

**SJ-427**

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**T.E. (Electronics) (Semester - V) Examination, November - 2016**  
**SIGNALS AND SYSTEMS**  
**Sub. Code : 66280**

Day and Date : Wednesday, 16-11-2016  
Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

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

**SECTION - I**

**Q1) Solve any two :**

**[16]**

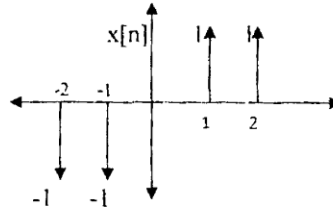
a) A signal  $x[n]$  is as shown in fig. sketch and label each of the following

i)  $x[2n+3]$

ii)  $x[n-4]$

iii)  $x[2+n/3]$

iv)  $x[n] + x[-n]$



b) Determine whether the following systems are linear or nonlinear. Justify your answer.

i)  $y(t) = x(t-7) - x(5-t)$

ii)  $y[n] = x[n] + \frac{1}{x[n+1]}$

c) Determine whether the following signals are energy signal, power signal or neither of two.

i)  $x[n] = \cos[\pi n]$  for  $n \geq 0$

ii)  $x(t) = t.u(t)$

**P.T.O.**

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**[16]**

**Q2)** Solve any two

a) Draw even and odd parts of following signals

i)  $x(t) = 1$  for  $-1 \leq t \leq 1$ .

$= -1$  for  $1 \leq t \leq 2$

ii)  $x[n] = [1.5, 2, \underset{\uparrow}{1}, 2, 1.5]$

b) Find the convolution sum of the following signals and plot resultant sketch.

$x[n] = \delta[n] + \delta[n-1] + \delta[n+1]$  and  $h[n] = \cos(\pi n)$  for  $0 \leq n \leq 3$  by analytical method.

c) The impulse response of LTI system is given below. Determine whether the system is stable or not.

i)  $h(t) = e^{t^2}$

ii)  $h[n] = a^n u[n-1]$   $a > 0$

**Q3)** Solve any three :

**[18]**

a) State and explain convolution properties for both C.T. and D.T.

b) Determine whether the following signals are periodic or non periodic. If periodic find fundamental period.

i)  $x(t) = \cos(t) + \sin(\sqrt{2} t)$

ii)  $x[n] = \cos\left[\frac{\pi n}{4}\right] - \sin\left[\frac{\pi n}{2}\right]$

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- c) What is Interpolation? What are its methods? Explain Zero Order Hold method.
- d) Consider the following signal
- $$x(t) = \cos(2000 \pi t) + 10\sin(10000 \pi t) + 20\cos(5000 \pi t)$$
- Determine
- Nyquist sampling rate
  - If sampling rate is 5000 samples per sec. Then what is the discrete time signal obtained after sampling.

**SECTION - II****Q4) Attempt any two : [16]**

- a) Discuss and derive the following properties of Fourier Transform:
- Time shift
  - Scaling theorem
  - Modulation theorem
  - Differentiation in frequency Theorem.
- b) Find the Z Transform of the following signal:  $y[n] = u[n-2] * \left(\frac{2}{3}\right)^n u[n]$  where \* indicates the convolution operation. Compute and sketch the ROC?
- c) Compute the DTFT of the following signal:

$$x[n] = \begin{cases} 2^n, & 0 \leq n \leq 9 \\ 0 & \text{otherwise} \end{cases}$$

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

- a) Derive the expression for input-output of the system in terms of linear constant coefficient differential equation for continuous time system?
- b) Using the DFT equation compute the DFT of  $x[n] = \{2, 0, -2, 1\}$ ?

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- c) Using the long division method, compute IZT of the following:

$$X(Z) = \frac{16Z^2 - 2Z + 1}{8Z^2 + 2Z - 1}$$

with i) ROC  $|Z| > \frac{1}{2}$

ii) ROC  $|Z| < \frac{1}{2}$

**Q6)** Attempt any two:

**[18]**

- a) Realize the following system in Direct Form I and II:

$$y[n] - y[n-1] + \frac{1}{4} y[n-2] = \frac{1}{4} x[n-1] - \frac{1}{8} x[n-2].$$

- b) Use the convolution property to find the Fourier Transform of the system output  $Y(\omega)$  for the system input  $x(t) = 3e^{-t} u(t)$  and the impulse response  $h(t) = 2 e^{-2t} u(t)$ ?
- c) Compute the Inverse DFT of  $X(k) = \{2, -2j, 2, 2j\}$ ?



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**T.E.(Electronics Engg.) (Part - I) (Revised) (Semester-V)**  
**Examination, November - 2016**  
**MICROCONTROLLERS**  
**Sub. Code :66281**

Day and Date :Saturday, 19-11-2016  
Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

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

**SECTION - I**

**Q1) Answer Any four of the following. [4×5=20]**

- a) Draw and explain interrupt structure of 8051.
- b) Compare between 80c535 and 89c420 Microcontrollers.
- c) Explain the SCON SFR with it's format.
- d) Explain the SWAP instruction of 8051 and write a program to swap the contents of RI register.
- e) Draw port-2 internal structure and explain it briefly.

