Roll No. ..... Total No. of Pages : 2

BT-3/D11 7606

Semiconductor Devices and Circuits

Paper : ECE-201 E

Time : Three Hours] [Maximum Marks : 100

Note :– Attempt any FIVE questions.

1. (a) How does a PN Junction work as a rectifier ? Compare rectifier circuits. 10

   (b) Explain photoelectric devices and their principle of working. 10

2. (a) Draw a series voltage regulator. How does it work ? 10

   (b) Draw block diagram of SMPS. Explain its working. 10

3. Explain the following :-

   (a) Miller's theorem

   (b) Early effect in transistors

   (c) Hybrid model of a transistor

   (d) Thermal runaway in transistors. 5×4=20

4. Explain the following :-

   (a) Bias Compensation

   (b) Thermistor

   (c) High frequency limitation of BJT

   (d) Emitter follower. 5×4=20

5. (a) What is the need of feedback ? What is its impact on input resistance, gain, Bandwidth and output impedance ? 10

   (b) Draw various feedback topologies. What are their applications ? Compare their features. 10

6. (a) What are various amplifiers ? Compare their features and obtain their efficiencies. 10

   (b) Draw circuit of a crystal oscillator. How does it work ? How is it better than weinbridge oscillator ? 10

7. (a) Draw the construction of a V-MOSFET. How does it work ? What are its applications ? 10

   (b) Write short notes on enhancement type MOSFET. 10

8. Explain the following terms and write short notes on :-

   (a) Biasing of MOSFETS 10

   (b) JFET. 10

Roll No. ..... Total No. of Pages : 2

BT-3/D11 7607

Analog Communication

Paper : ECE-203E

Time : Three Hours] [Maximum Marks : 100

Note :– Attempt any **FIVE** questions by taking at least **one** question from each unit.

UNIT–I

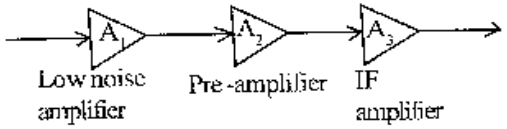
1. (a) The first stage of a two stage amplifier has a voltage gain of 10, a 600 Ω input resistor, a 1600 Ω equivalent noise resistance and a 27 kΩ output resistor. For the second stage, these values are 25, 81 kΩ, 10 kΩ, and 1 MΩ respectively. Find the equivalent input noise resistance. 10

   (b) Derive the expression for noise figure in terms of equivalent noise resistance. 10

2. (a) Determine the noise equivalent bandwidth of RC low pass filter whose frequency response is given by :

$$H(f) = \frac{1}{1 + j 2\pi f RC}$$ 10

   (b) Obtain the equivalent noise temperature of the system shown :-



$A_1 = 25dB$, $Te_1 = 4K$, $A_2 = 17dB$, $F_2 = 6dB$, $F_3 = 12dB$, Room Temperature = 17°C. 10

UNIT–II

3. (a) Define Modulation. What is the need for modulation ? Derive an expression for instantaneous voltage of amplitude modulated signal. 10

   (b) Discuss the third method for SSB modulation. 10

4. (a) Explain with the help of waveforms vestigial sideband modulation. Give its advantages. 10

   (b) Explain the working of square law detector with the help of circuit diagram. 10

UNIT–III

5. (a) Differentiate between :

   (i) AM and FM signals

   (ii) NBFM and WBFM signals

   (iii) Pre-emphasis and De-emphasis. 15

   (b) Discuss the spectrum of FM signal. 5

6. (a) Explain the working of balanced slope detector. What are its disadvantages ? 10

   (b) Explain the effect of noise on carrier signal in FM. 10

UNIT–IV

7. (a) With the help of block diagram, explain the working of Armstrong FM transmitter. 10

   (b) Explain the concept of AGC and AFC in receivers. Also draw the circuit for generation of AGC. 10

8. Explain the following :-

   (a) Image signal rejection

   (b) Privacy Devices

   (c) Tracking and Alignment of receivers

   (d) Radio broadcast transmitter. 5×4=20

Roll No. ..... Total No. of Pages : 3

BT-3/D11 7615

Network Analysis and Synthesis

Paper : EE-203 F

Time : Three Hours] [Maximum Marks : 100

Note :– Attempt 5 questions, selecting at least **ONE** from each Unit.

