Hall Ticket Number:

III/IV B.Tech (Supplementary) DEGREE EXAMINATION

October, 2016 **Common to ECE, EEE & EIE**

Sixth Semester **Professional Ethics And Human Values**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Write short notes on the following (1X12=12 Marks)

a) Spirituality
b) Sharing
c) Honesty
d) Moral Dilemma
e) Professionalism
f) Self interest
g) Collective Bargaining
h) Safety
i) Discrimination
j) ASCE
k) Moral Leadership
l) Expert witness

UNIT-I

2. a) By work ethics, duties to the self, family, society, and nation are fulfilled. Justify the statementby writing the importance of work ethics. 7M

b) What are the means that one should adapt to live peacefully? 5M

(OR)

3. a) What are the principles enunciated in 'respect for others'? 4M

b) What are characteristics that a leader should develop in him to practice empathy? Give the benefits of Empathy. 8M

UNIT-II

4. a) Explain about various types of Inquiries. 8M

b) Differentiate among Profession, professional and Professionalism 4M

(OR)

5. Explain the theories of 'Moral Development' in detail. 12M

UNIT-III

6. a) Explain the code of ethics and limitations. 8M

b) What are major reasons for risk – benefit analysis? 4M

(OR)

7. a) What is collective bargaining? Give some pro- and anti-views on unionism. 6M

b) What is Whistle blowing? Give the types of Whistle blowing. What are the instructions to be followed before blowing a whistle? 6M

UNIT-IV

8. a) Explain the different types of problems found in computer ethics. 7M

b) What are various issues and requirements for engineers who act as advisors for planning and policy making? 5M

(OR)

9. a) Explain the code of ethics of IEEE in detail. 8M

b) What are the ethical responsibilities of a consulting engineer? 4M

EC 322

Hall Ticket Number:

III/IV B.Tech (Supplementary) DEGREE EXAMINATION

October, 2016 — **Electronics & Communication Engineering**

Sixth Semester — **Digital Communication**

Time: Three Hours — **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)

(a) What is the need for non-uniform quantization?
(b) State the demerits of digital communication.
(c) Define hamming distance and hamming weight.
(d) What is ISI?
(e) Draw the signal space diagram for QPSK signal.
(f) State source coding theorem.
(g) What is meant by channel capacity?
(h) What is a PN sequence?
(i) What is the need of spread spectrum technique?
(j) What is mutual information?
(k) What is the probability of error of a BPSK signal?
(l) What is the need for pre-coding?

UNIT – I

2. (a) Explain the transmitter and receiver sections of a delta modulation system. (8M)

   (b) Explain the need of modified duo-binary signaling scheme. (4M)

(OR)

3. (a) Explain the need of a DPCM system. With the help of block diagrams explain the transmission and reception of a DPCM system. (8M)
   (b) Explain the Nyquist condition needed for zero-ISI. (4M)

UNIT – II

4. (a) Derive error probability of a QPSK signal. (7M)
   (b) Explain how the energy of a signal is related to its length in signal space representation. (5M)

(OR)

5. (a) Explain the difference between Coherent and non-coherent detection process. (6M)
   (b) Explain the signal space diagram of a binary FSK signal. Draw the block diagram of BFSIK transmitter and receiver. (6M)

UNIT – III

6. (a) Consider a binary symmetric channel with $P(x_1) = \alpha$.
   (i) Show that the mutual information I(x: y) is given by I(x; y) =H(y) +P $\log_2$P+ (1-p) log2 (1-p).
   (ii) Calculate I(x; y) for α =0.5 and P=0.1 P: conditional probability of error (8M)
   (b) What is entropy and give some properties of entropy. (4M)

(OR)

7. (a) What is Kraft-McMillan inequality and how it relates to a prefix code. (4M)
   (b) A DMS X has four symbols x_1, x_2, x_3 & x_4 with $P(x_1)=1/2, P(x_2)=1/4$. $P(x_3) = P(x_4) = 1/8$. Constrict a Shannon-Fano code for X and compare the code efficiency with Huffman coding. (8M)

UNIT - IV

8. (a) Explain the encoding and decoding methods of cyclic codes giving proper block diagrams. (6M)
   (b) What is a PN sequence? Explain how they are generated and mention some of their properties. (6M)

(OR)