**Q2) Answer Any Two of the following. [2×8=16]**

- a) Write ASM code to transfer the block of data from IRAM to XRAM (10numbers) .
- b) Explain the Timer/Counter mode - 1 of 8051 with suitable diagram.
- c) Explain the operating modes of serial port of 8051.

**Q3) Answer Any Two of the following. [2×7=14]**

- a) Write ASM code to find smallest of 5 numbers stored in IRAM address 40h onwards.
- b) Draw a hardware interface of DAC-0808 to 8051 and explain it in brief.
- c) Draw and explain LCD interface to 8051.

**P.T.O.**

**SECTION-II**

**Q4) Answer Any TWO from the following. [2×8=16]**

- a) Write an Embedded - C program for 8051, to toggle bits of port P1 continuously with a 250 ms delay.
- b) Explain the Serial Peripheral Interface (SPI) mode of MSSP Module.
- c) Draw format and explain different bits of INTCON Register.

**Q5) Answer Any TWO from the following. [2×8=16]**

- a) Write a PIC 16F877 assembly language program for DIVISION. Use data memory location 0×30 as dividend and 0×31 as divisor. Store the quotient at memory location 0×32 and remainder at 0×33.
- b) Draw and explain TIMERO module of PIC.
- c) Draw and explain block diagram of PIC 16F877.

**Q6) Answer Any THREE from the following. [3×6=18]**

- a) Explain Embedded - C 'Data Types' for 8051.
- b) Explain different alternate multiplexed pin functions of PORTC of 16F877.
- c) Describe CAPTURE mode of CCP module.
- d) Explain following instructions of 16F877.
  - i) ADDWF f,d.
  - ii) RETURN.



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**T.E. (Electronics) (Semester - V)**  
**Examination, November - 2016**  
**ELECTROMAGNETIC ENGINEERING**  
**Sub. Code : 66282**

Day and Date : Tuesday, 22-11-2016

Total Marks : 100

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

- Instructions :
- 1) All Questions are compulsory.
  - 2) Figures to the right indicates full marks.
  - 3) Assume suitable data if necessary.
  - 4) Use of non-programmable calculator is allowed.
  - 5) Use Smith chart if necessary.

**SECTION - I**

**Q1) Attempt any two**

**[16]**

- a) Derive the expression for Electric potential V due to
  - i) point charge,
  - ii) line charge with uniform charge density  $\rho_l$  C/m.
- b) Evaluate both sides of divergence theorem if  $D = 2xy\mathbf{a}_x + x^2\mathbf{a}_y$  C/m<sup>2</sup> and the rectangular parallelepiped formed by  $x = 0$  and  $1$ ,  $y = 0$  and  $2$ ,  $z = 0$  and  $3$ .
- c) Find E at the origin if the following charge distributions are present in free space : point charge, 12nC at P(2,0,6); uniform line charge density 3nC/m at  $x = -2$ ,  $y = 3$  and uniform surface charge density 0.2nC/m<sup>2</sup>, at  $x = 2$ .

**Q2) Attempt any two**

**[16]**

- a) Prove that :  $\text{curl } \mathbf{H} = \mathbf{J}$ .
- b) Explain the boundary conditions for steady magnetic fields.

**P.T.O.**

- c) Express the value of H at P(0, 0.2, 0) in the field due to
- current filament, 2.5 A in the  $a_z$  direction at  $x = 0.1, y = 0.3$ ;
  - three current sheets  $2.7 a_x$  A/m at  $y = 0.1, -1.4a_x$  A/m at  $y = 0.15$  and  $-1.3a_x$  A/m at  $y = 0.25$ .

**Q3) Attempt any three**

**[18]**

- Write short note on applications of Gauss's Law.
- Given the two points, C (-3, 2, 1) & D(5, 20°, -70°); Find:
  - spherical coordinates of C,
  - Cartesian coordinates of the point D;
  - the distance from C to D.
- Find gradient of :  $V = rz \sin \phi + z^2 \cos^2 \phi + r^2$ .
- Prove that, torque =  $M \times B$

**SECTION - II**

**Q4) Solve any Two**

**[16]**

- At an operating frequency of 500 Mrad/s, typical circuit values for a certain transmission line are :  $R = 0.2$  ohm/m,  $L = 0.25$   $\mu$ H/m,  $G = 10$   $\mu$ S/m and  $C = 100$  PF/m, find  $\alpha, \beta, V_p$  and  $Z_o$ .
- Give the Maxwell's equations for static fields.
- Given the material having  $\epsilon_r = 3.2$  and  $\sigma = 1.75 \times 10^{-4}$  S/m. find attenuation and phase constant at frequency 2.5 MHz.



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**[16]**

**Q5) Solve any Two**

- a) Explain various Transmission line parameters.
- b) A 10 GHz plane wave travelling in free space has an amplitude 15v/m. Find
  - i) Velocity of propagation.
  - ii) characteristic impedance of medium.
  - iii) amplitude of H.
  - iv) propagation constant.
- c) A 50-  $\Omega$  lossless transmission line is terminated in a load with impedance  $Z_L = (30 - j50) \Omega$ . The Wavelength is 8 cm. Find
  - i) the reflection coefficient at the load,
  - ii) the standing- wave ratio on the line.