UNIT–I

1. For the network of Fig. 1 below, write the tie set matrix, calculate loop currents and branch voltages : 20

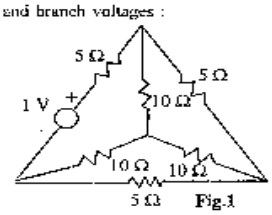


Fig.1

2. Obtain the complete response expressions of R–L series circuit to
   (i) Step input
   (ii) Ramp input. 20

UNIT–II

3. Find the transfer function $V_2(s)/V_1(s)$ for the network of Fig. 2. 20

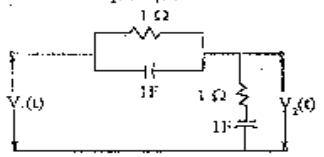


Fig. 2

4. (a) The transform voltage V(s) of a network is given by :

$$V(s) = \frac{4s}{(s+2)(s^2+2s+2)}.$$

Plot its pole-zero diagram and from that obtain v(t). 16

(b) Why is the following expression for driving point impedance not suitable for representing a passive one-port network ? 4

UNIT–III

5. (a) Find the z-parameters and A, B, C, D parameters of the network in Fig. 3.

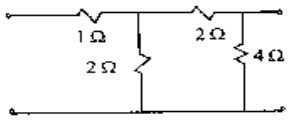


Fig. 3 14

(b) State the units of h and ABCD parameters. 6

6. Suppose two *identical sections* of the network in Fig. 4 are first obtained and then they are cascaded. Obtain the transmission parameters of the cascaded network.

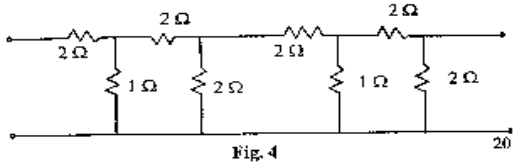


Fig. 4 20

UNIT–IV

7. Explain a constant-k low-pass filter. 20

8. (a) Realize the network function as a cauer network (any form) :

$$V(s) = \frac{(s+2)(s+4)}{(s+1)(s+3)}.$$ 15

(b) State the conditions for positive real functions. 5

Roll No. ..... Total No. of Page : 3

BT-5/D11 : 7707

ECE-301E : Antenna and Wave Propagation

Time : Three Hours Maximum Marks : 100

Note:- 1. Answer five questions selecting at least one from each unit.
2. Define all notations used.
3. Give examples wherever possible.
4. Answer of a question must be in continuity.

UNIT-I

Q.1 How does a Hertzian dipole radiate? Explain retarded vector potential including its significance in field calculation. Explain the feeding mechanism of a half wave dipole. For a dish antenna establish a relationship among various apertures. 4+6+5+5=20

Q.2 What do you mean by current length? Derive the expression for radiation resistance of a short dipole. Compare beamwidth & bandwidth. Explain what do you mean by absolute gain and relative gain and derive an expression for directivity for a half wavelength dipole. 2+8+4+6=20

UNIT - II

Q.3 Explain array pattern synthesis. How is it different from array analysis. Discuss the parameters on which the array performance depends. Derive the expression for Array factor of a linear array operating at 10GHz having uniform spacing of λ/y and total number of elements 10.

Q.4 How are the co-efficients of a binomial array decided. Explain in detail. Take an example of practically used end fore array and discuss its construction/design process. Compare uniform and non-uniform array. 8+8+4=20

UNIT - III

Q.5 What do you mean by frequency independent antenna. How is the frequency independency achieved in a log periodic antenna. Discuss its design, construction and operation. Explain radiation aperture. 3+4+8+5=20

Q.6 Discuss the design and working principle of a Lens antenna and how is it different from reflector antenna? Compare broadband and narrow band, frequency dependent and frequency independent and resonating and non-resonating antennas.

