

15/12/23

Printing Pages : 1

Paper Code : - BECE-301
(C) (SVSU) : 2023-2024/R

Enrollment No.

B.TECH (EC)

ELECTRONICS & COMMUNICATION ENGINEERING

2ND YEAR IIIRD SEM EXAMINATION

SUBJECT NAME: - Electronic Devices

[BECE-301]

[Time : 3:00 Hours]

[Max. Marks : 70]

Note: Attempt all the questions as per given Instruction.

- 1) Attempt any Four parts. [4×3=12]
 - a. Explain the working of Zener diode.
 - b. Explain the etching process.
 - c. What is BJT ? Explain with diagram.
 - d. What is solar cell?
 - e. Explain the working of Schottky diode.
 - f. Explain the oxidation process.
- 2) Attempt any Three parts. [3×4=12]
 - a. Explain semiconductor with diagram.
 - b. Explain various classification of BJT.
 - c. Describe the energy bands in intrinsic semiconductor.
 - d. Explain Oxidation process?
- 3) Attempt any Three parts. [3×6=18]
 - a. Explain the working of LED.
 - b. Explore biasing scheme of BJT with diagram?
 - c. What is the photolithography? Explain with diagram.
 - d. Give the fabrication process of CMOS.
- 4) Attempt any Two parts. [2x7=14]
 - a. Explain different types of MOSFET with diagram.
 - b. Explain VI characteristics of FET.
 - c. Explain different type configurations of BJT.
- 5) Attempt any Two parts. [2x7=14]
 - a. Explain different types of configuration used in FET.
 - b. Explore the different modes of PN Junction with diagram.
 - c. Explain the Working of NPN Transistor with its Characteristics.

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**B.TECH (ECE)
II YEAR, III SEMESTER EXAMINATION
SIGNALS & SYSTEMS**

[Time : 03:00 Hours]

[Max. Marks : 70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS**QUESTION NO.-1: ATTEMPT ANY FOUR PARTS.**

(4*3=12)

- Plot the signal with respect to time.
 $x(t) = [u(t) + r(t-1) - 2u(t-3)]u(-t+5)$
- Determine the Laplace Transform of following signal & also plot ROC.
 $x(t) = e^{-2t}u(t) - e^{-2t}u(-t)$
- Find and sketch the even and odd components of the following signals:
 $x(n) = e^{-(n/4)}u(n)$
- Define and Classify Signal
- Define and compare Energy & Power Signal with example.
- Determine the Fourier Transform
 $x(t) = \sin \omega_0 t \cos \omega_0 t$

QUESTION NO.-2: ATTEMPT ANY THREE PARTS.

(3*4=12)

- Define Elementary signals with suitable diagram
- Define ROC of Laplace- Transform & explain its properties.
- Determine the Z-transform of:
 $x(n) = \cos \omega_0 n u(n)$
- State & Prove frequency shifting & convolution property of DTFT.

QUESTION NO.-3: ATTEMPT ANY THREE PARTS.

(3*6=18)

- Determine whether or not the signals below are periodic & for each signal that is periodic, determine the fundamental period
 - $x(t) = \sin 15\pi t$
 - $x(n) = \sin(6\pi n/7)$
 - $x(n) = \sin(n/8)$
- Find $x(n)$ for the given $X(Z)$
 $X(Z) = \frac{10Z}{(Z-1)(Z-2)}$ using Residue Method
- State and prove initial and final value theorem for Laplace- transform
 - Find the initial and final values of the signal.
 $X(s) = \frac{s+10}{s^2+2s+2}$
- Prove the following
 - The power of the energy signal is Zero over infinite time
 - The Energy of the power signal is infinite over infinite time.

QUESTION NO.-4: ATTEMPT ANY TWO PARTS.

(2*7=14)

- A system characterized by the transfer function
 $\frac{Y(s)}{U(s)} = \frac{2}{s^3+6s^2+11s+6}$
Find the state and output equation in matrix form and test the controllability and observability

b) Consider the systems

- $y(t) = x^2(t-t_0)$
- $y(t) = \sin[x(t+2)]$

Determine whether the systems is

- Linear
- stable
- Causal

Justify your answer.

- Solve the difference equation of a causal LTI system which is expressed as under
 $y(n) + 3y(n) = x(n)$

Assume that the system is initially relaxed..

QUESTION NO.-5: ATTEMPT ANY TWO PARTS.

(2*7=14)

- Determine the Inverse Z-transform of
 $X(Z) = Z^2 / (0.5 - 1.5Z + Z^2)$
for ROC $|Z| < 0.5$ using long division method
- A discrete time signal is given by
 $x(n) = [1, 1, 1, 1, 2]$
sketch the following signals:
 - $x(n-2)$
 - $x(n+1)$
 - $x(3-n)$
 - $x(n)u(n-1)$
 - even samples of $x(n)$
 - Odd samples of $x(n)$
- Obtain the state model for the given transfer function
 $G(s) = \frac{Y(s)}{U(s)} = \frac{K(C3s+C1)}{s^2+a3s^2+a2s+a1}$

a) Explain about Series resonance with phasor diagrams. (2*7=14)

b) With neat figures, explain the variation of voltage across resistance, inductance, and capacitance w.r.t. frequency.

c) Obtain the inverse Laplace Transform of $F(s) = \frac{s+5}{s(s^2+2s+5)}$.

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(B) (SVSU) : 2023-2024/R

Enrollment No.

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B.TECH (ECE/CE)

**II YEAR, III SEMESTER EXAMINATION
BASIC ELECTRONICS/ BASICS OF ELECTRONICS ENGINEERING/**

[Time : 03:00 Hours]

[Max. Marks : 70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS**QUESTION NO.-1: ATTEMPT ANY FOUR PARTS.****(4*3=12)**

- Explain effect of temperature on semiconductor.
- What do you understand by pinch off voltage and cut-off voltage as applied to FET?
- What is op-amp? Draw and explain the block diagram of op-amp.
- Define CMRR and Slew Rate.
- What is the need for biasing a transistor?
- What is meant by dc load line and Q-point?

QUESTION NO.-2: ATTEMPT ANY THREE PARTS.**(3*4=12)**

- Draw and explain V-I characteristics of a PN junction diode.
- Explain Zener and Avalanche Breakdown.
- Explain Differentiator of op-amp.
- Explain forward and reverse biasing.

QUESTION NO.-3: ATTEMPT ANY THREE PARTS.**(3*6=18)**

- What is filter? What are the types of filters? Explain one of them.
- Explain the input and output characteristics of a transistor in CB configuration.
- What is clipper. Describe the operation of positive and negative clippers with the help of circuit diagrams.

QUESTION NO.-4: ATTEMPT ANY TWO PARTS.**(2*7=14)**

- Explain the working of Centre type full wave rectifier.
- Explain the formation of depletion region in a PN junction.
- Explain JFET.

QUESTION NO.-5: ATTEMPT ANY TWO PARTS.**(2*7=14)**

- Derive expression for rectification efficiency & ripple factor for Half wave and full wave rectifier.
- Explain Differential Amplifier & Integrator.
- Explain the working of PNP transistor.
