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T.E. (Electronics) (Semester - VI) (Revised) (New)

Examination, May - 2018

DIGITAL SIGNAL PROCESSING

Sub. Code : 66851

Day and Date : Thursday, 03 - 05 - 2018

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :**
- 1) **Figures to right indicate full marks.**
 - 2) **Assume suitable data if required.**

SECTION - I

Q1) Attempt any two: [18]

- a) Explain in detail Radix 2, DIF FFT Algorithm.
- b) Explain in detail Overlap add method of sectioned Convolution.
- c) State and prove any four properties of DFT.

Q2) Attempt any two: [16]

- a) Compare DFT, Z Transform and Wavelet Transform.
- b) Write a note on 'Applications of Wavelet Transform'.
- c) What are the properties of Wavelet Transform? Explain.

Q3) Attempt any two: [16]

- a) Explain the procedure for designing FIR filter by Fourier Series Method.
- b) Explain in detail necessary and sufficient condition for the linear phase characteristic of an FIR Filter? What are the advantages and disadvantages of FIR Filter?
- c) Explain in detail design of FIR filter using windows.

P.T.O.

SECTION - II

Q4) Attempt any two: [18]

- a) Explain in detail Bilinear Transformation Method.
- b) Write the procedure for the design of low pass digital Butterworth IIR Filter.
- c) Convert the analog filter with the system function $H(s)$ given below into digital filter using bilinear transformation. Take $T = 0.5$. $H(s) = \frac{s + 0.3}{(s + 0.3)^2 + 16}$.

Q5) Attempt any two: [16]

- a) Write a note on 'Architecture of TMS320C67XX'.
- b) Explain in detail finite word length effect in Digital filters.
- c) Explain in detail FIR and IIR Filter Realization Schemes.

Q6) Attempt any two: [16]

- a) Write a note on 'Sampling rate conversion by I/D factor'.
- b) Explain in detail Two Stage Interpolator.
- c) Explain the need of Multi-rate DSP. What is up sampling and Down Sampling? Explain.



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T.E. (Electronics Engineering) (Part-III) (Semester - VI)
(Revised) Examination, May - 2018

VIDEO ENGINEERING

Sub. Code : 66852

Day and Date : Saturday, 05 - 05 - 2018

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Use suitable assumptions if required.
 - 3) Draw necessary figures on right side of answer sheet.

SECTION-I

Q1) Solve any three: **[18]**

- a) Explain positive and negative modulation with suitable waveforms.
- b) Draw the block diagram of PAL decoder and write function of each blocks.
- c) Explain aspect ratio, horizontal and vertical resolution, and video bandwidth for TV.
- d) Explain the factors on which Channel Bandwidth for video broadcasting depends.
- e) Draw suitable diagram and explain microphone and speaker.

Q2) Solve any two: **[16]**

- a) What is equalizer & mixer. Explain with suitable application.
- b) What is Scanning? State and explain advantages of Interlace scanning.
- c) Draw and explain Composite video signal for chess board pattern.

Q3) Solve any two: **[16]**

- a) Explain optical recording and reproduction.
- b) Compare NTSC and SECAM T.V. system.
- c) Draw suitable diagram and explain different elements of Colour picture tube.

P.T.O.

SECTION-II

Q4) Answer any three sub Questions: [18]

- Describe briefly the merits of digital TV receivers that are not achievable in analog receivers.
- Draw the structure of the plasma display panel (PDP) used for Television and explains it's working.
- Explain the Multiple sub-Nyquist sampling encoding developed for HDTV.
- Draw the basic block diagram of an up-link setup and explain how the signals are Compressed, packetized and multiplexed before modulation and transmission.

Q5) Answer any two sub Questions: [16]

- Draw the block diagram of video codec VCU 2134 and explain digital signal processing carried out in it (I T T).
- Draw and explain the working of different types of LCD Matrix used for television.
- Describe the merits and applications of CATV system. Draw a typical layout of this system of signal distribution. Why are the amplifiers and equalizers required along trunk distribution lines?

Q6) Answer any two sub Questions: [16]

- Draw and explain D_2 MAC baseband signal waveform for normal unscrambled picture transmission.
- Draw and explain the construction of LCD panels used for the television.
- What are the features and functions of CCTV with suitable diagram? Explain any one application of the CCTV?