UNIT - IV

Q.7 What do you mean by multipath fading. Explain the sources of multipath fading in outdoor communication. What are the measures used to improve ground wave propagation explain in detail. Explain MUF. 5+7+5+3=20

Q.8 How does a short wave radio transmission take place. Explain in detail. Explain (i) Virtual Height (ii) Skip distance (iii) Critical frequency (iv) Space wave propagation. 8+4+4+4=20

Roll No. .....

Total No. of Page : 2

BT-5/D11 : 7708

ECE 303 E : COMPUTER HARDWARE DESIGN

Time : Three Hours

Maximum Marks : 100

Note:- Attempt FIVE questions in all, selecting one from each unit.

UNIT-I

Q.1. a) What do you understand by Instruction formats? What are the various trade-offs involved? 10

b) What are the differences between Machine and Assembly language programming? 10

Q.2 a) Discuss how the micro-operations are used in designing the control of a processor. 10

b) What are the basic addressing modes used in a processor? Discuss. 10

UNIT-III

Q.3 a) What do you understand by Decimal Arithmetic Unit? How is it designed using a binary adder for the fixed point arithmetic? 10

Contd

b) Discuss the Array processors. 10

Q.4 a) What do you understand by microprogrammed control? 10

b) Discuss the multiplier control unit.

UNIT-III

Q.5 a) What do you understand by random access memories? Discuss semiconductor RAMs. 10

b) What are Optical memories? 10

Q.6 Write notes on :

a) Virtual memory 10

b) Associative memory 10

UNIT-IV

Q.7 What are various ways of interfacing I/O systems with a computer system? Discuss at least one IO processor. 20

Q.8 a) Discuss mesh, tree and ring networks with their relative advantages and disadvantages. 10

b) What is Pipelining? Discuss the basic concept with an example. 10

Roll No. ..... Total No. of Page : 2

BT-5/D11 : 7709

ECE-305 E : Information Theory & Coding

Time : Three Hours Maximum Marks : 100

Note:- Attempt FIVE questions in all, selecting at least ONE question from each of the four units.

UNIT-I

Q.1. a) Ten passengers get into a train that has three cars. Assuming a random placement of passengers, what is the probability that the first car will contain three of them. 7

b) Define random variable. Also mention its properties. 6

c) Explain probability distribution and density functions with examples. 7

Q.2 a) State and explain central-Limit theorem. 5

b) Discuss the following: 4+4

(i) Stationary Ergodictity (ii) Markov Processes

c) Show that if the random variables x, y, and z are jointly normal and independent in pairs, they are independent. 7

UNIT-II

Q.3. a) Define entropy and discuss its properties. 5

b) State and explain shannon's theorem on coding for memory-less noisy channels. 7

c) Find the channel capacity of a symmetrical binary channel if the received information is always wrong. 8

Q.4 a) A source has seven elements with probabilities 0.3 0.2 0.15 0.15 0.1 0.06 0.04 respectively . Construct a huffman code and find their average code length. 10

b) Discuss the following

i) Noiseless coding

ii) Theorem of Decodability 10

UNIT-III

Q.5 a) Explain maximum likelihood decoding 6

b) What are different error control strategies? Discuss those. 8

c) Write a note on Galois fields. 6

Q.6 a) Explain error detecting and correcting capabilities of block codes. 10

b) Discuss the following in brief.

(i) Hamming code (ii) B.C.H. Codes 5+5

Roll No. ..... Total No. of Page : 3

BT-5/D11 : 7710

ECE-307E : Linear IC Applications

Time : Three Hours Maximum Marks : 100

Note:- i) Attempt any five questions, with at least one from each section.
ii) All questions carry equal marks.

SECTION - A

Q.1 a) Draw the circuit of Differential amplifier and derive the equation of CMRR Under what condition the CMRR is maximized.

