

B.TECH - III YEAR (CS, EC & ME) SUBJECT CODE - KNC -501

SUBJECT NAME - Constitution of India, Law & Engineering

Time Duration - 1 hr Maximum Marks - 15 (Each question of 5 marks)

Note - Attempt any three questions out of five.

Q1. Write down the Fundamental rights, fundamental duties, salient features of the Indian Constitution & discuss enforcement of constitution.

Q2. Write short note on following.

Preamble of Indian constitution, President Rule, Public interest Litigation, Lokayukt

Q3. What is the procedure of amendment of constitution of India? Discuss historical background of amendments in Indian constitution & emergency provisions.

Q4. What are the directive principles of state policy? Write short note on centre- state relations & federal system.

Q5. Discuss role & duties of Parliament & President of India.

C H
C R



**Bundelkhand Institute of Engineering & Technology
Jhansi, Uttar Pradesh 284128**

ODD SEM: CT-1: 2022-23

Class (Yr & Branch): 3rd (EC)
Subject: Digital Signal Processing
Time: 60 Minutes
Student's Name.....

Semester: 5th
Paper Code: KEC-503
M. Marks: 10
Roll No.....

Note: All parts are compulsory.

PART-1

Attempt any 3:

2*3= 6 Marks

1. Draw and explain block diagram of DSP, and its application (CO1)
2. Write short notes on (CO1)
 - a. Recursive & Non Recursive
 - b. Canonic and Non-Canonic form
3. Obtain a cascade realization of the system by following function (CO1)

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}$$

4. Obtain direct form realization for the transfer function of an FIR system given by. (CO1)

$$H(z) = \left(1 - \frac{1}{4}z^{-1} + \frac{3}{8}z^{-2}\right) \left(1 - \frac{1}{8}z^{-1} - \frac{1}{2}z^{-2}\right)$$

PART-2

Attempt any 1:

1*4=4 Marks

1. Difference between FIR and IIR digital Filter. (CO1)
2. An analog filter has the following system function, convert this function into digital filter using backward difference for the derivative (CO2)

$$H(s) = \frac{1}{(s+0.1)^2 + 9}$$

B.Tech Electronics & Communication Engineering
CT1 Examination 2022-23
KEC502 -Microprocessor and Microcontroller

Time : 1 hours

Max. Marks : 15

Note : Attempt all questions in context of 8085 microprocessor.
I. Attempt ALL questions. Each question carries 3 marks.

- 1> Explain the addressing modes of 8085 μp with examples. Explain the flags used in 8085. (CO1, RBL 2,3)
- 2> Explain with syntax and example : RAL, STAX, PUSH (CO2, RBL 2,3)
- 3> Draw the self explanatory block diagram of 8085 μp. OR (CO1, RBL 2)
- 3> Which address lines are multiplexed? How are they demultiplexed? (CO1, RBL 2)
- 4> Interface 3k EPROM and 2k RAM with 8085 μp using 3 to 8 decoder. Assume the start location of RAM is 8000h. Explain. (CO2, RBL 3)
- 5> Three unequal numbers are stored from memory location 2000h. Write a program to arrange them in ascending order. OR (CO2, RBL 3,4)
- 5> A string of eight data bytes is stored starting from memory location 2000h. These are the digital values of current readings. Whenever the circuit was off, the current reading was recorded as zero value(blank). Write a program to eliminate the blanks from the string. DATA (H) : E3, 74, 23, 00, C2, 00, 00, 5B (CO2, RBL 3,4)

LXI B, (2000)h

4X B

0000 → 0fff



Bundelkhand Institute of Engineering and Technology, Jhansi

Class Test-1, 2022-23

(Bachelor of Technology)

Branch: Electronics and Communication Engineering

Sem: Vth

Subject Name: VLSI Technology

Sub. Code: KEC-053

Max. Marks: 10

Time: 1 Hour

Note: Attempt any five questions. All questions carry equal marks.

- Q. 1 What do you understand by planar process in IC fabrication? Explain it with suitable diagram. [CO1]
- Q. 2 How does single Si crystal is grown from polycrystalline Si? Explain with the help of suitable diagram. [CO1]
- Q. 3 Explain Moore's law of integration for IC fabrication with suitable graph and also explain SSI, MSI, LSI and VLSI technologies with typical examples? [CO1]
- Q. 4 Discuss the shaping and sawing operations used for wafer fabrication with required diagram? [CO1]
- Q. 5 Explain the RCA wet cleaning procedure of wafers to clean the metal/ionic contamination. [CO1]
- Q. 6 Compare the properties of {1 0 0} and {1 1 1} crystal planes used for IC fabrication. [CO1]

Bundelkhand Institute of Engineering and technology, Jhansi
Department of Electronics and Communication
B.Tech. 5thSemester (EC), Class Test -I-September 2022
Subject: Integrated Circuit Subject code KEC501

Time: 1 Hr.

Maximum marks: 10

Note: Attempt any five questions. All questions carry 2 marks.

