VLSI

(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH.] JULY 2023

Paper Code: ECC-210 **Subject: Microprocessors and Microcontrollers**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No1 which is compulsory. Select one question from each unit.

Q1 Attempt all questions: **(3x5=15)**

a) Write initialization instructions for 8255A to set up PORT A as an O/P port in mode 0.

b) What is the function of Scan section in 8279 programmable keyboard/Display controller?

c) What are the different ways to end the interrupt execution in 8259 programmable Interrupt controller.

UNIT-I

Q2 a) Explain the different addressing modes in 8085 microprocessor. Give two examples for each addressing mode. **(6)**

b) Explain the evolution of microprocessors and different trends in microprocessor technology. **(6)**

c) State the function of given 8085 instructions: JP, JPE, JPO, JNZ. **(3)**

OR

Q3 a) Explain the features of 8085 microprocessors in detail. **(5)**

b) Explain **(10)**
i) Special purpose registers ii) Sixteen bit registers

UNIT-II

Q4 a) Explain the architecture, data flow and instruction execution of 8085 microprocessor. **(5)**

b) With timing diagram, explain the memory read operation in 8085 microprocessor. **(5)**

c) Specify the size of data, address, memory word and memory capacity of 8085 microprocessor. **(5)**

OR

Q5 a) Write an assembly language program based on 8085 microprocessor instruction set to search the smallest data in a set. **(8)**

b) With suitable example, discuss about 8085 microprocessor instructions used for data manipulation. **(7)**

UNIT-III

Q6 a) Show and explain the 8 bit ADC interfacing with 8085 microprocessor. **(8)**

b) Describe the different types of interrupts used in 8085 microprocessors. **(7)**

OR

Q7 a) Describe with suitable examples concept of data transfer. **(5)**

b) Write short note on i) RS-232 standard ii) RS-485 standard **(10)**

P.T.O.

P-1/2
ECC-210

UNIT-IV

Q8 Discuss with suitable examples various priority modes of programmable interrupt controller 8259 A. **(15)**

OR

Q9 Draw the architecture of 8255 programmable peripheral interface and explain in detail. **(15)**

****

(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH.] JULY 2023

Paper Code: ECC-212 **Subject: Digital Communications**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No1 which is compulsory. Select one question from each unit.

Q1 Attempt all questions **(5x3=15)**

a) State the properties of mutual information.

b) Explain the significance of Source coding theorem.

c) Explain the lossless data compression.

UNIT-I

Q2 a) An event has six possible outcomes with the probabilities $p_1 = \frac{1}{2}, p_2 = \frac{1}{4}, p_3 = \frac{1}{8}, p_4 = \frac{1}{16}, p_5 = \frac{1}{32}, p_6 = \frac{1}{32}$. Find the entropy of the system. Also find the rate of information if there are 16 outcomes per second. **(8)**

b) Explain channel capacity with mathematical expressions **(7)**

OR

Q3 a) Explain the Process of Quantization and types of quantization. **(7)**

b) A Television signal having a bandwidth of 4.2 MHz is transmitted using binary PCM system. Given that the number of quantization levels is 512. Determine i) Code word length? ii) Transmission Bandwidth? iii). Final Bit rate? iv). Output SNR ratio? **(8)**

UNIT-II

Q4 a) Derive mathematical expression for probability of errors in AWGN channel **(8)**

b) Sketch with a neat diagram of M-array PSK transmitter and receiver. **(7)**

OR

Q5 a) Draw the block diagram of QASK transmitter and receiver and explain the operation **(8)**

b) Describe the generation and detection of DPSK. **(7)**

UNIT-III

Q6 Draw the block diagram of the structure and behavior of Matched filter Receiver. Explain? **(15)**

OR

Q7 Write short note on

a) Adaptive equalization **(7.5)**

b) Inter symbol interference **(7.5)**

P.T.O.