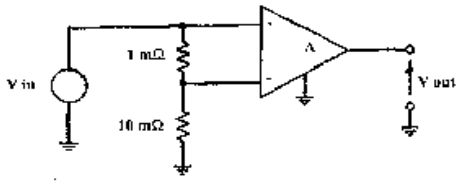
b) If differential gain of differential amplifier is 112 and input is 2sin1001 V, then determine common mode output if CMRR is 55db

Q.2 a) Write a short note on
(i) Current Mirror
(ii) Level translator

b) Why CMRR-> ∞ for emitter coupled differential amplifier when R_E-> ∞

SECTION - B

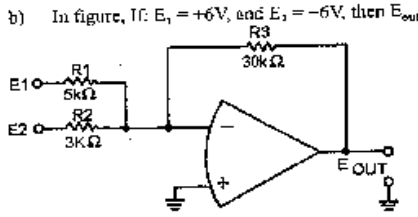
Q.3 a) Find the value V_{out} in the circuit of Figure, if V_{in} = 10 mV and A = 2000



b) Discuss the need of compensating networks in OPAMP circuit. Draw the circuit of lag network and show that how it affects the frequency response of the OPAMP

Q.4 a) How negative feedback affects the performance of a inverting amplifier and in what way a non inverting amplifier is a special case of voltage follower.

b) In figure, If: E_1 = +6V, and E_2 = −6V, then E_{out} = ?



SECTION - C

Q.5 a) Describe the use of Opamp as
i) Logarithmic amplifier.
ii) Instrumentation amplifier

b) Design an operational amplifier whose output (for a sinusoidal signal) is equal in magnitude to its input and leads the input by 45°.

Q.6 a) Find R_1 and R_f in the lossy integrator so that peak gain is 20dB down from its peak value when ω = 10000 rad/sec. Use capacitance of 0.01 uF.

b) What is the difference between a basic comparator and Schmitt trigger? Discuss the apllication of OP-AMP as Schmitt trigger.

SECTION - D

Q.7 a) Draw a block schematic of PLL and explain its operation.

b) Explain the application of PLL as a
i) FM demodulator
ii) Frequency multiplier

Q.8 Write a short note on the following
i) 555 as a Astable multivibrator.
ii) IC8038

Roll No. ..... Total No. of Page : 3

BT-5/D11 : 7711

ECE- 309 - E :Microelectronics

Time : Three Hours Maximum Marks : 100

Note:- Attempt Five questions in all, selecting at least one question from each unit. All questions carry equal marks.

UNIT - I

Q.1. Describe the production of Metallurgical grade silicon and the production of electronic grade silicon through hydrogen reduction of trichlorosilane. 20

Q.2 (a) Describe difference between pull rate and growth rate in CZ puller crystal growth process and its effect on the properties of CZ grown crystal.

(b) Describe oxidation induced defects and techniques used to mitiinize it. 10+10

UNIT - II

Q.3 Describe Optical Lithography, also highlights its advantages and limitations.

(b) Plasma etching techniques, equipments and uses. 20

Q.4 Write notes any two of the followings: 20

(a) X-ray lithography, sources and mask materials.

(b) Feature size control and anisotropic etching.

(c) E- beam Lithography.

UNIT - III

Q.5 (a) Describe basic diffusion mechanism in solids and Fick's law of diffusion and its solution for the limited source diffusion. 10

(b) Compare thermal diffusion & ion implantation also explain Ion-channeling and methods to avoid it. 10

Q.6 (a) Describe various techniques used for the measurements of diffusion profiles in semiconductor technology. 10

(b) Draw Schematic diagram of an ion-implanter and discuss its working principles. 10

UNIT - IV

Q.7 Describe Twin-tub CMOS IC's fabrication process sequence and highlight the mask requirements. 20

Q.8 Write short notes on any Four of followings: 20

(a) Double diffusion BJT IC fabrication process sequence.

(b) Trench Isolation Technique.

(c) Semi-recessed LOCOS and bird's beak encroachment.

(d) Constraints in MEMS packaging.

(e) Package fabrication technologies.

Roll No. .....

Total No. of Page : 3

BT-7/D11 : 7817

ECE-401E : VLSI Design

Time : Three Hours

Maximum Marks : 100

Note:- Attempt any FIVE questions by selecting atleast ONE question from each unit.