**Q6) Solve any Three:**

**[18]**

- a) Inconsistency of Ampere's law.
- b) Poynting theorem.
- c) Double stub matching.
- d) Infinite line.



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**T.E. (Electronics) (Semester - V) (Revised)****Examination, November - 2016****VLSI DESIGN****Sub. Code : 66283****Day and Date : Thursday, 24 - 11 - 2016****Total Marks : 100****Time : 2.30 p.m. to 5.30 p.m.**

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) **Figures to write 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 “or gate” using ‘When-else’ statement.
- b) Explain the syntax with examples of Library, package in VHDL.
- c) Write a VHDL description to implement 1:4 DEMUX using ‘CASE’ statement.
- d) Explain with example: operators in VHDL.

**Q2) Attempt any TWO:****[2 × 8 = 16]**

- a) Draw neat labeled diagram of 4 bit subtracter and Write a VHDL description using structural architecture.
- b) Write a VHDL description to implement 4 bit serial to parallel converter describe necessary control inputs.
- c) What is clock skew? Explain with example the techniques used to reduce clock skew and gating of clocks.

***P.T.O.***

**Q3) Attempt any TWO:****[2 × 8 = 16]**

- a) Write a VHDL description for 4-bit wide 16 dip single port RAM.
- b) Write a VHDL description for D F-F with:
  - i) Synchronous reset
  - ii) Asynchronous reset
- c) Explain with example Different types of architectures in VHDL.

**SECTION - II****Q4) Attempt any THREE:****[3 × 6 = 18]**

- a) What is the need for simulation? Explain different types of Simulators.
- b) Explain various TYPE and SIGNAL attributes.
- c) What is testing and its need? Explain various fault models.
- d) Explain different steps for datapath design.

**Q5) Attempt any TWO:****[2 × 8 = 16]**

- a) What are the inertial and transport delays? Explain with neat timing diagram. Write syntax for these.
- b) Design a datapath for  $A = A + 8$  and  $A = B + C$  using only one adder where A, B and C are 4 bit registers.
- c) Design rotating lights standalone controller.

**Q6) Attempt any TWO:****[2 × 8 = 16]**

- a) With neat diagram explain use of LFSR in testing technique.
- b) Explain with neat diagram structure of microcell of XC95xx series CPLD.
- c) Explain various functions of TEXT IO package and explain with example.



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Total No. of Pages :3

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**T.E. (Electronics) (Semester - V) Examination, November - 2016**

**DIGITAL COMMUNICATION**

**Sub. Code : 66284**

**Day and Date :Saturday, 26-11-2016**

**Total Marks : 100**

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

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

**SECTION - I**

**Q1) Solve any Two:**

**[18]**

- a) What is Slope over Load Distortion and granular noise in delta modulation?  
Explain how it is removed in ADM with block diagram of it.
- b) A random variable has an experimental PDF given by  $f(x) = ae^{-b|x|}$ , where a and b are constant find
  - i) Relationship between a and b
  - ii) The distribution function of x
- c) Write short notes on:
  - i) Uniform distribution
  - ii) Binomial distribution
  - iii) Rayleigh distribution

**P.T.O.**

**Q2) Solve any Two****[16]**

- a) What is CDF? Explain its properties in brief with proof.
- b) Explain differential pulse code modulation (DPCM) transmitter and receiver with block diagram.
- c) Explain in detail Uniform quantization.

**Q3) Solve any Two****[16]**

- a) With one suitable example Explain coding format of
  - i) Bipolar RZ
  - ii) Bipolar NRZ
  - iii) Uni Polar RZ
  - iv) Split phase Manchester format
- b) Explain carrier recovery circuit.
- c) Derive an expression for Signal to Noise Ratio for a PCM based system.

**SECTION - II****Q4) Solve any Two:****[18]**

- a) Explain the QPSK modulation scheme with suitable transmitter and receiver block diagram.
- b) What is Inter symbol interface (ISI)? Explain its cause effect on digital communication system and remedy to reduce it.
- c) With neat block diagram discuss on DSSS transmitter and receiver and list the characteristics of Spread Spectrum signal.

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**Q5) Solve any Two:**

**[16]**

- a) Draw the Block diagram of BFSK and explain its operation in detail.
- b) Discuss the properties and applications of matched filter.
- c) What is the necessity of equalization in digital transmission? What is adaptive equalization?

**Q6) Solve any Two:**

**[16]**

- a) Explain in detail about coherent BPSK techniques with relevant diagrams.
- b) Discuss the frequency - Hop spread spectrum technique in detail.
- c) List out and prove the properties of Pseudo-random sequences used in CDMA systems.



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**T.E. (Electronics) (Part - I) (Semester - V) (Old) (Pre-revised)  
Examination, November - 2016**

**MICROPROCESSOR PERIPHERALS AND INTERFACING**

**Sub. Code : 45589**

**Day and Date : Wednesday, 16-11-2016**

**Total Marks : 100**

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

- Instructions :**
- 1) All questions are compulsory.
  - 2) Digits to right indicate full marks.
  - 3) Make suitable assumptions wherever necessary.