Q.1

Draw transfer characteristics of non-inverting Opamp

(2)CO1

Q.2

An analog-circuit designer requires a +5 V power source from which to run a small amount of digital logic requiring 20 mA at +5 V. The analog system uses ± 15 V supplies which are quite well-regulated (that is stable over time and temperature and reasonably independent of load). Suggest a simple op-amp circuit, using a resistor network operating at 0.5 mA, to do the job. If the op amp requires a bias current of 2 mA from its supplies at no load, what is its total power dissipation when fully loaded at the maximum current required by the logic?

(2)CO1

Q.3

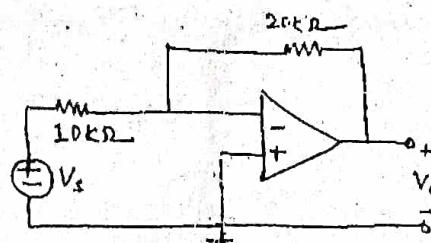
The slew rate of an op-amp is 0.5 V/ μ s. Calculate the maximum frequency of a sinusoidal input of 2V rms that can be handled without excessive distortion.

(2)CO1

Q.4

A 741 Opamp has an open loop voltage gain of 2×10^5 input resistance of $2M\Omega$ and output resistance 50Ω . Determine V_o/V_s .

(2)CO2

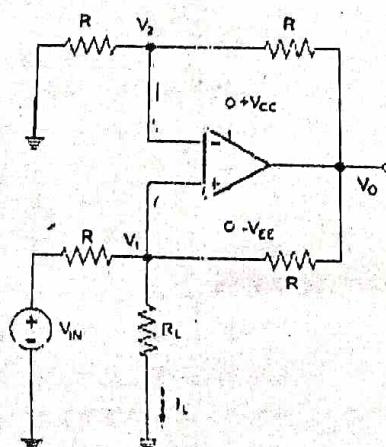


~~VS~~

Q.5

Determine current I_L in the circuit given below

(2)CO2



$$V_o = V_0 \sin \omega t$$

$$\frac{dV_o}{dt} = \omega V_0 \cos \omega t$$

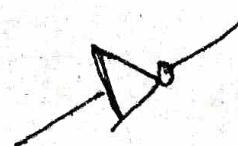
$$S = 2\pi f \cdot V_0$$

$$\frac{S}{V_0 \times 2\pi} = f$$

Q.6

Design a circuit using OPAMP to perform multiplication of two input voltages.

(2)CO2



Class Test_1 (Session: 2022-23)
Electronic instrumentation and measurements KEC-057

MM. 15

Time: 01 Hour

Note: Attempt all questions.

1. Explain the transistor voltmeter (TVM) with cascaded transistors. **(4 Marks)**
2. How can a Galvanometer with $G=20$ Ohms and full scale deflection current $I_g=1\text{mA}$ be converted into
 - (i) a voltmeter with a maximum range of 10V?
 - (ii) an Ammeter with a range of 0 to 50 mA. **(4 Marks)**
3. The resistance of a circuit is found by measuring current flowing and power fed in the circuit. Find the limiting error in the measurement of the resistance when the limiting errors in the measurement of power and current are respectively $\pm 1.5\%$ and $\pm 1\%$. **(3 Marks)**
4. Explain the digital voltmeter with suitable block diagram. Explain ramp type digital voltmeter in detail. **(4 Marks)**

Utkarsh Tripathi (2009331054)

B.TECH – IIIYEAR (CS, ME & EC) SUBJECT CODE – KNC -501
SUBJECT NAME – Constitution of India, Law & Engineering
Time Duration – 1 hr Maximum Marks – 15 (Each question of 5 marks)

Note - Attempt any three questions out of five.

- Q1. What is It act? Explain E – governance, Cyber war & copyright act.
- Q2. Write down short note on following: Cyber appellate Tribunal, Contract Law, Tort and Work place law.
- Q3. What is intellectual property law? Explain Patent filing application.
- Q4. Comment on following: Arbitration as an alternative to resolve dispute.
- Q5. Describe role of chief minister, Legislative assembly & Governor.

Utkarsh Tripathi (2009331054)



Bundelkhand Institute of Engineering & Technology
Jhansi, Uttar Pradesh 284128

ODD SEM EXAM: 2022-23

Class (Yr & Branch): 3rd (EC)

Semester: 5th

Subject: Digital Signal Processing

Paper Code: KEC-503

Time: 60 Minutes

M.M.: 10

Student's Name.....

Roll No.....

Note: All parts are compulsory.

