Answer any Four. 20

a. Role of SPSS in data analysis
b. Foot notes and Bibliography
c. Importance of t-tests
d. Descriptive statistics
e. Testing of hypothesis
f. Non-parametric tests

Q.2 a. What is the research methodology? Explain the steps in scientific research process. Briefly explain about literature review. 10

b. State the sources of research problem. How a problem is identified? Enumerate the criteria for the selection of a problem. 10

Q.3 a. Explain the concept of attitude scale. Explain the Likert's scale to measure data attitude. 10

b. Explain Quantitative vs. Qualitative type of research. Explain Post Facto research and Motivation in research. 10

Q.4 a. Explain critically interpretation and Organization of the data. 10

b. Hypothesis is a statement which involves a relationship of variable. Enumerate the types of variables included in stating a hypothesis. 10

Q.5 a. What are the characteristics of research? What are the factors affecting research design? 10

b. "A systematic bias results from errors in the sampling procedures". What do you mean by such a systematic bias? Describe the important causes responsible for such a bias. 10

Q.6 a. What are the differences between observation and interviewing as methods of data collection? Explain with two specific examples of situations where either observation or interviewing would be more appropriate. 10

b. You have been asked to research setting up of a roadside hotel. Design a questionnaire to find out the prospects of proceeding with the venture. 10

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