**SECTION - I**

**Q1) Answer any three [3 × 6 = 18]**

- a) Draw and illustrate timing diagram of MOV B, M instruction.
- b) Explain Addressing modes of 8085 microprocessor.
- c) Differentiate RAM & ROM.
- d) Explain 8085 state transition diagram.

**Q2) Answer any two [2 × 8 = 16]**

- a) Explain by diagram effect of CALL and RET instruction on the stack, SP and PC.
- b) Draw timing diagram of IN. 8 bit address instruction.
- c) Write assembly language program for memory block transfer of ten bytes.

**Q3) Answer any two [2 × 8 = 16]**

- a) Interface 8255 to 8085 microprocessor in I/o mapped I/o with address 40h, 41h, 42h, 43h.
- b) Explain following pins of 8085 microprocessor \_\_\_\_\_
  - i) Resetin
  - ii) Ready
  - iii) HOLD
  - iv) HLDA

**P.T.O.**

- c) Explain following instructions
  - i) MOV A, B
  - ii) LXI M, 6000 H
  - iii) DAA
  - iv) DAD RP

**SECTION - II**

**Q4) Answer any three** **[3 × 6 = 18]**

- a) Draw block diagram of IC 8279.
- b) Explain FIFO status word format of IC 8279.
- c) Explain Modem Control signals of 8251.
- d) Give specifications of ADC 0809.

**Q5) Answer any two** **[2 × 8 =16]**

- a) Write a program to generate triangular wave using DAC 0808 also draw interfacing diagram.
- b) Draw and explain block diagram of IC 8251.
- c) With neat sketch explain interface between 8085 and 8255 for port addresses 20,21,22,23h.

**Q6) Answer any two** **[2 × 8 =16]**

- a) Interface 4-digit common anode display with IC 8255 to 8085 microprocessor using multiplexing technique.
- b) With the help of block diagram explain the functioning of 8259 in detail.
- c) Explain following control words of 8259
  - i) OCW1
  - ii) ICW1





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Total No. of Pages : 2

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**T.E. (Electronics) (Semester - V) (Pre Revised) (Old)**  
**Examination, November - 2016**  
**ANALOG INTEGRATED CIRCUITS AND APPLICATIONS**  
**Sub. Code : 45590**

Day and Date : Thursday, 24 - 11 - 2016

Total Marks : 100

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

- Instructions :
- 1) All questions are compulsory.
  - 2) Draw circuit diagrams/figures wherever necessary.
  - 3) Assume suitable data if necessary.

**SECTION - I**

**Q1) Attempt any two questions: [18]**

- a) With the help of AC equivalent circuit of dual input unbalanced output differential amplifier derive equation for voltage gain.
- b) With neat sketch explain output stage of op-amp block schematic. Explain requirements of good output stage.
- c) Explain ideal and practical characteristics of op-amp in detail.

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

- a) With neat circuit diagram explain op-amp as differentiator. Draw frequency response for the same.
- b) Draw high frequency equivalent circuit for op-amp. Derive expression for open loop voltage gain as a function of frequency.
- c) Explain the techniques used for offset voltage compensation for inverting and non inverting operational amplifier.

**Q3) Attempt any two questions: [16]**

- a) Draw neat circuit diagram for inverting and non-inverting amplifier. Also derive expression for its gain.
- b) Explain in detail why open loop op-amp circuits are not used for linear applications.
- c) Explain slew rate with its causes. Also derive an expression for same.

**P.T.O.**

**SECTION - II**

**Q4) Attempt any two questions: [16]**

- a) Draw neat circuit diagram of sample & hold circuit using op-amp. Explain it in detail.
- b) How will you generate square wave by using op-amp. Explain it in detail with neat circuit diagram & waveforms.
- c) Explain instrumentation amplifier using transducer bridge with neat sketch. Derive equation of output voltage for the same.

**Q5) Attempt any two questions: [16]**

- a) Design first order low pass filter for cut off frequency  $f_h = 1\text{KHz}$  & pass band gain = 2.
- b) Draw neat circuit diagram of astable multivibrator using timer & design the same for following specifications.
  - i) Charging time = 25 msec
  - ii) Discharging time = 15 msec
- c) Draw neat circuit diagram for differentiator using op-amp. Explain it in detail.

**Q6) Write short note on: [18]**

- a) Wein bridge oscillator.
- b) IC 566.
- c) Precision full wave rectifier.



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**T.E. (Electronics) (Semester - V) (Pre-revised) (Old)**  
**Examination, November - 2016**  
**DIGITAL SYSTEM DESIGN**  
**Sub. Code : 45591**

**Day and Date : Monday, 28 - 11 - 2016**

**Total Marks : 100**

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

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

**SECTION - I**

**Q1) Attempt any THREE**

**[3×6=18]**

- a) Write a note on package & configuration statement.
- b) Write a VHDL code for 4 : 1 multiplexer.
- c) Write a note on component instantiation, also given an example.
- d) Compare concurrent & sequential statements.

**Q2) Attempt any TWO**

**[2×8=16]**

- a) Write a VHDL code for 3:8 decoder.
- b) Write a VHDL code for priority encoder.
- c) Write a note on data types available in VHDL.

**Q3) Attempt any TWO**

- a) Design sequence detector for detecting the sequence 1011. **[2×8=16]**
- b) Draw and explain VLSI design flow.
- c) What is port map? When it is used? Explain different types of port map with example.