PART-1

Attempt any 3:

3*2= 6 Marks

1. Transform the prototype low pass filter with system function

$$H(s) = \frac{\Omega_c}{s + \Omega_c} \text{ into a high-pass filter with cut-off frequency } \Omega_c^* \quad [\text{CO2}]$$

2. The transfer function of first order normalized LPF is

$$H(S) = \frac{1}{S+1} \quad \Omega_c = 1$$

Obtained the transfer function of second order band pass filter having pass band 1 KHz- 2 KHz. [CO2]

3. Explain the advantages of Kaiser Window. Also write mathematical formula for Kaiser Window. [CO3]

4. Write short note on:

- (a) Coefficient Quantization error (b) Limit cycle oscillation [CO3]

PART-2

Attempt any 1:

1*4=4 Marks

1. Using the bilinear transformation, design a high pass filter, monotonic in pass band with cut off frequency of 1000Hz and down 10dB at 350 Hz. The sampling frequency is 5000Hz. [CO3]

2. Design a digital Butterworth filter satisfying the constraints [CO3]

$$0.707 \leq |H(e^{j\omega})| \leq 1 \quad \text{for } 0 \leq \omega \leq \frac{\pi}{2}$$

$$|H(e^{j\omega})| \leq 0.2 \quad \text{for } \frac{3\pi}{4} \leq \omega \leq \pi$$

With $T=1$ sec using bilinear transformation

Utkarsh Tripathi (2004331054)

Bundelkhand Institute of Engineering and Technology, Jhansi

Class Test-2, 2022-23

(Bachelor of Technology)

Branch: Electronics and Communication Engineering

Sem: Vth

Subject Name: VLSI Technology

Sub. Code: KEC-053

Max. Marks: 10

Time: 1 Hour

Note: Attempt any five questions. All questions carry equal marks.

Q. 1 What is epitaxy? Explain the Molecular beam epitaxy system with suitable diagram. [CO2]

Q. 2 What are the important properties of SiO₂ layers in view of IC fabrication? [CO2]

Q. 3 Discuss the four point probe method for measuring the sheet resistance of grown epitaxial layer? [CO2]

Q. 4 What is photoresist? Explain the working of positive photoresist with necessary chemical equations. [CO3]

Q. 5 Explain the wet chemical etching process for etching of Si layer? [CO3]

Q. 6 Discuss the deposition process of Poly-Si layer on to the wafer with the suitable chemical equations. [CO3]

Utkalsh Tripathi (2009331054)
B.Tech Electronics & Communication Engineering

CT2 Examination 2022-23 KEC 502 -Microprocessor and Microcontroller

Time : 1 hours

Max. Marks : 15

Note : Attempt all questions in context of 8051 microcontroller.

Note : Attempt ALL questions. Each question carries 3 marks.

- 1> Illustrate the instructions with syntax and example : DJNZ, CJNE, MUL
- 2> Interface and write a program to control direction of DC motor with 8051.
- 3> Interface 8 bit DAC with 8051 and write a program to generate sine wave.
- 4> Write a program in assembly language of 8051 to generate a Fibonacci series of given number N which is at memory location 2000h. OR
- 4> Write a program to arrange the 15 numbers stored from location 60H in ascending order and save these from location 80H.
- 5> Explain TCON and TMOD registers and write a program to generate a delay of 50 msec with 12 MHz crystal frequency using Timer interrupt. OR
- 5> Explain the modes of serial communication and explain the significance of selection of crystal frequency with one example baud rate 4800.

Utkarsh Tripathi (2004331059)

Class Test_2 (Session: 2022-23)

Electronic instrumentation and measurements KEC-057

MM. 15

Time: 01 Hour

Note: Attempt all questions.

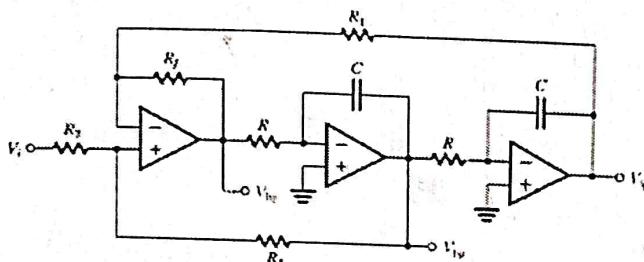
1. Give classification of resistances on their values. Write down the different methods for measuring medium resistances. Explain both connections of Ammeter-Voltmeter methods for measuring medium resistances with their comparative errors. **4 Marks C0 3**
2. What is Guard circuit in high resistance measurements? Explain direct deflection method for measuring high resistances. **4 Marks C0 3**
3. Determine the general equation for balanced AC bridge. **3 Marks C0 3**
4. Discuss the cathode ray oscilloscope (CRO) by explaining all its components with neat block diagram. **4 Marks C0 4**

1 HR.

Attempt any five questions. All questions carry 2 marks.

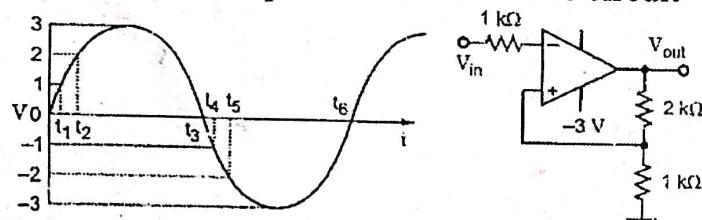
Q.1 Design a Generalized Impedance Converter to act as an inductor of 1H (2)CO2

