14ECEI302/EC 212

Hall Ticket Number:

II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION

November, 2016 **Common To ECE & EIE**

Third Semester **Data Structures 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 all questions (1X12=12 Marks)

a What are the applications of linked list?
b Compare singly linked list and doubly linked list.
c Define ADT.
d What are the basic operations of Queue?
e Write the operations of Stack.
f Write the time complexity of merge sort.
g Define tree.
h An empty tree is Binary tree? True/False
i What are the properties of BST?
j Define Graph.
k Write the representation of graph.
l What is BFT?

UNIT – I

2. Differentiate linear search and binary search. Write an algorithm both the searching techniques. Explain them with examples. 12M

(OR)

3.a List and explain about different types of linked lists. 6M
3.b Write an algorithm to insert an element into SLL. 6M

UNIT – II

4.a Define Stack. Write a program to implement Stack ADT. 6M
4.b Write a step wise evaluations for conversion of infix to postfix or the following expression. A-B/C-D/E(F-G) 6M

(OR)

5.a What is a Queue? Explain its concept. 6M
5.b Discuss the Queue ADT for array implementation. 6M

UNIT – III

6.a What is Binary tree? Explain its representation. 6M
6.b Define AVL Tree. Explain it with suitable examples. 6M

(OR)

7.a Write a program to implement insertion operation of Binary Search Tree. 6M
7.b Construct the BST for the following key sequence 6M
34 12 67 58 22 27 20 45 50

UNIT – IV

8.a Explain different types of graphs. 6M
8.b Define DFS. Explain it with example. 6M

(OR)

9.a What is minimal spanning tree? Illustrate it with example. 6M
9.b Explain about Breadth First spanning tree. 6M

Hall Ticket Number:

II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION

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

Third Semester **Electronic Devices**

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) Find the factor by which the reverse saturation current of Silicon diode will get multiplied when the temperature is increased from 27^0 C to 47^0 C.
b) What happens to the depletion region when a pn junction is reverse biased?
c) What is the bandgap energy of silicon in eV at room temperature.
d) What are the applications of diode?
e) Which configuration of BJT has a characteristic of high input impedance?
f) Give the symbol of Zener diode.
g) Why Silicon is preferred over Germanium though Germanium has high mobility in comparison to Silicon?
h) Define the stability factor 'S".
i) Draw the symbol of n-channel Enhancement MOSFET.
j) Why self-bias circuit is preferred over other circuits for biasing in a BJT?
k) What is the condition for thermal stability?
l) In a UJT, if η= 0.75, V_{BB} = 12V and V_D = 0.6V, find the value of V_P.

UNIT-I

2 a) Derive the expression for Continuity Equation. (8M)
b) Find the concentration of holes and electrons in a p-type Germanium at 300^0 K if the conductivity is 100 $(\Omega\ cm)^{-1}$. Assume that the conductivity due to electrons is negligible as compared to that due to holes. (4M)

(OR)

3 a) What are the methods of generating excess carriers? (6M)
b) For a particular semiconductor material, $N_C = 1.5 \times 10^{18}\ cm^{-3}$, $N_V = 1.3 \times 10^{19}\ cm^{-3}$ and E_g = 1.43eV at $T=300^0$K.
(i) Determine the position of intrinsic Fermi level w.r.t the center of the bandgap. (6M)
(ii) What is the position of the Fermi level w.r.t the top of the valence band E_V.

UNIT-II

4 a) Explain the characteristics of a Tunnel Diode with energy band diagram. (8M)
b) Explain the V-I characteristics of a PN diode. (4M)

(OR)

5 a) Explain the working principle of photodiode. What are its applications? (8M)
b) The diode current is 0.6 mA when the applied voltage is 300mV and 10mA when the applied voltage is 400mV. Determine dynamic resistance. (4M)

UNIT-III

6 a) Explain the operation of an n-channel JFET with the help of drain and transfer characteristics. (8M)
b) A p-channel JFET has I_{DSS} = -10mA, V_p= 4V, V_{GS} = 1.5 V. Calculate I_D, g_m. (4M)

(OR)

7 a) What is Early Effect? What are its consequences? (6M)
b) Calculate the values of I_E, α and β for a transistor with I_C = 10mA, I_B = 100 μA and I_{CBO} = 10 μA. (6M)