UNIT-IV

Q8 a) A generator matrix for a (6, 3) block code is given below **(10)**

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 1 & 1 & 1 & 0 \end{bmatrix}$$

i) List all the code vectors.
ii) Find out minimum distance & weight of the code.
iii) How many errors can be detected & corrected?

b) What is forward error correction system and explain in detail? **(5)**

OR

Q9 a) Explain the Convolutional Encoding and Decoding methods. **(7)**

b) Discuss in brief about sequential decoding of convolutional codes. **(8)**

****

(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH] JULY 2023

Paper Code: ECC-214 **Subject: Analog Eelectronics-II**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No1 which is compulsory. Select one question from each unit.

Q1 a) Describe the working of an op-amp with the help of its block diagram. **(5)**

b) Define slew rate. Also discuss its causes and effects **(5)**

c) Explain phase shift oscillator in detail. **(5)**

UNIT-I

Q2 a) What are the characteristics of an ideal op-amp? Draw and explain its equivalent circuit and voltage transfer curve. **(9)**

b) Discuss IC-741 and its characteristics with the help of its schematic diagram. **(6)**

OR

Q3 a) Explain working of Inverting and Non-Inverting Amplifiers. Also derive the expressions for their gain. **(8)**

b) A differential amplifier has (i) CMRR-1000 and CMRR=10000. The first set of inputs is V_1 = +100μV and V_2 = -100μV. The second set of inputs is V_1 = 1100μV and V_2 = 900μV. Calculate the percentage difference in output voltage obtained for the two sets of input voltages. **(7)**

UNIT-II

Q4 a) Explain Input & output offset voltage, Input offset current and input bias current in an op-amp. **(8)**

b) Describe concept of SVRR and CMRR. **(7)**

OR

Q5 a) Discuss various frequency compensation techniques in detail. **(10)**

b) Derive expression of open loop voltage gain of an op-amp as a function of frequency. **(5)**

UNIT-III

Q6 a) Explain V to I and I to V convertors in detail. **(8)**

b) Design a differentiator using op-amp to differentiate an input signal with f_{max}=200KHz. Also draw the output for a sine wave and a square wave input of 1V peak at 200KHz. **(7)**

OR

Q7 a) Describe how a basic comparator can be used as an inverting zero-crossing detector. **(5)**

b) Explain inverting and non-inverting Schmitt trigger circuits. **(5)**

P.T.O.

c) Explain saw-tooth waveform generator. **(5)**

UNIT-IV

Q8 a) Explain working of 555 timer IC with the help of its block diagram. Also discuss Monostable multi-vibrator using 555 timer. **(8)**

b) What do you mean by voltage regulator? Describe IC voltage regulator LM-317. **(7)**

OR

Q9 a) What are the advantages and disadvantages of Active filter over passive filters? **(5)**

b) Explain Discuss frequency response of ideal and practical filters (LPF, HPF, BPF& BRF). **(10)**

****

(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH.] JULY 2023

Paper Code: ECC-216 **Subject: Electromagnetic Field Theory**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No1 which is compulsory. Select one question from each unit. Assume missing data, if any.

Q1 (a) Given a vector $\vec{A} = (x^2 - y^2)\hat{x} - 2xy\hat{y} + (x^2 - xy)\hat{z}$. Evaluate $\oint\oint A.ds$over the surface of the cube with the center at origin and length of side 'a'. **(5)**

(b) Given a vector $\vec{A} = 10\hat{r} - 5sin\theta\hat{\theta}$. Find ∇.A. **(5)**

(c) Explain the inconsistency of Ampere's work law for time varying fields. **(5)**

(d) State and prove Poynting Theorem. **(5)**

(e) Explain infinite transmission line in detail. **(5)**

UNIT-I

Q2 (a) Explain application of Gauss's Law for volume charge distribution. **(6)**

(b) A closed surface is defined in spherical coordinates by $6<r<10$, $0.2\pi<\theta<0.6\pi$, $1.2\pi<\phi<1.6\pi$. Find:(i) the volume enclosed and (ii)total surface enclosing the volume. **(6.5)**