Q.2 The KHN Biquad circuit is shown below determine expression for V_{hp} (2)CO2

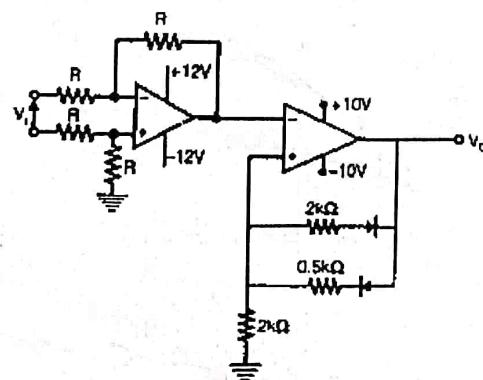


Q.3 Design a high – pass filter at a cutoff frequency of 1 kHz. With a passband gain of 2. Plot the frequency response of the filter. (2)CO2

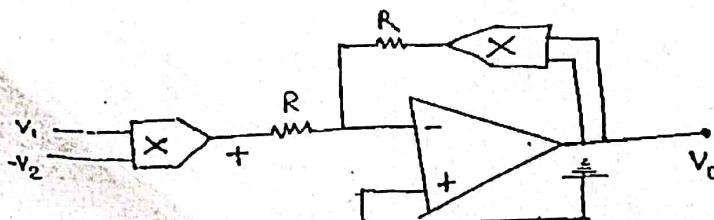
Q.4 An ideal op-amp circuit and its input waveform are shown in the figures. Draw output waveform of this circuit (2)CO3



Q.5 For the circuit shown below draw its transfer characteristics assuming ideal diodes with zero cut in voltage (2)CO3



Q.6 Apply the concept of analog multiplier to calculate output voltage V_0 for the circuit given below if $V_P = V_1 * V_2$ (2)CO3



Utkarsh Tripathi (2004331059)

Class Test_2 (Session: 2022-23)

Electronic instrumentation and measurements KEC-057

MM. 15

Time: 01 Hour

Note: Attempt all questions.

1. Give classification of resistances on their values. Write down the different methods for measuring medium resistances. Explain both connections of Ammeter-Voltmeter methods for measuring medium resistances with their comparative errors. **4 Marks C0 3**
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Utkarsh Tripathi.

(Roll No. to be filled by candidate)

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B. TECH.

FIFTH SEMESTER THEORY EXAMINATION, 2022-23

KEC-502

MICROPROCESSOR AND MICROCONTROLLER

Time: 03 Hours

Max. Marks: 100

Note:

- Attempt all questions. All questions carry equal marks.

1 Attempt any *FOUR* parts of the following: 4×5 CO

- Which lines of 8085 microprocessor need demultiplexing CO1 and why? Explain the process of demultiplexing. Also explain addressing modes of 8085 microprocessor.
- Consider the execution of the following instructions by 8085 CO1 microprocessor :

LXI H, 2030 H

MVI M, 80H

LXI H, 2031H

MVI M, 02H

LHLD 2030H

What are the contents of memory location 2030H and 2031H and the register H and L after execution of above instruction?

- To shift the bits of accumulator towards left and right with CO1 and without carry, which instructions are used in 8085 microprocessor, explain with examples?
- What are the different flags used in 8085 microprocessor? CO1 Which instructions are used to know the status of pending interrupts and masking the interrupts? Explain them with syntax.

RLC
RRC

RAR
RAL

e. Interface 2k EPROM and 1k RAM with 8085 μp using 3 to CO₁ 8 decoder. Assume the start location of RAM is 7000H.

Explain.

f. Differentiate between 8085 microprocessor and 8051 CO₁ microcontroller.

2. Attempt any **TWO** parts of the following: 2×10 CO

a. A set of eight readings is stored in memory location starting CO₂ at 2050H. Write a program to check whether a byte 00H exists in the set. If it does, stop checking and display its memory location. Otherwise output FFH. Data (H) : 48, 32, F2, 38, 37, 40, 00, 8A

b. Three unequal numbers are stored from memory location CO₂ 2000H. Write a program to arrange them in descending order.

c. A BCD number between 0 to 99 is stored in an R/W memory CO₂ location called the input buffer. Write a main program and a conversion subroutine (BCDBIN) to convert the BCD number into its equivalent binary number. Store the result in a memory location define as the output buffer (OUTBUF)

3. Attempt any **TWO** parts of the following: 2×10 CO

a. Write the initialization instructions to set the port A as Input CO₃ port, port B as output port of 8255 with the explanation of its control word. Assume that 8 switches are connected at port A and 8 LEDs are connected at Port B. Write a program to glow the corresponding LED on Port B for corresponding switch ON on port A.

b. Which mode of 8253/8254 programmable timer/counter is CO₃ used generate a pulse every 50 microseconds from counter 0. Explain the modes of 8253/8254 programmable timer/counter

Mode 4; Software trigger mode.

Mode 5; Hardware trigger mode.

Mode 0; interrupt or timer of other.
 Mode 1; Programmable in one shot
 Mode 2; Rate generator.
 Mode 3; Square wave generator.