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T.E. (Electronics) (Part-III) (Semester - VI) (New) (Revised)
Examination, May - 2018
POWER ELECTRONICS
Sub. Code : 66853

Day and Date : Tuesday, 08 - 05 - 2018**Total Marks : 100****Time : 2.30 p.m. to 5.30 p.m.**

- Instructions :**
- 1) All questions are compulsory.
 - 2) Draw neat circuit diagrams and waveforms wherever necessary.
 - 3) Figures to the right indicate full marks.

Q1) Attempt any two of the following: [16]

- a) State different turn-on methods of SCR and explain gate turn on method with neat circuit diagram.
- b) Draw and explain construction and characteristics of IGBT.
- c) Draw and explain gate trigger characteristics of SCR.

Q2) Attempt any two of the following: [16]

- a) What is the need of synchronization of control and power circuit in controlled rectifiers. Draw and explain line synchronized UJT triggering circuit?
- b) Explain the different types of isolation circuits. What is the need of such circuits when motors are driven by power electronic circuits.
- c) Draw and explain microprocessor based firing scheme for single phase full converter.

Q3) Attempt any two of the following: [18]

- a) Draw and explain the operation of single phase full bridge converter with RL load for continuous and discontinuous currents.
- b) Draw the Diac-triac phase controlled circuit and explain its operation with waveforms.

P.T.O.

- c) A single phase semiconverter operated from 230 V at 50 Hz, if $\alpha = 45^\circ$.

Find out:

- | | |
|---------------------------|------------------------|
| i) Average output voltage | ii) RMS output voltage |
| iii) Form factor | iv) Ripple factor |

Q4) Attempt any two of the following:

[16]

- How the choppers are classified. Explain the classification in details.
- Draw the circuit diagram of a step up chopper and derive its equation for o/p voltage.
- A DC chopper of input voltage 200 V remains on for 25 m.sec and off for 10 m.sec. Determine the average voltage which appears across the load. If the load is assumed to be resistive ($R = 10 \text{ ohms}$), then find the RMS value of output voltage and power delivered to the load.

Q5) Attempt any two of the following:

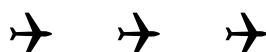
[16]

- What is the principle of operation of an inverter? Explain in detail operation of single phase full bridge inverter with R-load & also derive the equation of rms output voltage?
- What are the techniques for harmonic reduction. Explain any one technique in details.
- What are the types of Inverter. Explain the different performance parameters of Inverter.

Q6) Attempt any three of the following:

[18]

- Draw the diagram of constant voltage transformer & explain its operation.
- With neat block diagram explain online and offline UPS.
- Derive the expression for heat developed in a material by induction heating. What factors decide the depth of penetration?
- Explain in detail battery charger circuit.



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T.E. (Electronics) (Semester - VI)**Examination, May - 2018****COMPUTER ARCHITECTURE AND OPERATING SYSTEM****Sub. Code : 66854****Day and Date : Saturday, 12 - 05 - 2018****Total Marks : 100****Time : 2.30 p.m. to 5.30 p.m.**

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figure to the right indicates full marks.
 - 3) Use suitable data if necessary.

SECTION - I**Q1) Answer any two. [16]**

- a) Explain Booth's algorithm with flowchart and example.
- b) Draw and explain the flowchart for implementing twos complement multiplier Control unit.
- c) Explain OS services and components.

Q2) Attempt any Two. [16]

- a) Explain the operating system services provided to user and to the system itself.
- b) Design a complete Twos-complement 8 bit adder subtractor.
- c) Explain register level design of a floating point adder pipeline

Q3) Attempt any three. [18]

- a) Explain hard wired control with example.
- b) Design 4 bit combinational Array Multiplier.
- c) Explain the concept of multitasking.
- d) Draw single precision and double precision micro instruction format.

P.T.O.

SECTION - II

Q4) Answer Any Two. [18]

- a) What is process control block? Explain with suitable diagram.
- b) Explain the various reasons for process termination.
- c) Explain process state transition diagram with suspended state.

Q5) Answer Any Two. [16]

- a) What is semaphore? Explain its types.
- b) Explain producer-consumer problem.
- c) What is deadlock? Explain the conditions for deadlock.