UNIT - I

Q.1. Describe with illustration, the double-metal P-well CMOS fabrication process. List all the masks involved in the sequence of usage. 20

Q.2 a) Draw VTC of a saturated-loaded MOS inverter and discuss the critical voltages. How does VTC change with increasing $\beta_{drive}/\beta_{load}$. 10

b) Draw the stick diagram of a 1-bit full adder circuit in double metal p-well CMOS process.

UNIT - II

Q.3. a) A MOSFET is fabricated with the following parameters: 10

$W = 10\ \mu m$, $L = 6\ \mu m$, $t_{ox} = 0.08\ \mu m$,

$\mu_n = 580 cm^2/Vsec$, $V_{TO} = 1.0\ V$, $N_A = 10^{15}\ cm^{-3}$. The device is subjected to the constant field scaling with $\alpha = 4$. Calculate the original and scaled values of (i) device transconductance parameter, β (ii) body bias coefficient, γ.

b) What are layout methodologies? Discuss. 10

Q.4 a) Define R_s, C_g and τ. Find the value of sheet resistance of the channel and C_g of a transistor in 5μm technology. Also find the value of τ for the technology. Given that $\mu_n = 600\ cm^2/Vsec$, $C_{ox} = 4 \times 10^{-4}\ pF/\mu m^2$, $V_t = 1.0$ volt, gate voltage w.r.t. source = 3 volts. 10

b) What is Packaging? What are the various types of packages and issues involved? 10

UNIT - III

Q.5 What do you understand by routing? Discuss the various routing algorithms. What is the grid model for global routing? 20

Q.6 Discuss the various Partitioning Algorithms. Discuss the advantages and disadvantages of each. 20

UNIT - IV

Q.7 Describe the delay models in Physical Design. How are timing constraints applied? 20

Q.8 Write short notes on:

a) Performance issues in circuits 10

b) Timing driven placement 10

Roll No. .....

Total No. of Page : 4

BT-7/D11 : 7818

ECE-403 E : Television Engineering

Time : Three Hours

Maximum Marks : 100

Note:- Attempt any FIVE questions in all, selecting at least ONE question from each Unit.

UNIT-I

Q.1. a) What do you understand by interlaced scanning. Show that it reduces flicker and conserve Bandwidth? 10

b) Explain with suitable diagram the working principle of color TV transmission and Reception. 10

Q.2 a) What is VESTIGIAL SIDEBAND TRANSMISSION and why it is used for transmission of TV signals. 10

b) Name the various transmitting and Recieving Antennas. Explain any one of them in detail. 8

UNIT-III

Q.5 a) Explain:- 3+3+2

i) Additive color mixing

ii) Saturation and Hue

iii) Luminance and chrominance

b) Describe the essential features of Trinitron color picture tube. Explain why it is considered superior over the delta gun and PIL Picture tube. 12

Q.6 a) Explain with a suitable block diagram the encoding process in PAL color system. 10

b) Compare the three television systems on the basis of their merits and demerits and factors which influence the choice of any of the three systems. 10

UNIT-II

Q.3 a) Draw crossectional view of an Image orthicon camera tube and explain how it develops video signal when light from any scene is focussed on its face plate. 10

b) Explain briefly with diagram how the electron beam is focussed on the tube screen. What is meant by crossover point in the electron gun. 10

Q.4 a) Draw and explain briefly the block diagram of monochrome TV Receiver and label its various sections indicated by waveshapes the nature of signal at the Input and Output of each block of Reciever. 12

b) Sketch the details of horizontal blanking and sync pulses. Label on it Front Porch, Horizontal sync pulse, Back porch, Active Line Periods. Why are the front porch and back porch intervals provided before and after the horizontal sync pulse. 10

UNIT-IV

Q.7 a) With the help of suitable diagram. Explain the working of HDTV. 10

b) Compare the 3D TV, projector TV and HDTV with the help of suitable diagrams. 10

Q.8 Explain:- 10+10

(i) Cable Television

(ii) Electronic Control System.

Roll No. .....