- c. When 8237 is used? Explain the process of DMA transfer CO3 with DMA signals.
 *HOLD
 HLDA (hold acknowledge)*
4. Attempt any **FOUR** parts of the following: 4×5 CO
 a. Evaluate the contents of R7 register after the execution of CO4
 following instructions of 8051 μc :
 MOV 50h, #45H
 MOV R7, @50H
 ADD 07, #20H
- b. Explain the terms : CO4
 i. CISC Processors
 ii. RISC Processors
 iii. Embedded Systems
- c. Explain the following instructions of 8051 μc with proper CO4
 syntax and examples.
 i. MOVX
 ii. MUL
- d. Explain the following instructions of 8051 μc with proper CO4
 syntax and examples.
 i. CJNE
 ii. DJNZ
- e. Interface 8 bit DAC with 8051 microcontroller and write a CO4
 program to generate a Ramp wave on port 1.
- f. Write a program in assembly language of 8051 to transfer CO4
 the 16 bytes of data given from 2000H memory location to
 2050H memory location.
5. Attempt any **TWO** parts of the following: 2×10 CO
a. Prepare a hardware interface using L293D with 8051 μc for CO5
 driving a stepper motor and then develop a routine to run the
 stepper motor in any one direction at alternately slower or

faster speeds.

- b. Explain TCON and TMOD registers of 8051 μ c in detail. CO5
Also write a program to generate an interrupt every 50 msec
with 12 MHz Crystal using timer of 8051 μ c.
- c. Interface ADC with 8051 microcontroller to record the body CO5
temperature using thermistor as a temperature transducer.
Write a program and justify the use of hardware
components. Draw the interface diagram.

Utkarsh Tripathi.

(Roll No. to be filled by candidate)

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B. TECH.
FIFTH SEMESTER THEORY EXAMINATION, 2022-23
 KEC-501
Integrated Circuits

Time: 03 Hours

Max. Marks: 100

Note:

- Attempt all questions. All questions carry equal marks.
- Assume missing data suitably.

1. Attempt any **FOUR** parts of the following: 4×5 CO1

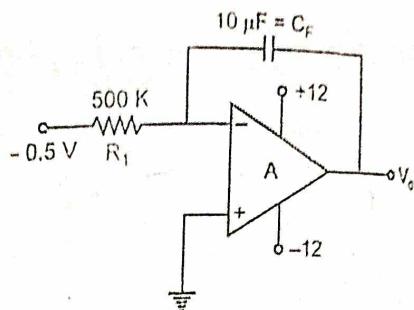
a. If a 741 IC is configured as an I – to - V converter, What is the CO1 lowest value of current that may be measured by this converter?
 If for IC 741 $V_{sat} = \pm 15V$.

b. For a typical IC 741 Op-Amp in voltage follower mode, the CO1 parameters are given as $I_{CQ} = 10\mu A$ and $C_c = 33pF$. The peak value of the input signal is 12 V. To get undistorted output from this Op-Amp, calculate slew rate and maximum possible frequency.

c. Design an inverting Op-Amp circuit with a voltage gain of CO1 $A_f = \frac{V_o}{V_i} = -30$ and an input resistance that is largest possible but under constraint that the largest resistance value is limited to $1M\Omega$

d. Explain why open – loop Op-Amp configurations are not used CO1 in linear applications.

e. In the figure below assume Op-Amp to be ideal. Enlist the problems in getting proper output V_o of the circuit

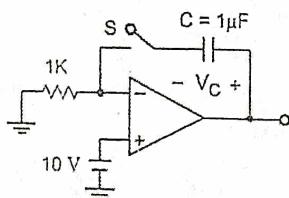


- If the differential voltage gain and the common mode voltage CO1 gain of a differential amplifier are 48dB and 2dB respectively. Then calculate common mode rejection ratio in dB.

96

2. Attempt any **FOUR** parts of the following: 4x5 CO2

- a. For the circuit shown in the figure, the capacitor C is initially CO2 uncharged. At $t = 0$, the switch S is closed. Calculate the voltage V_C across the capacitor at $t = 1$ millisecond



$$1 - e^{-t/RC}$$

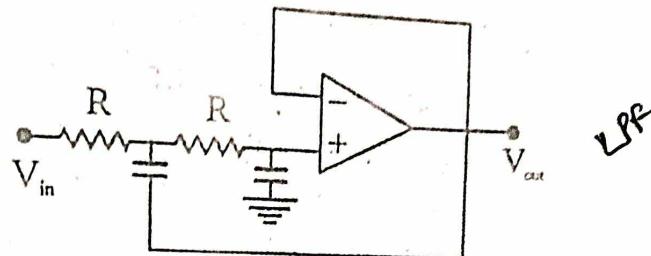
- b. If a 741 IC is configured as an I-to- V converter using $1M\Omega$ CO2 resistor, What is the lowest value of current that may be measured using this circuit?

- c. What is all pass filters? Where and why is it needed? CO2

- d. Design a high – pass filter at a cutoff frequency of 1 kHz. With CO2 a passband gain of 2. Plot the frequency response of the filter.

- e. Design a wide band-pass filter with $f_L = 200$ Hz, $f_H = 1$ kHz, CO2 and a pass band gain = 4. Draw the frequency response plot of this filter.