Q6) Answer Any Two. [16]

- a) What is memory partitioning? Explain dynamic Partitioning with the help of suitable diagram.
- b) What is paging? Explain logical to physical address translation with the help of diagram.
- c) What is segmentation? Explain segmentation with the help of suitable diagram.

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T.E. (Electronics) (Semester - VI)
Examination, May - 2018
ELECTRONIC SYSTEM DESIGN
Sub. Code : 66855

Day and Date : Tuesday, 15 - 05 - 2018

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :**
- 1) **Draw neat circuit diagram wherever necessary.**
 - 2) **Clearly specify assumptions if any.**
 - 3) **Numbers to right indicate full marks.**
 - 4) **Write answers to bits in questions at one place and in sequence. Do not place answers randomly.**

SECTION - I

Q1) Answer any three of the following: [18]

- a) Explain the importance of reliability considerations with the help of bath tub curve.
- b) Explain how the TTL output signal can be interfaced with a CMOS chip operating at $V_{dd}=10\text{ V}$.
- c) Explain different characteristics of an operational amplifier from design perspective. Explain by giving example, the importance of a Particular characteristics in any one application.
- d) What is the role of pull up and pull down resistors connected on digital line?

Q2) Answer any two of the following: [16]

- a) Explain the characteristics of an instrumentation amplifier and importance of instrumentation amplifier in signal conditioning? List some of the applications of instrumentation amplifiers.

P.T.O.

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- b) The output from a load cell changes $20\mu\text{V/kg}$ with an output of 18mV with no load on the cell. Design a zero and span (gain offset) converter using an instrumentation amplifier which will output 0V dc when there is no load, and will change at 10mV/kg .
- c) Design a V to I converter that will produce 4mA with an input of 0Volts & 20mA with an input of 4V in to floating load.

Q3) Answer any two of the following:

[16]

- a) The full scale range of input voltage supplied to ADC is 0 to 2.048 Volts . The full scale output decimal count of ADC is between 0 and 2048 . What is the bit width of ADC and what should be the reference voltage to be applied to ADC? Explain by giving formula.
- b) Draw a detailed interface diagram to interface 4 no of seven segment LED display modules to 8051 microcontroller using dynamic display interface. Use Common Anode displays modules, use Port 1 to interface segments 'a' to 'dp' and $P2.0$ to $P2.3$ lines to drive display modules.
- c) Draw and interface diagram for interfacing 12 V DC operated double acting actuator for pneumatic cylinder. Use two separate 1 CO relays for both of actuator coils, a PIC microcontrollers two port lines drive 5 V , 10 mA relay coil directly.
- d) Write the short note on resistive and capacitive touch pad sensor.

SECTION - II

Q4) Write any two of the following.

- a) Explain in the detail ECG signal with different intervals and their magnitudes. **[8]**
- b) With a neat diagram, explain principle and working of pulse oximeter. **[8]**
- c) Explain with a neat diagram working of blood sugar measuring instrument. **[8]**

Q5) Solve any one:

- a) Design SMPS that delivers 1 A load current at 12V DC output voltage. The input voltage is 18VDC. Use LM3524 SMPS regulator.
 - i) Draw neat circuit diagram of above configuration using LM3524.
 - ii) Calculate values of feedback resistors.
 - iii) Calculate the values of L and C to stabilize output voltage within 10mv ripple.
- b) With a neat circuit diagram explain buck regulator and derive the equation for the output voltage V_o , inductance L and capacitance C.

Q6) Solve any two of the following.

- a) Describe the significance of EMI and EMC. How the noise coupling takes Place in the electrical and electronic circuits. **[9]**
- b) Describe various methods of minimizing the EMI and EMC effects from compliance testing. **[9]**
- c) With a neat diagram describe working of fly-back converter. **[9]**



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T.E. (Electronics Engineering) (Part - III) (Semester - V)
(Revised) Examination, April - 2018

MICROCONTROLLER

Sub. Code : 66281

Day and Date : Wednesday, 25 - 4 - 2018

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Assume suitable data if necessary.
 - 3) Figures to right indicate full marks.

SECTION - I

Q1) Answer any three of the following. [18]

- a) Explain TCON register of MCS 8051.
- b) Explain read modify write feature & list all read modify write instructions.
- c) Explain all Conditional branch Instructions of 8051.
- d) Explain single stepping operation with respect to interrupt of MCS 8051.