9. (a) Explain the generation and detection of FHSS signals in detail. (6M)
   (b) A (7, 4) Hamming code defined by the generator polynomial $g(x) = 1+x+x^3$ and the code word 0111001 sent was received as 0101001. Determine the syndrome polynomial s(x) and show that it is identical to error polynomial e(x). (6M)

EC/EI 323

Hall Ticket Number:

III/IV B.Tech (Supplementary) DEGREE EXAMINATION

October, 2016 **Common for ECE & EIE**

Sixth Semester **Digital Signal Processing**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer the following (1X12=12 Marks)

a) Determine the fundamental period of the following signal

$x(n) = 1 + e^{\overline{\quad}} - e^{\overline{\quad}}$

b) Determine whether the signal is power or energy signal or neither

$x(n) = \quad \bar{j} \quad + \quad \bar{j}$

c) Mention the condition for causality for LTI systems.

d) Derive the condition for Region Of Convergence for Z-transform.

e) State Initial value theorem with regard to Z-Transform.

f) Why we do not represent ROC for Uni-Lateral Z-Transform?

g) What is pre-wrapping? Why is it employed?

h) What are the requirements for a digital filter to be stable and causal?

i) How the order of the filter affects the frequency response of Butterworth filter.

j) What is the necessary and sufficient condition for the linear phase characteristics of an FIR filter?

k) What is the drawback in FIR filter design using windowing method?

l) Why direct form-II is called canonic form?

UNIT I

2 (a) Assume $x_1(n)$ and $x_2(n)$ are periodic signals with periods N_1 and N_2 respectively. Under what condition is the sum $x(n)= x_1(n)+ x_2(n)$ periodic and what will be the period of x(n) if it is periodic. (4M)

(ii) The following system have input x(n) and output y(n). Determine whether it is memory less, stable, causal, linear, time-invariant or not y(n)=sgn[x(n)]. (8M)

(OR)

3. (a) Apply the final value theorem to determine x(α) for the signal (4M)

$$x(n) = \begin{cases} 1 & if\ n\ is\ even \\ 0 & otherwise \end{cases}$$

(b) Consider the system $H(z) = \dfrac{z^{-1} + \frac{1}{2}z^{-2}}{1 - \frac{3}{5}z^{-1} + \frac{2}{25}z^{-2}}$ determine the following (8M)

(i) The Impulse response.

(ii) The zero-state step response

(iii)The step response if y(-1)=1 and y(-2)=2.

UNIT II

4. (a) Determine the Fourier series coefficients of the signal x(n) and plot its magnitude and phase spectra $x(n) = 1 + \sin(\frac{2\pi}{N} n) + 3\cos(\frac{2\pi}{N} n) + \cos(\frac{4\pi}{N} n + \frac{\pi}{2})$ (6M)

(b) Compute the N-point DFT of the length –N sequence (4M)

$x(n) = \cos(\frac{2\pi}{N} rn); \quad 0 \le n \le N-1; \qquad 0 \le r \le N-1$

(OR)

5. (a) Prove that the number of multiplication for computing N-point DFT using FFT with N=2^r [r is a positive integer] is $\frac{N}{2}\log_2^N$. (6M)

(b) Compute the 4-point DFT X(k) using DIF-FFT algorithm of a length-4 sequence x(n), $0 \le n \le 3$. Draw the Butterfly diagram. (6M)

UNIT III

6. (a) Realize the following FIR system $H(z) = 1 + 3z^{-1} + 2z^{-2}$ in the following forms
(i) Cascade form (ii) Lattice form (8M)

(b) Prove that symmetric and anti-symmetric FIR filter have Linear phase. (4M)

(OR)

7. (a) Design a linear phase FIR high pass filter using Hamming window with a cut off frequencies ω_c=0.8πrad/sample and N=7. (8M)

(ii) Compare the characteristics of rectangular window with Bartlett window. (4M)

UNIT IV

8. (a) Design an IIR low-pass Butterworth filter using Bilinear Transformation for the following specifications

Pass band: $0.8 \le |H(e^{j\omega})| \le 1 \qquad |\omega| \le 0.2\pi$

Stop band: $|H(e^{j\omega})| \le 0.2 \qquad 0.6\pi \le |\omega| \le \pi$ assume T =1sec. (8M)

(b) Discuss the advantage of Bilinear Transformation when compared to Impulse Invariant method. (4M)