Total No. of Page : 2

BT-7/D11 : 7819

ECE-405E : Optical Communication

Time : Three Hours

Maximum Marks : 100

Note:- Attempt any five

UNIT - I

Q.1. a) What is the role of cladding in optical fibers and how does the numerical aperture decide the light propagation in the fiber ? 10

b) Distinguish between step index and graded index fiber. Explain with an example how latter is use ful in OFC system? 10

OR

Q.2 a) Write a short note on 20

a) Modes of Propagation in fibers.

b) Fiber splices and connectors

UNIT - II

Q.3. Explain the different loss mechanisms in the fibers and techniques used to minimize them? 20

OR

Contd

Q.4 What are the different dispersion effects in optical fibers and how does't affect the OFC performance. 20

UNIT - III

Q.5 Discuss the working principle of LEDs and injection lasers and explain why the latter is quite popular for wide area networks? 20

OR

Q.6 a) What is the operating principle of Pn junction based photo detector and explain why P-i-n diodes are most widely used in OFC systems ?

b) Explain the working principle of APD (avalanche Photo diode) and what are their advantages and limitations? 10+10

UNIT - IV

Q.7 a) What are the various modulation schemes used in OFC ? 10

b) What are the constituents of a typical optical fiber net work? 10

Q.8 Write a short note on: 20

a) Optical coupler

b) Wavelength Division multiplexer

c) Optical amplifier

d) Hybrid & photo nic network

structure of a semiconductor must satisfy in order to exhibit negative resistance? Explain the concept of high domain formation in Gunn Diode and discuss the properties of high field domain? 8

b) A M-Si-M BARITT Diode has ε_r equal to $2 \times 10^{15}/cm^3$ and current density J is $20KA/cm^2$. Calculate avalanche zone velocity? 4

c) Compare the performance and general characteristics of TRAPATT and IMPATT diodes? 8

Q.8 a) Explain the operation and significance of Parametric amplifiers with the help of its equivalent circuit and necessary expressions and also give application of it? 8

b) An IMAPTT diode has carrier drift velocity V_d equals to 2×10^7 cm/s, drift length L is 6μm, maximum operating voltage is 100V, maximum operating current is 200mA and breakdown voltage is 90V with efficiency 15% then calculate maximum CW output power by watts and resonant frequency in GHz? 2+2=4

c) Compare the performance & general characteristics of GUNN and BARITT diodes?8

BT-7/D11 : 7820

ECE-407E : MICROWAVE ENGINEERING

Time : Three Hours Maximum Marks : 100

Note:- Attempt any five questions by selecting at least one question from each section!

SECTION - I

Q.1. a) A rectangular waveguide measures 3 X 4.5cm internally and has 9GHz signal propagated in it. Calculate the cutoff wavelength, guided wavelength and characteristic wave impedance for TE_{10} mode? 10

b) Define the Coplanar waveguide Give detail of Opened waveguide, with diagram and necessary expressions? 10

Q.2 a) Explain the Attenuation measurement technique with the help of necessary block diagram? 8

b) Give slotted line technique for impedance measurement with the help of expression and diagram? 8

c) Two identical directional coupler of 30dB are used to sample incident and reflected power in a

waveguide VSWR = 2 and the output of the coupler sampling incident power is 4.5W. What is the value of reflected power? 4

SECTION - II

Q.3. a) Calculate the modulated velocity of electron if the electron enters the cavity at the instant when the RF input signal is at its negative peak. Assume cavity gap to be 2mm and frequency of RF signal to be 9GHz with peak to peak values of 10mV and V_o = 1000volts? 10

b) What do you mean by a microwave phase shifter? Give principle of operation, constructional detail and applications of Precision Rotary Phase Shifter with the help of expressions and diagram? 10

Q.4 a) Give equivalent circuit for one resonator of a magnetron and derive expressions for power output & efficiency for it? 10,

b) Explain the velocity modulation process for Reflex Klystron with the help of necessary expression and Applegate diagram

SECTION - III

Q.5 a) Prove that the product of any column of scattering matrix with the complex conjugate of any other column is zero? 10

b) A two port network is measured and the following scattering matrix is obtained : 10

$$\begin{bmatrix} 0.1\angle 0 & 0.8\angle 90^0 \\ 0.8\angle 90^0 & 0.2\angle 0 \end{bmatrix}$$

Determine whether the network is reciprocal or lossless. If a short circuit is placed on the port2, what will be the resulting return loss at port1?