Q2) Answer any two of the following. [16]

- a) Explain various timer modes of 8051.
- b) Explain program memory organization & data memory organization of MCS 51.
- c) Explain IP Register & IE Register of 8051.

Q3) Answer any two of the following. [16]

- a) Explain various Serial communication modes and comment on baud rate in each mode.
- b) Interface four digit 7 Segment displays (Common Anode Type) with MCS 8051 and write assembly language program to display message "8051".
- c) Explain PCON register in detail.

P.T.O.

SECTION - II

Q4) Answer any three of the following. [18]

- a) Explain various C data types.
- b) Write a 8051 C Program to get a data byte from port P1, wait half Second and then send it to port P2.
- c) Explain configuration word of PIC 16f877.
- d) What is oscillator start up timer and power up timer, explain their significance.

Q5) Answer any two of the following. [16]

- a) Explain timer 1 and T1CON register of PIC 16f877.
- b) Write assembly language program to blink LED connected to PC0 Pin of PIC 16f877.
- c) Explain PSP mode of PIC 16f877 and also comment on IBF, OBF and IBOE status bits of TRISE register.

Q6) Answer any two of the following. [16]

- a) Explain PWM module of PIC 16f877.
- b) Explain Interrupt structure of PIC 16f877.
- c) Explain Sleep mode of PIC 16f877.

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T.E. (Electronics) (Semester - V) (New)
Examination, April - 2018
ELECTROMAGNETIC ENGINEERING
Sub. Code : 66282

Day and Date : Thursday, 26 - 4 - 2018
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicates full marks,
 - 3) Assume suitable data if necessary.
 - 4) Use non-programmable calculator.

SECTION-I

Q1) Attempt any two: **[16]**

- a) Explain the following terms:
 - i) Flux density.
 - ii) Coulomb's law and electric field.
- b) State and prove Divergence theorem.
- c) Point charges of 50 nc each are located at A(1, 0, 0), B(-1, 0, 0), C(0, 1, 0) and D(0, -1, 0) in free space. Find the total force on the charge at A.

Q2) Attempt any two: **[16]**

- a) Give Maxwell's equations for time varying fields.
- b) Derive the expression for Electrostatic potential.
- c) A dipole moment $\vec{p} = 6\vec{a}_z$ nc-m is located at the origin in free space
 - i) Find V at P($r = 4$, $\theta = 20^\circ$, $\phi = 0^\circ$)
 - ii) Find \vec{E} at p.

Q3) Attempt any Three: **[18]**

- a) Torque on loop.
- b) Stoke's Theorem.
- c) Potential Gradient.
- d) Find total charge enclosed if

$$D = e^{-x} \sin y \vec{a}_x - e^{-x} \cos y \vec{a}_y + 2z \vec{a}_z \text{ c/m}^2$$

P.T.O.

SECTION-II

Q4) Attempt any two: [16]

- Derive the expression for attenuation constant α and phase shift constant β for conducting media.
- Explain power flow in uniform plane wave and give circuit applications of the poynting vector.
- The parameters of a certain transmission line operating at 6×10^8 rad/s are $L = 0.4 \mu\text{H/m}$, $C = 40 \text{ pf/m}$, $G = 80 \mu\text{s/m}$ and $R = 20 \Omega/\text{m}$. Find γ and Z_0 .

Q5) Attempt any two: [16]

- Explain in detail transmission line parameters.
- What is stub matching? Why it is needed? Explain.
- The electric field amplitude of a uniform plane wave propagating in the \bar{a}_z direction is 250 v/m. If $\bar{E} = E_x \bar{a}_x$ and $\omega = 1.00 \text{ Mrad/s}$, find
 - the frequency
 - the wavelength
 - the period
 - the amplitude of \bar{H}

Q6) Attempt any Three: [18]

- Characteristics impedance Z_0 .
- Polarization.
- Smith chart.
- The characteristic impedance of a certain lossless transmission line is 72Ω . If $L = 0.5 \mu\text{H/m}$, find capacitance C .



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T.E. (Electronics) (Semester - V) (Revised)**Examination, April - 2018****VLSI DESIGN****Sub. Code :66283****Day and Date : Friday, 27- 4 - 2018****Total Marks : 100****Time : 10.00 a.m. to 1.00 p.m.**

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicates full marks.
 - 3) Assume suitable data if required.