9. (i) Prove that the cut-off frequency of a low-pass Butterworth filter is (6M)

$$\Omega_c = \frac{\Omega_p}{(10^{0.1A_p} - 1)^{\frac{1}{2N}}} = \frac{\Omega_s}{(10^{0.1A_s} - 1)^{\frac{1}{2N}}}$$

(ii) Obtain the cascade and parallel form realization of the given LTI system governed by the difference equation (6M)

$$y(n) = \frac{5}{8} y(n-1) - \frac{1}{16} y(n-2) + x(n) - 3x(n-1) + 3x(n-2) - x(n-3)$$

1. Mention the condition for stability for LTI systems.
2. Compare Recursive and Non- Recursive filters.
3. Why circular convolution should be converted to linear convolution.
4. Why zero padding is needed.
5. Why linear convolution is important in DSP?
6. Mention the ROC condition in Z-Transform.
7. Mention the ROC of finite duration discrete-time signal and night-sided i.e. for causal signal.
8. State Initial value theorem with regard to Z-Transform.
9. Why we do not represent ROC for uni-lateral Z-Transform?
10. What are the factors that Influence in realization of structures.
11. Mention the need of Bilateral Z-Transform.
12. What is frequency wrapping and how it can be eliminated?
13. What is pre-wrapping? Why is it employed?
14. What are the requirements for an analog filter to be stable and causal?
15. What are the requirements for a digital filter to be stable and causal?
16. How the order of the filter affects the frequency response of Butterworth filter.
17. How the poles of chebyshev transfer function are located in S-plane.
18. How the poles of Butterworth transfer function are located in S-plane.
19. Compare Butterworth and Chebyshev type-I filters.
20. What is the necessary and sufficient condition for the linear phase characteristics of an FIR filter?
21. What is the drawback in FIR filter design using windowing method?

EC 324

Hall Ticket Number:

III/IV B.Tech (Supplementary) DEGREE EXAMINATION

October, 2016 **Electronics & Communication Engineering**

Sixth Semester **Antennas And Wave Propagation**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer the following (12X1=12 Marks)

a) State the Lorentz Gauge condition.
b) At what distance the radiation field(E_r) is equal to the induction field (E_q)?
c) What is the difference between HPBW and FNBW
d) What is axial mode of a helical antenna?
e) Define effective length of an antenna.
f) Define the critical frequency of the ionosphere
g) What are the advantages of parasitic elements?
h) Why vertical polarization is employed in ground wave propagation?
i) What are the advantageous of antenna array?
j) What is the value of radiation resistance in ohms of a half-wave dipole in free space?
k) What type of propagation is used for television broadcasting?
l) What is meant by Cassegrain feed and for which type of antennas it is used?

UNIT-I

2. a) Derive the expression for power radiated and radiation resistance of alternating current element from fundamentals. (8M)
   b) Derive the expression for potential function using Maxwell's equation approach. (4M)

(OR)

3. a) Derive the expressions for radiation fields from a vertical λ/2 radiator and hence prove that it has a radiation resistance of about 73Ω. List all the assumptions involved in it. (8M)
   b) Starting from the source current expression, obtain the final expression for the far field component of Hφ of a short dipole. (4M)

UNIT – II

4. a) Obtain the relation between maximum effective aperture and directivity from fundamentals. (4M)
   b) Derive the FRIIS transmission equation and discuss the terms isotropic, omni-directional and principle patterns. (8M)

(OR)

5. a) Derive and sketch the radiation pattern of a 2 element array with half - wavelength spacing, equal amplitude and opposite phase excitations (6M)
   b) Derive the expressions for side lobe level and beam width of broad side array. (6M)

UNIT – III

6. a) Sketch the geometry of a helical antenna, and explain the working in normal mode. (6M)
   b) List out the different types of feeds used for parabolic reflectors and distinguish between them bringing out their merits and demerits. (6M)

(OR)

7. a) Explain the working of an antenna which can produce circular polarization. Determine the design conditions for obtaining circular polarization. Draw the radiation pattern of an antenna. (8M)
   b) Explain the operation and design considerations of Rhombic antennas. (4M)

UNIT – IV

8. a) Define and explain the terms: MUF, Virtual Height and Skip Distance as applicable for wave propagation. (6M)
   b) With neat illustrations, explain the structure and formation of ionospheric layers, and the corresponding frequencies of propagation (6M)

(OR)

9. a) Derive the expression for radio horizon. (6M)
   b) Explain the mechanism by which the space wave propagates. (6M)