*N.T.O.*

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

- a) Write a note signal and array attributes.
- b) Explain cycle based simulator?
- c) Draw and explain product term allocator of XC95XX CPLD.
- d) What are the drawbacks of stuck at fault model? Explain in detail the path sensitizing model.

**Q5) Attempt any TWO.****[2×8=16]**

- a) Draw and explain the CLB of Spartan-II FPGA.
- b) Draw and explain boundary scan testing technique.
- c) Design the control unit processor having instructions like IN, OUT, DEC, JNZ & HALT.

**Q6) Attempt any TWO****[2×8=16]**

- a) What do you mean by delay? Explain inertial & transport delay.
- b) Draw and explain architecture of IOB of xc2s30 FPGA.
- c) Explain Datapath designing for EC-I GPP with appropriate diagram.



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**T.E.(Electronics)(Part-III) (Semester -V)(Pre-Revised)(Old)**  
**Examination, November - 2016**  
**CONTROL SYSTEM ENGINEERING**  
**Sub. Code :45593**

Day and Date :Tuesday, 29 -11 -2016

Total Marks : 100

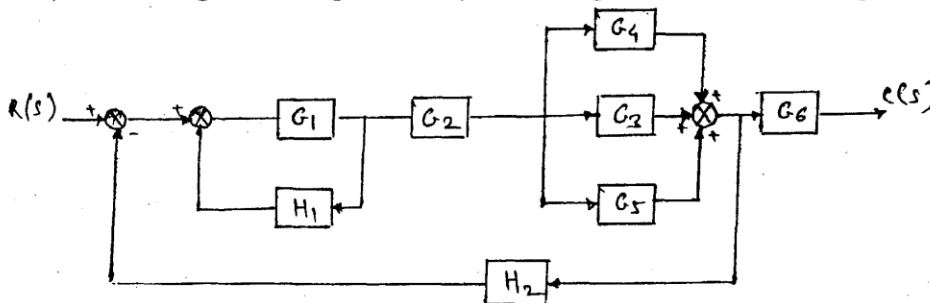
Time :2.30p.m. to 5.30 p.m.

- Instructions : 1) All the questions are compulsory  
 2) Assume suitable data if necessary.

**SECTION-I**

Q1) Solve any two of the following: [2×9=18]

- Explain steps to solve Signal Flow Graph using Masons' Gain Formula
- Derive Force - Voltage Analogy.
- Find single block equivalent by block diagram reduction technique.



Q2) Solve any two of the following: [2×8=16]

- Derive steady state error for type zero, type one & type two system when parabolic input is given.
- The control system having unity feedback has

$$G(S) = \frac{125}{s(1+10s)}$$

Determine peak Overshoot and settling Time.

- Explain in brief regenerative feedback.

P.T.O.

**Q3) Solve any two of the following: [2×8=16]**

- a) Draw Root Locus for the system

$$G(s).H(s) = \frac{k}{s(s+6)(s+9)}$$

- b) Explain the term Asymptote breakaway point, angle of departure & angle of arrival.  
 c) With neat sketch explain linearizing effect of feedback.

**SECTION-II**

**Q4) Solve any two of the following: [2×9=18]**

- a) Explain steps to solve Bode Plot. Also explain Gain Margin & Phase Margin  
 b) With neat sketch derive Lead-Lag Compensator.  
 c) Find the Transfer function of the system

$$A = \begin{bmatrix} -1 & -4 & -1 \\ -1 & -6 & -2 \\ -1 & -2 & -3 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \quad C = [3 \quad 1 \quad 0]$$

**Q5) Solve any two of the following: [2×8=16]**

- a) With help of neat circuit diagram explain the PI Controller  
 b) Solve Polar Plot

$$G(s).H(s) = \frac{100}{(s+2)(s+4)(s+8)}$$

- c) State & explain Nyquist stability criteria.

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**[2×8=16]**

**Q6)** Solve any two of the following:

- a) Explain advantage of frequency domain over time domain analysis.
- b) Find controllability and Observability of the system

$$A = \begin{bmatrix} -2 & 4 \\ 2 & -1 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 1 \end{bmatrix} \quad C = [0 \quad 1]$$

- c) Derive transfer function from state model for continuous time system.



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**T.E. (Electronics) (Part - II) (Semester - VI) (Old)**

**Examination, November - 2016**

**POWER ELECTRONICS**

**Sub. Code:45597**

**Day and Date : Wednesday, 09 - 11 - 2016**

**Total Marks : 100**

**Time :10.30 a.m. to 1.30 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: [16]**

- a) Explain Dynamic characteristics during turn on, turn off, and gate triggering characteristics of SCR.
- b) Explain class-C commutation with necessary waveform.
- c) Explain R and RC triggering method for SCR with necessary waveform.

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

- a) Explain with circuit diagram and waveform of class D commutation.
- b) Explain with circuit diagram during circuit of MOSFET.
- c) Explain with necessary waveforms single phase full wave controlled rectifier with R-L load. Consider the firing angle as  $60^\circ$  & small value of inductance.