SECTION - I**Q1) Attempt any three.****[3×6=18]**

- a) Write a VHDL description to implement with D-FF with synchronous reset.
- b) Write a VHDL description to implement 4-bit 2-input multiplexer.
- c) Explain the syntax for physical literals. Describe Current (nA, μ A, mA, A) as physical type.
- d) What is meta stability and synchronizer failure? Explain in brief with neat diagrams.

Q2) Attempt any two.**[2×8=16]**

- a) What is concurrent statement? List and explain the syntax of 'when-else' and 'with select' statement.
- b) Write VHDL description for 8: 1 Mux using 'with select' statement
- c) Write a VHDL structural description to implement 4:1 mux using 2:1 mux.

P.T.O.

Q3) Attempt any two.**[2×8=16]**

- a) Design a Moore machine to detect non overlapping sequence '101' sequence and describe it using VHDL.
- b) Design a 4 bit shift register with shift enable and shift left or shift right controls and describe it using VHDL.
- c) Design a FSM to produce a sequence 1,3,7,9,11,13,15,17 describe it using VHDL.

SECTION - II**Q4) Attempt any three.****[3×6=18]**

- a) Explain 'block' and 'arrayl' attributes with example.
- b) Explain with example WAIT statements in VHDL.
- c) Explain with example fault models for testing.
- d) What is JTAG? Explain the JTAG standard and interface.

Q5) Attempt any two.**[2×8=16]**

- a) Explain with neat diagram structure of IOB spartan - II FPGA.
- b) Write a algorithm and design the datapath for n Factorial and list control words.
- c) Design a control unit for simple IF – THEN–ELSE algorithm.

Q6) Attempt any Two.**[2×8=16]**

- a) List various features of spartan - II LUT and details of BLOCK RAM.
- b) With neat diagram explain boundary scan testing technique.
- c) Draw and explain architecture, features of XC95xx series CPLD.



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T.E. (Electronics) (Part - III) (Semester - V) (Revised)

Examination, April - 2018

DIGITAL COMMUNICATION

Sub. Code : 66284

Day and Date : Saturday, 28 - 04 - 2018

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary.

Q1) Solve any two of the following:

[18]

- a) In an experiment of drawing a card from a well shuffled pack, all the elementary events are equally likely. If the event of getting a Heart is denoted by H, and that of an ace is denoted by A, explain the events $H \cap A$, $H \cup A$ and find their probabilities.
- b) A pair of fair dice is rolled, the values of their faces are added; and sum of faces and probabilities are noted down. Draw the distribution function associated with the experiment.
- c) Define joint probability density function & mention the properties of joint probability density function of two random variables.

Q2) Solve any two:

[16]

- a) Explain in detail non uniform quantization.
- b) In a pcm, using n-bits encoder. Show that signal to quantization noise ratio is given as $(1.8 + 6N)$ dB for sine wave input.
- c) Draw the block diagram of Adaptive delta modulation and explain in detail.

P.T.O.

Q3) Solve any two:**[16]**

- a) Draw the waveforms of Adaptive delta modulation & Linear delta modulation & compare their response & comment on it.
- b) Represent the data 101101001 using following data formats with the help of waveforms.
 - i) Bipolar RZ.
 - ii) Bipolar NRZ.
 - iii) Unipolar RZ.
 - iv) Split phase manchester format.
- c) Explain carrier recovery circuit.

Q4) Solve any two:**[16]**

- a) Explain the QPSk modulation scheme with suitable transmitter and receiver block diagram.
- b) With the help of neat block schematic & space diagram explain the QAM transmitter & receiver.
- c) Explain Coherent Binary Phase shift keying.

Q5) Solve any two:**[16]**

- a) What do you understand by inter symbol interference? What are its effects? How can ISI be reduced. (Intersymbol Interference).
- b) Discuss the properties and applications of matched filter.
- c) Explain with circuit diagram Early-Late bit symbol synchronization.

Q6) Solve any two:

- a) List out and prove the properties of Pseudo-random sequences used in CDMA systems.
- b) Explain the concept of spread spectrum modulation and list characteristics of SS signal.
- c) Explain how integration is used to detect baseband signal. Obtain an expression for signal to noise ratio integrate and dump receiver.