EC 325

Hall Ticket Number:

III/IV B.Tech (Supplementary) DEGREE EXAMINATION

October, 2016 — **Electronics & Communication Engineering**

Sixth Semester — **Object Oriented Programming Using C++**

Time: Three Hours — **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer the following (12X1=12 Marks)

a. Name the operator used to access the class members outside the class.
b. Write syntaxes of any two formatted I/O operations.
c. What is the purpose of using manipulators? Explain?
d. Write any two advantages of fried function.
e. What are the advantages of using static keyword.
f. Write down the syntax for a class.
g. Why we need to define multiple constructors in a class. Explain?
h. Define dynamic constructor.
i. Write the purpose of Operator Overloading.
j. List the different types of inheritance.
k. Give an example to hybrid inheritance.
l. this pointer.

UNIT-I

2.(a) What is a token? Identify different tokens in C++ with example. 6M

(b) Write a C++ program to find and display the prime numbers in a given n digit word(example: word = 2367, prime no's are 2,3,7) 6M

(OR)

3. (a) Distinguish formatted I/O with unformatted I/O operations . 4M

(b) Identify different types of control structures in C++. Explain with examples 8M

UNIT-II

4.(a) Analyze different parts of a function. 4M

(b) Understand the advantages of a virtual function and develop a program to describe a virtual function 8M

(OR)

5. (a) Analyze accessing of private member of class and explain with example. 6M

(b) Develop a program that pass objects as function parameters. 6M

UNIT-III

6.(a) We cannot define a virtual destructor. Justify 4M

(b) What is virtual constructor? Explain it with suitable example? 8M

(OR)

7. (a) Decscribe any four string operations in brief. 4M

(b) Develop a program to describe any three operations on strings using operator overloading 8M

UNIT-IV

8. (a) What is virtual function? Discuss in detail about rules for virtual functions? 6M

(b) Write a C++ program that illustrate the use of Pure virtual function 6M

(OR)

9. (a) Reusability can be achieved through inheritance. Justify 4M

(b) What is derived class? Write a program to make a private member inheritance? 8M

EC 326(A)

Hall Ticket Number:

III/IV B.Tech (Supplementary) DEGREE EXAMINATION

October, 2016 **Electronics & Communication Engineering**

Sixth Semester **Communication Systems**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer the following (12X1=12Marks)

a) Define sensitivity & selectivity of a Receiver.
b) What is the difference between TRF & Super heterodyne receiver?
c) Define Image rejection ratio.
d) Write the expression for blocking probability for three -Stage Telecommunication networks.
e) List the advantages of space switching.
f) Define Time division space switching.
g) What is the typical bandwidth of TV signal?
h)What is the purpose of delayed AGC..
i) what is the necessity of synchronous pulses?
j) List the different colour picture tubes?
k) Define hue & saturation.
l) Mention some features of PAL system.

UNIT I

2) a) Draw the block diagram of high level AM Transmitter and explain the function of each block? (6M)

b) Explain the function of pre-emphasis and de-emphasis networks in FM Transmitter. (6M)

(OR)

3) a) With a neat diagram explain the working of Communication receiver? (6M)

b) What are the factors influencing the choice of intermediate frequency? (6M)

UNIT – II

4) a) Explain in detail about the Distributed SPC. (6M)

b) Explain the basic concept of message & circuit switching. (6M)

(OR)

5) a) Explain fully connected 3-stage switching network with diagram and obtain the expression for minimum number of cross points required. (6M)

b) Calculate the number of trunks that can be supported on a time-multiplexed space switch given that (i) 32- channels are multiplexed in each stream (ii) control memory access time is 100ns, bus switching and transfer time is 100ns per transfer. (6M)

UNIT III

6) a) Draw a neat sketch showing the construction of an Vidicon TV camera tube and explain its working?. (6M)

b) Draw and explain about composite video signal? . (6M)

(OR)

7) a) Draw a neat block diagram of a broadcast TV receiver and explain individual blocks? (6M)

b) Explain interlaced scanning and how it is used in reducing flicker? (6M)

UNIT – IV

8) a) Compare CATV and DTH? (6M)

b) With suitable block diagram explain the PAL encoder? (6M)

(OR)

9) a) Draw the functional block diagram of NTSC encoder and explain its operation? (6M)

. b) Explain the construction and working of Trinitron picture tube? (6M)