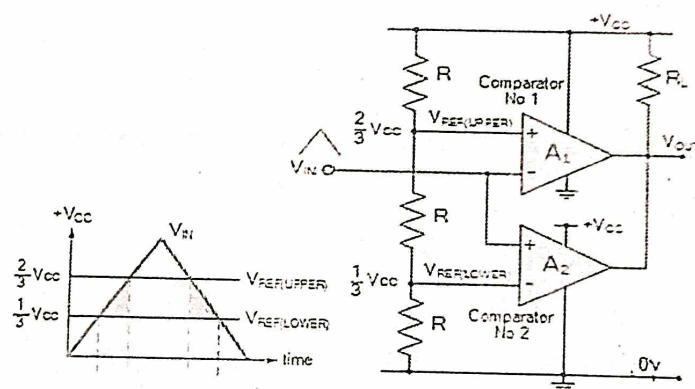
- f. Determine the type of filter in the circuit given below CO2



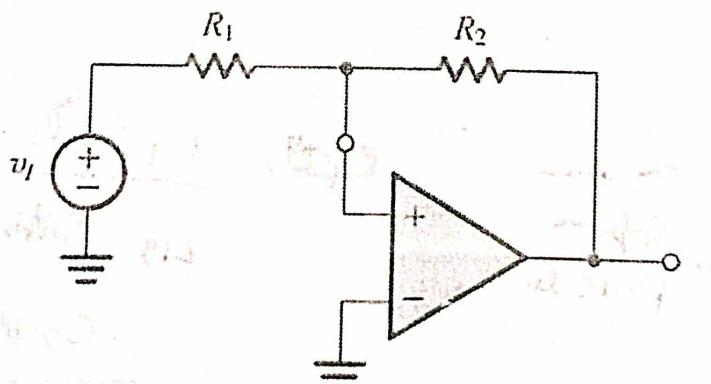
3. Attempt any TWO parts of the following: 2×10

- a. Draw output waveform of the comparator circuit shown below

CO3
CO3



- b. If a triangular waveform of 6V peak to peak is supplied as input CO3 to the circuit given below then draw output waveform.
 $R_1 = R_2 = 1k\Omega$. $+V_{sat} = 5V$, $-V_{sat} = -5V$.



c. Design a generalized impedance converter to act as 2mF CO3 capacitor

4. Attempt any TWO parts of the following: 2×10 CO4

a. Implement SR Flip-Flops using CMOS with the help of CO4 suitable diagram. Also minimize number of MOS transistors. Calculate the reduction of MOS transistor in percentage.

b. Implement following CMOS integrated circuit. Analyze the CO4 design for various inputs.

$$Y = AB + CD$$

c. Compare flip flop and latches and discuss CMOS CO4 implementation of both?

5. Attempt any TWO parts of the following: 2×10 CO5

a. Apply OPAMP as digital to analog converter using R-2R ladder network

b. What are different modes of operation of IC 555? Draw the circuit diagram of a delay circuit using IC 555. What is maximum delay that can be provided with IC 555 with a capacitor of $1000\ \mu\text{F}$

c. What are types of PLL. Briefly describe the role of the Ex-OR gate in PLL application. CO5

OII

o

Free wheel

Capture

Phase lock.

DD,

$$\frac{R_1 R_3 R_5 C_2}{R_4}$$

LSS

$R_{4\text{min}}$

$$\frac{C_2 R_1 R_3 R_5}{R_4} \quad 4$$

$4x1$

$x\sqrt{x}$

\checkmark

\checkmark

\checkmark

\checkmark

$$Z = \frac{z_1 z_3 z_5}{z_2 z_4}$$

$$\textcircled{2} \frac{R_1 R_3 R_5}{\frac{1}{S} C \cdot R_4}$$

$$Z = SC$$

$$= \frac{SC}{R_1 R_3 R_5}$$

$$\frac{1}{S} C$$

$$\frac{1}{R_1 R_3 R_5}$$

$$\frac{6 \times 6 \times}{(2)^2}$$

$$\frac{S \left[\frac{1}{R_1 R_3 R_5} \right]}{\left[\frac{1}{R_2 R_4} \right]}$$

Utkarsh Tripathi.

(Roll No. to be filled by candidate)

2	0	0	4	3	3	1	0	5	9
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B. TECH.

THIRD SEMESTER THEORY EXAMINATION, 2022-23

KEC-503

DIGITAL SIGNAL PROCESSING

Time: 03 Hours

Max. Marks: 100

Note:

- Attempt all questions. All questions carry equal marks.