Q.6 a) What do you mean by a microwave phase shifter. Give principle of operation. Constructional detail and applications of Precision Rotary Phase Shifter with the help of expressions and diagram? 12

b) Determine the scattering parameters for a 10dB direction coupler. The directivity is 30dB. Assume that it is lossless and the VSWR at each port is 1 under matched conditions. Designate the ports in the main guide as 1 or 2 and the ports in the auxiliary guide as 3 and 4?

SECTION-IV

Q.7 a) What are the basic criterion that the band

Roll No. .....

Total No. of Page : 2

BT-7/D11 : 7821

ECE-415E : MICROCONTROLLER

Time : Three Hours

Maximum Marks : 100

Note:- Attempt five questions in all, selecting at least one question from each unit.

UNIT - I

Q.1. Compare and contrast 8051, 8031 and 8751 micro controllers. Discuss the criteria for choosing these micro-controller for particular application. 20

Q.2 Compare general-purpose microprocessor system with the micro controller system. Explain memory types used for various micro controllers. 20

UNIT - II

Q.3. a) Draw the block diagram of 8051 micro controller and describe functions of DPTR and PC register of 8051

b) Find the TH1 needed to have the baud rate of 2400 with the crystal frequency of 11.0592MHz 10

UNIT - II

Q.4 a) Write a program to generate a square wave of 2KHz frequency on pin P1.7 with crystal frequency of 11.0592MHz 10

b) Explain the serial control register (SCON) of 8051 10

UNIT - III

Q.5 a) Give the interrupt vector tale and state the steps to enable an interrupt. 10

b) To program the timer of 8051 for mode-2 find the value in hex to be loaded into TH for the following cases

MOV TH1, # -200

MOV TH1, # -12

MOV TH0, # -60 10

Q.6 a) Write a program to clear 60 RAM location starting from RAM address 60H. 10

b) Correct the error by giving reason

i) MOV R5, #F7H

ii) MOV R2, 400 10

UNIT - IV

Q.7 Draw interfacing diagram of DAC with 8051 micro controller & write ALP to generate saw-tooth waveform at the output of DAC. 20

Q.8 Draw the circuit diagram with suitable ALP to interface seven segment display with 8051 micro controller. 20

Roll No. ..... Total No. of Page : 3

BT-7/D11 : 7824

ECE-423-E/452E (Common with El. Engg) : Advanced Microprocessors

Time : Three Hours Maximum Marks : 100

Note:- Attempt any Five questions in all, select at least one question from each unit. Each unit. All questions carry equal marks.

UNIT - I

Q.1. (a) Explain the internal architecture of 8086. Draw and discuss 8086 flag register format. 15

(b) What is the difference between the min and max mode as applied to the 8086 microprocessor. What is the difference between real mode and protected mode of X86 microprocessors? 5

Q.2 (a) Discuss the real and virtual modes execution of INTEL'S X86 (80386) family. 9

(b) Describe the conditions which cause the 8086 to perform each of the following types of interrupts: type 0, type 1, type 2, type 3, and type 4. Also describe the purpose of the 8086 interrupt vector table. 11

UNIT - II

Q.3 Describe the internal block diagram of Intel 80286 microprocessor. Also discuss the different mode of operation of 80286 microprocessor. 20

Q.4 (a) Explain following 8086 instructions; CALLDWORD PTR [BX], XLAT, WAIT, CMPS and LDS reg. 5

(b) What are the major improvements that the 80486 processor have over the 80386 processor. Discuss the Intel 486 internal block diagram. 3-12

UNIT - III

Q.5 (a) Describe the pin diagram of 80287 arithmetic co-processor. 10

(b) Discuss the 80287 arithmetic co- processor. status and tag register format. 10

Q.6 (a) Explain with help of examples the various instruction set of 80287 arithmetic co-processor. 12

(b) Explain how to interface the 80287 arithmetic co-processor with 80286 Microprocessor. 8

UNIT - IV

Q.7 Write note on 80387 co-processor, its interfacing with 386 microprocessor and its applications. 20

Q.8 Describe the 80387 timing requirements of the bus interface unit. List at least three major advances that the 80487 Co-processor has over the 80387. Why 80487 coprocessor is known as floating coprocessor. 20

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Total No. of Page : 2

BT-7/D11 : 7826

ECE-427-E/ECE-429-E : Power Electronics

Time : Three Hours

Maximum Marks : 100

Note:- Attempt 5 questions in all, selecting at least ONE from each Unit.