UNIT-IV

8 a) Derive the stability factor S for a self-bias circuit. (7M)
b) Determine the quiescent currents and the collector to emitter voltage for a silicon transistor with β=75, in the self biasing arrangement. The circuit component values are V_{CC}=18V, R_C=2.2K, R_E=0.15K, R_1=100K and R_2 = 5K. (5M)

(OR)

9 a) Draw and explain UJT emitter characteristics and mention various regions. (6M)
b) Explain the construction and working of a TRIAC. Sketch its V-I characteristics. (6M)

14EC304

Hall Ticket Number:

II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION

November, 2016 **Electronics and Communication Engineering**

Third Semester **Signals And 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 all questions (1X12=12 Marks)

a) Determine the even component of a signal $x(t) = 2\cos(2t) + 3\sin(3t)$.
b) What is the fundamental period of $x(t) = 1 + \cos(10\pi t)$.
c) What is the relationship between unit impulse and unit step function.
d) Determine whether the LTI system with impulse response $h(t) = e^{-2t}u(t+1)$ is causal or not?
e) List the properties of convolution integral.
f) State the necessary and sufficient conditions for the existence of Fourier series.
g) What is the Fourier transform of $x(t) = \quad (t-2)$.
h) State Duality property of Fourier transforms.
i) Determine the frequency response of an LTI system with impulse response $h(t) = \quad (t)$.
j) Define Nyquist rate and Nyquist interval.
k) Define Correlation.
l) What is the relationship between Autocorrelation and Power spectral density?

UNIT- I

2. a) Determine whether the following signals are energy signals, power signals or neither 2X3 = 6 M
   i. $x(t) = t\,u(t)$
   ii. $x(t) = \cos(20\pi t)$
   b) Determine whether the following signals are periodic or not. If periodic find its Fundamental period. 3X2=6 M
   i. $x(t) = \cos(2t) + \sin(4t)$
   ii. $x(t) = e^{-j\pi t}u(t)$
   iii. $x(t) = e^{-j2\pi t} + e^{-j3t}$

(OR)

3. a) Graph the following signals 3X2=6 M
   i. $x(t) = 2\,\mathrm{sgn}(t+3)$
   ii. $x(t) = 2\,r(t+2)$
   iii. $x(t) = 5\,e^{-2t}u(t-3)$
   b) Determine whether the following systems are Linear, Time-invariant, causal and stable 2X3 = 6 M
   i. $y(t) = 2\,x(t-2) + 3\,x(2-t)$
   ii. $y(t) = \cos\{|x(t)|\}$

UNIT- II

4. a) Derive the relation between trigonometric Fourier series and exponential Fourier series 4 M

   b) Consider a continuous-time LTI system with impulse response $h(t) = u(t)$. Determine the response of the system to the input $x(t) = e^{-|t|}$ 8M

(OR)

5. a) Find the exponential Fourier series representation of the periodic signal
   $x(t) = t^2$; $-1 < t < 1$ with fundamental period T = 2 sec. 6 M
   b) Find the convolution of the following signals 6 M
   $x(t) = e^{-2t}\,u(t)$ and $h(t) = e^{4t}u(-t+2)$

UNIT- III

6. a) Find the Fourier transform of a signal $x(t) = e^{-t}\sin(\pi t)\, u(t)$ 6 M
   b) State and prove the following properties of continuous-time Fourier transform 2X3=6M
      i) Time scaling ii) Multiplication

(OR)

7. a) Find the Fourier transform of a signal $x(t) = (1 - t)u(t)$ 6 M
   b) Frequency response of an LTI system is given by $H(j\omega) =$ ——

   Find the response of the system to the input $x(t) = (0.8)\, u(t)$ 6 M

UNIT- IV

8. a) State and prove the properties of autocorrelation 6 M
   b) Compute $R(\tau)$ and $\psi(\omega)$ for the signal $x(t) = e^{at}\, u(-t)$ 6 M

(OR)

9. a) Compare Energy spectral density and Power spectral density 4 M
   b) State and prove Sampling theorem for low pass signals 8 M

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

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Third Semester **Electronic Devices**

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