1. Attempt any **FOUR** parts of the following: $4 \times 5 = 20$ CO

a. Draw & explain the block diagram of digital signal processing, and write its advantages and disadvantages. CO1

b. Write short notes on CO1

i. Recursive & Non-recursive

ii. Canonic and Non-canonic structure

c. Write down advantages and disadvantages of bilinear transformation. CO1

d. Obtain the cascade realization of the system by the following function. CO1

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}$$

e. Obtain direct form realization for the transfer function of an FIR system given by. CO1

$$H(z) = \left(1 - \frac{1}{4}z^{-1} + \frac{3}{8}z^{-2}\right) \left(1 - \frac{1}{8}z^{-1} - \frac{3}{2}z^{-2}\right)$$

f. Determine the direct form-I structure of the IIR Filter described by the following equation. CO1

$$y(n) = 0.5y(n-1) - 0.76y(n-2) + 0.63y(n-3) + x(n) + 0.875x(n-1)$$

2. Attempt any **TWO** parts of the following: **2×10=20** CO
CO2

a. For the analog transfer function

$$H(z) = \frac{2}{(s+1)(s+2)}.$$

Find $H(z)$ using Impulse Invariance method ($T=1$ sec). And also write advantages of impulse invariance method.

- b. Design a second order discrete time Butterworth filter with CO₂ cut-off frequency 1KHz and sampling frequency of 10^4 samples/sec by bilinear transformation.

c. i. Explain the significance of frequency transformation. CO₂
ii. The transfer function of first order normalized LPF is

$$H(S) = \frac{1}{S+1} \quad \Omega_v = 1$$

Obtained the transfer function of second order band pass filter having pass band 1 KHz- 2 KHz.

3. Attempt any *TWO* parts of the following: $2 \times 10 = 20$ CO
a. What is difference between Butterworth and Chebyshev? CO3
b. Design a digital Chebyshev filter to satisfy the constraints. CO3

$$0.707 \leq |H(e^{j\omega})| \leq 1 \quad 0 \leq \omega \leq 0.2\pi$$

$$|H(e^{j\omega})| \leq 0.1 \quad 0.5\pi \leq \omega \leq \pi$$

- c. Design a digital Butterworth filter that satisfies the CO3 following constraint using bilinear transformation. Assume T=1s.

$$0.9 \leq |H(e^{j\omega})| \leq 1 \quad 0 \leq \omega \leq \pi/2$$

$$|H(e^{j\omega})| \leq 0.2 \quad 3\pi/4 \leq \omega \leq \pi$$

4. Attempt any **TWO** parts of the following: $2 \times 10 = 20$ CO

a. Write the properties of

- a. Write the properties of DFT with mathematical expression. $2 \times 10 = 20$ CO
 i. Periodicity ... CO4

- ### ii. Circular convolution

- b. i. What are the advantages of FFT over DFT? Explain DIT CO4
 ii. Find the inverse DFT of $X(k) = \{1, 2, 3, 4\}$.

c. Given $x(n)=\{1, 2, 3, 4, 4, 3, 2, 1\}$, Find $X(k)$ using DIT- CO4 FFT Algorithm.

5. Attempt any **TWO** parts of the following:

- a. Explain the process of multirate signal processing in detail. $2 \times 10 = 20$ CO
Also enlist the advantages of multirate signal processing. CO5
- b. Explain the phenomenon of decimation and interpolation by suitable example. CO5
- c. Write a short note on CO5
- i. Sub band coding of speech signal
 - ii. Quadrature Mirror filter

Utkarsh Tripathi

(Roll No. to be filled by candidate)

2	0	0	4	3	3	1	0	5	4
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B. TECH.

FIFTH SEMESTER THEORY EXAMINATION, 2022-23

KEC-053

VLSI TECHNOLOGY

Time: 03 Hours

Max. Marks: 100

Note:

- Attempt all questions. All questions carry equal marks.
- Assume missing data suitably.

1. Attempt any *FOUR* parts of the following: 4×5 CO1
2. What is Planar process? Explain the IC fabrication steps using Planar process?
- b. How the purification of quartzite is done to obtain EGS? Show that the EGS is 99.99999% pure.
- c. Explain the growth of single Si-crystal using Czochralski technique with suitable diagram?
- d. Explain the dry cleaning technique used for wafer cleaning?
- e. What are the favorable properties of Si that make it the most popular choice for IC manufacturing?
- f. Discuss the various contaminant sources that contaminates the wafer?
2. Attempt any *TWO* parts of the following: 2×10 CO2
- a. How does Si-epitaxial layer can be deposited using vapor phase epitaxy. Explain with the help of suitable chemical equations?
- b. What are the important parameters of epitaxial layer that need evaluation? Discuss the evaluation technique for impurity profile within epitaxial layer.
- c. Derive the equation for growth rate of oxide layer using the

+
exp → solute , ~~unsp~~ → solute

Deal-Grove's model. Also discuss the importance of linear and parabolic rate constant in case of wet and dry oxidation.

3. Attempt any **TWO** parts of the following: 4×5 CO3

a. Explain the steps involved in Photo-lithography process?
What are the important characteristics of a photoresist?

b. Discuss the deposition of SiO_2 layer with required chemical equations. Compare the properties of layer deposited at various temperatures?

c. What are the various types of etching? Explain the Wet chemical etching process in detail?

4. Attempt any **FOUR** parts of the following: 2×10 CO4

a. Explain the Fick's law of diffusion and derive the 1-dimensional diffusion equation?

b. Explain the doping procedure using the Ion implantation technique with necessary diagram.

c. Make comparison between doping procedure done by diffusion technique and Ion implantation technique?

d. Explain the difference between the Interstitial and Interstitialcy model of diffusion?

e. Explain the liquid source diffusion system by drawing a suitable diagram.

f. How Si can be doped with Boron using solid and liquid source. Explain with help of chemical equations.