UNIT-I

Q.1. Describe the construction of SCR, draw its characteristics & Discuss its operation. Is their any negative resistance region? If so, explain how this region is achieved? 20

Q.2 a) What are the conditions for satisfactory parallel-connections of SCRs?

b) Draw a UJT firing circuit. Describe it operation & draw its characteristics indicate peak & valley points there on. 15

UNIT-II

Q.3 Draw the ckt. diagram for 3 phase half wave rectifier. Explain its operation for continuous conduction for

$\alpha < 30°$ & discontinuous condition $\alpha > 30°$. Draw all relevant wave shapes such as output voltage, thyristor voltage etc. Also derive equation (s) for output d.c. voltage. 20

Q.4 Explain Extinction angle control of power factor improvement. 20

UNIT-III

Q.5 Draw the circuit diagram of current source invertor & Explain its operation, using all relevant wave forms. 20

Q.6 Draw a single phase Mc Murray Bridge Inverter. Draw all voltage & current wave forms & Explain its operation for different intervals. 20

UNIT-IV

Q.7 Draw the four quadrant chopper & Explain its operation, clearly outlining the sequence of steps, along in the requisite wave shapes. 20

Q.8 Write brief technical notes on:

a) Circulating - type cyclo converter 15

b) Basic Principle of cyclo convertor. 5

BT-3/D11: 7613-RE

ELE 201E : Electromechanical Engg. Conversion

Time : 3 Hours Maximum Marks : 100

Note: Attempt Any Five question. Selecting at least one question from each unit. Each Question carries equal marks.

UNIT - I

Q.1 a) Discuss how will you describe magnetism around a solenoid. 10

b) Discuss what are frictional and copper losses. 10

Q.2 a) A transformer is operated at rated frequency but at a voltage higher than its rated value. Explain how the following quantities would change;

a) No load current.

b) Hysteresis loss.

c) Eddy current loss. 4x3 = 12

b) What are the condition for parallel operation of the transformer? 8

Q.3 a) Show that the torque developed in a doubly excited magnetic system is equal to the rate of increase of field energy with respect to displacement at constant currents. 10

b) For a singly excited magnetic system derive the relation for magnetic stored energy in terms of reluctance. 10

Q.4 a) Show that the effect of armature mmf on the main field is entirely cross magnetizing. 10

b) Explain three types of characteristics of a DC generator. Why do the external characteristics of a shunt generator turn back as the generator is overloaded? 10

Q.5 a) Why is it not advisable to start wound rotor induction motors by the methods employed for starting cage induction motor. 7

b) What is the objection to the reduced voltage starting of polyphase induction motor? 6

c) What are the causes of an induction motor operating always at lagging power factors. 7

Q.6 A 181 K.W, 3 phase, 50 Hz,4 pole induction motor has a full load slip of 0.03. mechanical and stray load losses at full load are 3.5% of output power. Compute

a) Power delivered by stator to rotor

b) Electromagnetic (internal) torque at full load

c) Rotor ohmic losses at full load 20

Q.7 a) Explain the difference between cylindrical rotor theory and two reaction theory. 8

b) A salient pole synchronous is connected to infinite bus. If its field current is reduced to zero, will it stop or continue running? If the latter, what will be its speed at what load angle will it fall out of step with zero field current. 12

Q.8 a) Explain how the graph between the p.f.and field current can be obtained from the V curves of a synchronous motor. 10

b) A 5 MVA, 11 KV,50Hz, 4 pole, star connected synchronous generator with synchronous reactance of 0.7 per unit is connected to an infinite bus. Find synchronizing power and the corresponding torque per unit of mechanical angle displacement,

a) at no load

b) at full load of 0.8 p.f. lag 10