Q3 (a) Assuming the potential function V varies as a function of 'r' in spherical coordinate system, obtain the solution of Laplace equation. **(6)**

(b) Using Gauss's law in integral form obtain the electric field at all points due to the following charge distribution in spherical coordinates: **(6.5)**

$$\rho(r,\theta,\phi) = \begin{cases} \rho_o\left(\frac{r}{a}\right) & ; \ 0 < r \le a \\ 0 & ; \ a \le r \le \infty \end{cases}$$

UNIT-II

Q4 (a) State and prove boundary conditions at a boundary between two dielectric materials for magnetic fields. **(6)**

(b) There exists a boundary between two magnetic mediums at Z = 0, $\mu_1 = 4\mu_o$ H/m in the region 1, Z > 0, and $\mu_2 = 7\mu_o$H/m in region 2, Z < 0. If the flux density in the region 1 is $\overrightarrow{B_1} = 2\hat{x} - 3\hat{y} - 2\hat{z}$, find $\overrightarrow{B_2}$ and $\overrightarrow{H_2}$ in region 2. Assume, there is no current at the boundary. **(6.5)**

Q5 (a) Derive the expression for energy density in a static magnetic field. **(6)**

(b) Calculate $\vec{H}$ everywhere due to the following current density in cylindrical coordinates. **(6.5)**

$$\vec{J} = J_o \begin{cases} 0 & ; \ 0 \le r \le a \\ \left(\frac{r}{a}\right)\hat{z} & ; \ a \le r \le b \\ 0 & ; \ b \le r \le \infty \end{cases}$$

P.T.O.

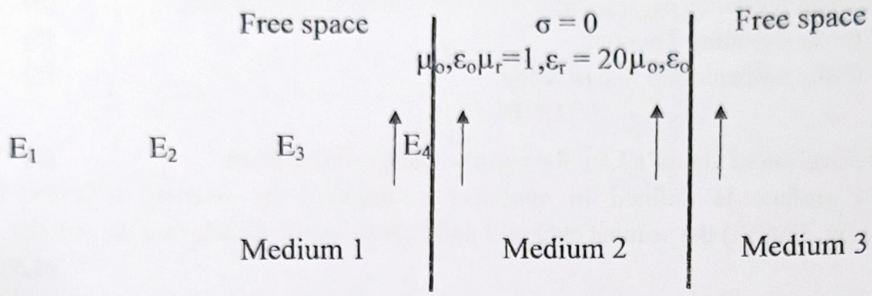
UNIT-III

Q6 (a) Derive wave equation for the propagation of EM waves ina lossless medium. **(6)**

(b) For a non-magnetic material, having ε_r=2.25, $\sigma=10^{-4}$ S/m, Find: (i) the loss tangent, (ii) attenuation constant, (iii) phase constant, and (iv) intrinsic impedance for a wave having frequency of 2.5 MHz. Assume the material to be a good dielectric. **(6.5)**

Q7 (a) Derive the expression for reflection coefficient and transmission coefficient for $\vec{E}$ and $\vec{H}$ when EM wave is incident normally on the boundary between two dielectric medium.**(6)**

(b) A travelling electric field of amplitude 100v/m in free space strikes a dielectric material as shown below. Find E_2, E_3, E_4. **(6.5)**



UNIT-IV

Q8 (a) Find characteristic impedance, propagation constant and velocity of propagation for a transmission line having the following parameters: R=84 Ω/km, L=0.01 H/km, $G=10^{-6}$ ℧/km, C=0.061 μF/km, frequency=1KHz. **(6)**

(b) A 60 Ω distortion less transmission line has a capacitance of 0.15 nF/m. the attenuation on the line is 1.15×10^{-3} Np/m. Calculate:(i) the line parameters: R, L, G & C of the line per meter, and (ii) velocity of propagation. **(6.5)**

Q9 Write short notes on:

(a) Stub Matching **(6)**

(b) Loss Tangent **(6.5)**

****