5. Attempt any **TWO** parts of the following: 2×10 CO5

a. Explain the CMOS fabrication steps with necessary diagram?

b. Explain the Sputter deposition method for deposition of metal with appropriate diagram.

c. Draw the basic structure of a chip carrier and explain its various parts? Also make comparisons between various chip carriers based on connections?

utkarsh tripathi.

(Roll No. to be filled by candidate)

2	0	0	4	3	3	1	0	5	4
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B. TECH.

FIFTH SEMESTER THEORY EXAMINATION, 2022-23

KNC-501

CONSTITUTION OF INDIA

Time: 02 Hours

Max. Marks: 50

Note:

- Attempt all questions. All questions carry equal marks.

1. Attempt any *TWO* parts of the following: 2×5 CO1

- Define constitution. Write its functions and elements.
- Define fundamental rights and duties. Also describe the six fundamental Rights briefly.
- What is the preamble? Explain the Preamble to the Indian Constitution.

2. Attempt any *TWO* parts of the following: 2×5 CO2

- Write a note on the Indian Parliament and its powers.
- Define Lok Sabha and Rajya Sabha. Differentiate between them.
- What do you mean by judiciary? What are the functions of the judiciary of India?

3. Attempt any *TWO* parts of the following: 2×5 CO3

- Explain the term law. What do you understand by the term sources of law?
- Write a short note on the court structures in India.
- Describe the Arbitration and Conciliation act of 1996.

4. Attempt any *TWO* parts of the following: 2×5 CO4

- What is a patent? Write the procedure for obtaining a patent.

Total Number of Printed Pages: 02

- b. What are infringements and non- infringements activities?
c. What do you understand by the term copyright? Who is the owner of a copyrighted work?

5. Attempt any *TWO* parts of the following: 2×5 CO5
- a. What do you mean by sole trader? Write its advantages and disadvantages.
b. Differentiate between memorandum of association and article of association.
c. What is partnership? Mention its type in detail.

Utkarsh Tripathi -

(Roll No. to be filled by candidate)

2	0	0	4	3	3	1	0	5	4
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B. TECH.

FIFTH SEMESTER THEORY EXAMINATION, 2022-23

KEC-057

ELECTRONIC INSTRUMENTATION AND MEASUREMENTS

Time: 03 Hours

Max. Marks: 100

Note:

- Attempt all questions. All questions carry equal marks.

1. Attempt any *TWO* parts of the following: 2×10 CO
- a. Discuss different types of errors occurred during measurement. *(Error corr.)* *Read (true)* *int. Obsv.*
- b. Define measurement. Give classification of different types CO1 of analog instruments. Discuss different types of operating forces required in electromechanical analog instruments.
- c. Discuss the construction of Galvanometer. CO1

Current was measured during a test as 30.4 A, flowing in a resistor of 0.105 ohms. It was discovered late that the ammeter reading was low by 1.2% and marked resistance was high by 0.3%. find the true power as a percentage of originally measured power.

1 / 1 + relative error

2. Attempt any *TWO* parts of the following: 2×10 CO
- a. Discuss the advantages of electronic devices for CO2 measurement purposes. Discuss the transistor voltmeter (TVM) with cascaded transistors.
- b. Explain the digital voltmeter (DVM) with suitable block diagram. Give classification of DVMs. Explain ramp type DVM in detail.

Ramp
dual slope
integr.

$$P = \frac{V^2}{R} = \frac{I^2 R^2}{R}$$

c. Discuss followings:

- i. Digital multimeter
- ii. Digital frequency meter

CO2

3. Attempt any TWO parts of the following:

2×10 CO

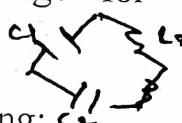
a. Give classification of resistances on their values. Explain construction of 4-terminal low resistance. Discuss Kelvin's double bridge for low resistance measurements.

CO3

b. What is guard circuit? Discuss loss of charge method for measuring high resistance.

CO3

c. Derive the general equation of AC bridge at balance condition. Discuss De-Sauty's bridge for capacitance measurement.



4. Attempt any TWO parts of the following:

2×10 CO

a. Discuss cathode ray oscilloscope (CRO) in detail by explaining its different components with suitable block diagram.

CO4

b. Discuss measurement of phase shift using CRO. Show the Lissajous pattern at phase shift of 0° , 30° , 60° , 90° , 120° , 150° and 180° .

CO4

c. Discuss storage type CRO. Explain measurement of frequency using CRO by taking an example of Lissajous pattern with frequency ratio 2:1.

5. Attempt any TWO parts of the following:

2×10 CO

a. Define electric transducer, its classification and advantages. Discuss pressure sensitive primary devices.

CO5

b. Explain linear variable differential transformer (LVDT) and its advantages and disadvantages.

CO5

c. Explain the Hall effect. Discuss measurement of flux density using Hall effect.

CO5