**P.T.O.**



**SJ-437**

**Q3) Solve any two: [18]**

- a) Explain with necessary wave form mid-point configuration with R-load. Derive average output voltage equation.
- b) Explain with necessary waveform single phase semi-converter with R-L load. Derive average output voltage equation.
- c) With the help of layer diagram & VI characteristics of DIAC, explain its working principle. Why DIAC is used as firing device for Triac?

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

- a) Explain the working of series turn off chopper with necessary waveform.
- b) A DC chopper has a resistive load of  $20\Omega$  and input voltage  $V_s = 220V$ . When the chopper is ON, its voltage drop is  $1.5V$  and chopping frequency is  $10kHz$ , if duty cycle is  $80\%$ , determine output voltage, rms output voltage & chopper on time.
- c) Explain with circuit diagram servo voltage stabilizer.

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

- a) Explain control circuit of SMPS.
- b) Explain A.C. power flasher using Triac.
- c) Explain switch mode AC power supply.

**Q6) Write notes on any three: [18]**

- a) Battery charger.
- b) Morgan chopper.
- c) Burglar Alarm.
- d) Constant voltage transformer.

*EEE*

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**T.E. (Electronics) (Semester-VI) (Revised) (New)**  
**Examination, November - 2016**  
**DIGITAL SIGNAL PROCESSING**  
**Sub. Code: 66851**

**Day and Date : Monday, 07 - 11 - 2016**  
**Time : 10.30 a.m. to 1.30 p.m.**

**Total Marks : 100**

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

**SECTION-I**

**Q1) Attempt Any Two: [18]**

- a) What are the properties of DFT? Explain.
- b) An 8 point sequence is given by  $x(n) = \{2, 1, 2, 1, 1, 2, 1, 2\}$  compute 8 point DFT of  $x(n)$  by radix 2 DIF - FFT. Also sketch the magnitude and phase spectrum.
- c) Explain in detail overlap save method of sectioned convolution.

**Q2) Attempt Any Two: [16]**

- a) Define motherwavelet, how can better resolution be obtained through wavelet transform.
- b) Explain how discrete wavelet transform obtained from dyadic sampling.
- c) What are the applications of wavelet transform?

**Q3) Attempt Any Two: [16]**

- a) Explain in detail FIR filter design by fourier series method.
- b) What is Gibb's phenomenon? Compare different window function used in design of FIR filter.
- c) Design a linear phase FIR low pass filter using rectangular window by taking 7 samples of window sequence and with cutoff frequency  $\omega_c = 0.2 \pi$  rad/samples.

**P.T.O.**

**SECTION-II****Q4) Attempt Any Two:****[18]**

- Explain in detail impulse invariant method in IIR filter design.
- Design a Butterworth digital IIR filter (highpass) using bilinear transformation by taking  $T = 0.1$  sec. to satisfy the following specifications.

$$0.6 \leq |H(e^{j\omega})| \leq 1.0; \text{ for } 0.7\pi \leq \omega \leq \pi$$

$$|H(e^{j\omega})| \leq 0.1; \text{ for } 0 \leq \omega \leq 0.35\pi$$

Draw direct form I structure of the filter

Take passband ripple  $\leq 4.436$  dB

stopband attenuation  $\geq 20$  dB.

passband edge frequency =  $0.7\pi$  rad/sample

stopband edge frequency =  $0.35\pi$  rad/sample

- Write a note on 'frequency transformation in IIR filters'.

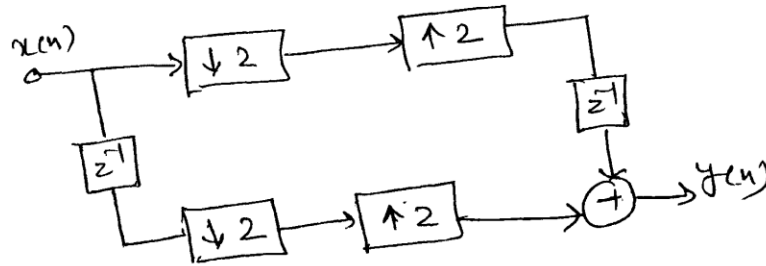
**Q5) Attempt Any Two:****[16]**

- Explain in detail cascade form and parallel form of realization of filter.
- Explain in detail architecture of TMS 320 C67XX processor.
- Obtain the cascade and parallel realization for the system function given by

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

Q6) Attempt Any Two:

- a) Explain in detail process of down sampling with example.
- b) For the multirate system below, determine  $y(n)$  as a function of  $x(n)$ .



- c) Write a note on 'Applications of multirate DSP'.

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**T.E.(Electronics) (Semester - VI) (New)**  
**Examination, November - 2016**  
**VIDEO ENGINEERING**  
**Sub. Code : 66852**

**Day and Date : Tuesday, 08 - 11 - 2016**  
**Time : 10.30 a.m. to 1.30 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) For colour information transmission what is new of colour burst signal?
- b) With the help of mathematical relation explain video band width.
- c) Explain PAL Encoder block diagram.
- d) Explain NTSC decoder block diagram.

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

- a) What is compatibility and reverse compatibility? Explain the requirements to achieve reverse compatibility.
- 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 PAL and SECAM T.V. system.
- c) Draw suitable diagram and explain different elements of colour picture tube. What are the factors on which beam current depends?

