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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.

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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.



Seat No.	
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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
Time : 2.30 p.m. to 5.30 p.m.**

Total Marks : 100

- 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?



Seat No.	
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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
Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

- 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]**

- a) How the choppers are classified. Explain the classification in details.
b) Draw the circuit diagram of a step up chopper and derive its equation for o/p voltage.
c) 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 ($R = 10$ ohms), then find the RMS value of output voltage and power delivered to the load.

Q5) Attempt any two of the following: **[16]**

- a) 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?
b) What are the techniques for harmonic reduction. Explain any one technique in details.
c) What are the types of Inverter. Explain the different performance parameters of Inverter.

Q6) Attempt any three of the following: **[18]**

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



Seat No.	
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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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Seat No.	
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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.

SV - 171

- 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 12V DC operated double acting actuator for pneumatic cylinder. Use two separate 1CO relays for both of actuator coils, a PIC microcontrollers two port lines drive 5V , 10mA 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:**[16]**

- a) Design SMPS that delivers 1 A load current at 12V DC output voltage. The input voltage is 18VDC. Use LM3524 SMPS regulator.
- Draw neat circuit diagram of above configuration using LM3524.
 - Calculate values of feedback resistors.
 - 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.

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



Seat No.	
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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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Seat No.	
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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 $\bar{p} = 6\bar{a}_z$ 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 \bar{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

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

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 .



Seat No.	
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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]**

- Design a Moore machine to detect non overlapping sequence '101' sequence and describe it using VHDL.
- Design a 4 bit shift register with shift enable and shift left or shift right controls and describe it using VHDL.
- 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]**

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

Q5) Attempt any two.**[2×8=16]**

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

Q6) Attempt any Two.**[2×8=16]**

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



Seat No.	
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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.