**P.T.O.**

**SECTION - II**

**Q4) Answer any three sub questions. [18]**

- a) Draw and explain D<sub>2</sub> MAC Baseband Signal waveform for normal unscrambled picture transmission.
- b) Explain special features and special effects available in digital television.
- c) What is Plasma? How its presence results in the flow of charge when small voltage is applied across a plasma glass panel? How this results in the release of color photons?
- d) Why transponders are used in satellites? Explain with block diagram how transponder after receiving the uplink transmission, amplifiers and down converts the signals before feeding it to the down link transmission antenna.

**Q5) Answer any two sub questions: [16]**

- a) Draw the block diagram of video processor VPU 2203 and explain digital signal processing carried out in it (ITT).
- b) Explain how basic LCD can be created? Why application of Electric charge across it either blocks or permits passage of lights through its layers?
- c) Draw block schematic diagram of a Infrared remote control unit. How are the signals transmitted by I.R. transmitter, decoded by the I.R. receiver, located on the front panel of the T.V. receiver.

**Q6) Answer any two sub questions. [16]**

- a) What is need of MAC encoding? Explain the general format of MAC signals for transmitting colour television signals.
- b) How liquid crystals are differ from solid and liquids? Explain the working of different types of LCD Matrix used for television.
- c) How is 'DTH' T.V. system differ from basic digital transmission-Reception system? What are its merits and limitations?

**x x x**



**SJ-441**

**Q3) Solve Any Two:**

**[16]**

- a) Explain in detail operation of midpoint converter with continuous current mode of operation, also draw input output voltage & current waveform.
- b) Explain the operation of single phase semiconverter with RL load.
- c) A single phase full controlled converter is connected to 230V AC supply. The load current is assumed to be continuous with  $R = 10\Omega$   $L = 10$  mH, calculate:
  - i)  $V_o$
  - ii)  $V_{o\ rms}$
  - iii) Powerfactor
  - iv) Ripplefactor
  - v) TUF

if given firing angle  $\alpha = \pi/3$ .

**Q4) Solve Any Two:**

**[16]**

- a) Explain in detail operation of step up chopper & also derive the equation of rms output voltage.
- b) Explain in detail voltage control techniques of chopper.
- c) A step down chopper has resistive load of  $10\Omega$  & input voltage of 200V. When chopper is turned on, the voltage drop across switch is 1V. Chopping Frequency is 1kHz if the duty cycle is 40% then calculate
  - i) average output voltage
  - ii) RMS o/p voltage
  - iii) i/p resistance  $R_i$  of chopper



**SJ-441**

**[16]**

**Q5) Solve Any Two:**

- a) Explain in detail single pulse with modulation technique of harmonic reduction.
- b) Explain in detail operation of single phase bridge inverter with R load & also derive the equation of o/p voltage.
- c) A single phase half bridge inverter has resistive load of  $10\Omega$  & centre tapped dc i/p voltage is 96V. Then calculate
  - i) RMS o/p voltage
  - ii) Fundamental voltage of o/p waveform
  - iii) First five harmonic components.
  - iv) Fundamental power consumed by load

**Q6) Solve Any Three:**

**[18]**

- a) Explain in detail operation of light dimmer using triac & diac.
- b) Explain in detail battery charger ckt.
- c) Explain AC voltage stabilizer relay type.
- d) Explain block diagrams of online & offline UPS.

*EEE*

**SJ-442**

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**T.E. (Electronics) (Semester - VI) (Revised) (New)**  
**Examination, November - 2016**  
**COMPUTER ARCHITECTURE AND OPERATING SYSTEM - III**  
**Sub. Code : 66854**

**Day and Date : Thursday, 10-11-2016**

**Total Marks : 100**

**Time : 10.30 a.m. to 1.30 p.m.**

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

**SECTION - I**

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

- a) Draw and Explain two's complement multiplier data path.
- b) Design a control unit for Accumulator based CPU.
- c) Explain OS services and components.

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

- a) Design a control unit for Accumulator based CPU.
- b) Perform the multiplication
  - i)  $8 * 3$ ,
  - ii)  $(-5) * (4)$  by using Booth's algorithm.
- c) Lists various types of operating system. Explain multiprocessor Operating system in details.

**P.T.O.**

**SJ-442**

**Q3) Answer any three:**

**[18]**

- a) Explain Assembler, compiler and linker.
- b) Design n-bit subtractor by using ripple carry adder.
- c) Explain Micro programmed control with example.
- d) Draw single precision and double precision micro instruction format.

**SECTION - II**

**Q4) Answer any two:**

**[18]**

- a) What is thread? Explain with example one to many and many to one thread structure.
- b) Explain CPU scheduling criterion in detail.
- c) What is the difference among deadlock avoidance, detection and prevention?

**Q5) Answer any two:**

**[16]**

- a) What are single threaded and multithreaded processes? What are the benefits of multithreaded programming?
- b) Describe Dining Philosophers classic synchronization problem.
- c) Describe deadlocks using system resource allocation graph.

**Q6) Answer any two:**

**[16]**

- a) Explain LRU page replacement algorithm with example. How it is implemented.
- b) Explain in detail partitioned memory allocation w.r.t. memory management.
- c) Write a note on segmentation.

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**T.E. (Electronics - II) (Semester - VI)**  
**Examination, November - 2016**  
**ELECTRONIC SYSTEM DESIGN**  
**Sub. Code : 66855**

Day and Date : Friday, 11-11-2016

Total Marks : 100

Time : 10.30 a.m. to 1.30 p.m.

- Instructions :
- 1) Draw neat circuit diagram where ever 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.
  - 5) Answers to the bits written randomly may not be assessed.
  - 6) Write answers neatly and should be legible.
  - 7) Draw diagrams neatly and giving appropriate labels and legends.

**SECTION - I**

**Q1) Answer the following: [18]**

- a) Explain important requirements of Op-Amp that is to be used for signal conditioning of the sensor that cannot source any power.
- b) What are input and output voltage levels of CMOS and TTL families of digital ICs?
- c) What is reliability? Explain exponential law of reliability & factors for reliability of equipment.

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

- a) What is the need of signal conditioning circuits in measurement or control application?
- b) Design a floating load I to V convertor that will convert 4 to 20mA current signal into a 0 to 8V ground referenced voltage signal.

**P.T.O.**

**SJ-443**

- c) Design an On-Off controller to control air pressure in the pneumatic tank. The pressure sensor delivers linear output between 0 to 5 volts DC over the pressure range of 0 to 10 kg/cm<sup>2</sup>. The pressure in the tank is to be controlled at 6 kg/cm<sup>2</sup> ± 1 kg/cm<sup>2</sup>. On-Off control output should be 0 and 12 VDC for ON and OFF respectively. Draw neat circuit diagram of On-Off controller and computer values of V<sub>pv</sub> at 9 kg/cm<sup>2</sup>, V<sub>sp</sub>, and β.

**Q3) Answer any two of the following: [16]**

- a) A 12 bit ADC is supplied with reference voltage of 4.096 V. What will be per bit (step) resolution of ADC? If this ADC is to be used to get output count in the range of 0 to 1000 decimal, then what should be the range of input voltage analog? Voltage Justify your answer.
- b) Design an alphanumeric LCD module interface to AD0 to AD7 lines 80C51 microcontroller such that LCD control registers are mapped in external data memory address space and meet following requirements. Draw neat circuit diagram.
- 8 data lines of LCD module to data bus of 80C51, control lines are interfaced to address lines A0, A1 and A2 address lines.
- c) Explain various criteria for selection of microcontroller for proposed application.

**SECTION - II**

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

- a) Explain different types of ECG electrodes.
- b) Draw and explain ECG machine with microcontroller having input and output interface.
- c) With neat diagram explain microcontroller based the automatic drug delivery system using peristaltic pumps.

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**Q5) Solve any two:**

**[18]**

- a) Explain LM3524 SMPS regulator.
- b) Design boost type SMPS regulator using LM3524 to regulate output voltage to 50V at 100mA. The input voltage is varying from 12V to 18 volt.
- c) Design step-down SMPS regulator using LM 3524 to regulate output voltage to + 12 at load current to be 1A. the input voltage is varying from 100V to 120V.

**Q6) Solve any two:**

**[16]**

- a) What are the various test carried out on different products like - pocket calculator, PLC, ECG machine, X-ray machine.
- b) Explain the need of grounding and grounding principles.  
Discuss: i) Safety grounds  
ii) signal grounds  
iii) Multipoint ground system
- c) Explain different types of shielding.



**SJ-974**

Total No. of Pages : 2

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**T.E. (Electronics) (Semester - VI) (Old)**  
**Examination, November - 2016**  
**DIGITAL SIGNAL PROCESSING**  
**Sub. Code : 45598**

**Day and Date : Thursday, 10-11-2016**

**Total Marks : 100**

**Time : 10.30 a.m. to 1.30 p.m.**

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

**SECTION - I**

**Q1) Attempt any two [18]**

- a) Explain in detail difference between DFT and Z Transform. Also state any two properties of DFT.
- b) Explain DIT - FFT algorithm.
- c) Explain overlap - save method of sectioned convolution.

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

- a) Compute linear and circular convolution of the following two sequences using DFT.  
 $x(n) = \{1, 2\}$  and  $h(n) = \{2, 1\}$ .
- b) Explain in detail frequency sampling method of design of FIR filter.
- c) Compare different types of windows.

**P.T.O.**

**SJ-974**

**Q3) Attempt any two**

**[16]**

- a) Explain in detail Bilinear transformation method.
- b) Explain in detail step by step design of Butterworth digital filter.
- c) Explain methods of realization of IIR filter.

**SECTION - II**

**Q4) Attempt any two**

**[18]**

- a) Explain concept of adaptive filtering.
- b) Write a note on 'LMS algorithm'.
- c) Write a note on 'DCT and inverse DCT'.

**Q5) Attempt any two**

**[16]**

- a) Compare Fourier Transform and wavelet Transform.
- b) What are the properties of CWT? Explain.
- c) What are the applications of wavelet Transform?

**Q6) Attempt any two**

**[16]**

- a) Write a note on 'ECG processing'.
- b) Write a note on 'speech analysis and synthesis system'.
- c) Write a note on 'subband coding'.

