Hall Ticket Number :										

R-15

Code: 5G364

III B.Tech. II Semester Regular & Supplementary Examinations May 2019

Digital Signal Processing

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Examine the following systems for linearity, time-invariance and stability
   (i) $y(n) + y(n-1) = x(n) + x(n-2)$
   (ii) $y(n) = a^{\{x(n)\}}$ 7M

   b) A discrete time system is represented by the following equation
   $y(n) = (3/2)\, y(n-1) – (½)\, y(n-2) + x(n)$ with initial conditions $y(-1) = 0$, $y(-2) = -2$ and $x(n) = (1/4)^n\, u(n)$.
   Determine the total response of the system. 7M

OR

2. a) State and prove the following DFS properties
   (i) Linearity (ii) Time shifting
   (iii) Symmetry (iv) Periodic Convolution 8M

   b) If the DFT{x(n)} = X(k)={4, -j2, 0, j2}, using properties of DFT, find DFT of x(n - 2). 6M

UNIT–II

3. a) Compare DIT and DIF algorithms. 4M

   b) Develop the necessary three stage computation equations for radix-2 DIT FFT method. 10M

OR

4. a) Find the DFT of the sequence x(n) = {2,1,2,1,2,1,2,1,} using radix-2 DIF-FFT algorithm. 8M

   b) Find the IDFT of the sequence
   X(k) = { 10, -2+j2, -2, -2-j2 } using DIT algorithm. 6M

UNIT–III

5. a) For the given specifications design an analog Butterworth filter.
   $0.9 \le |H(j\Omega)| \le 1$ for $0 \le \Omega \le 0.2\pi$.
   $|H(j\Omega)| \le 0.2$ for $0.4\pi \le \Omega \le \pi$. 7M

   b) Determine the transposed direct form-II for the given system
   $y(n) = ½\ y(n-1) – ¼\ y(n-2) + x(n) + x(n-1)$ 7M

OR

6. a) Explain FIR filter design procedure using windowing method. 4M

   b) Design a digital FIR low pass filter using rectangular window by taking 9 samples of w(n) and with a cutoff frequency of 1.2 rad/sec. 10M

UNIT–IV

7. a) (i) Describe the Decimation process by a factor D
   (ii) Describe the interpolation process by a factor I 7M

   b) Discuss about sampling conversion by a rational factor I/D. Obtain necessary equations. 7M

OR

8. Discuss various filter design methods and implementations for sampling rate conversion. 14M

UNIT–V

9. What are the applications of DSP? Explain any one application clearly. 14M

OR

10. a) Explain the process of signal compression and decompression 7M
    b) Discuss about oversampling of D/A Converter 7M

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Hall Ticket Number :										

R-15

Code: 5G361

III B.Tech. II Semester Regular & Supplementary Examinations May 2019

VLSI Design

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the MOS Transistor operation with the help of neat sketches in the Depletion mode. 7M

   b) Derive the expression for the threshold voltage of MOSFET 7M

OR

2. a) With neat sketches explain the Ion -lithography process. 7M

   b) Derive the relation between I_{DS} & V_{DS} of MOSFET. 7M

UNIT–II

3. a) Implement the logic functions using CMOS logic $Y = (AB + CD)^1$ 5M

   b) Write stick diagram for p-well CMOS inverter 9M

OR

4. a) Explain different forms of pull ups used as load, in CMOS and in enhancement & depletion modes of NMOS 8M

   b) For nMOS Inverter driven by another nMOS Inverter, derive the expression for Z_{pu}/ Z_{pd} ratio. 6M

UNIT–III

5. a) Explain with suitable examples how to design the layout of a gate to maximize performance and minimize area 6M

   b) What are the alternate gate circuits available? Explain any one of item with suitable sketch by taking NAND gate as an example. 8M

OR

6. a) Explain different wiring capacitances used in Gate level design with example 8M

   b) Calculate the rise time and fall time of the CMOS inverter $(W/L)_n$ = 6 and $(W/L)_p$ =8. k_a = 150 µA/V^2, V_m = 0.7V, k_p= 62 µA/V^2, V_{tp}= -0.85V, V_{DD} = 3.3V. Total output capacitance = 150 pF. 6M

UNIT–IV

7. a) Explain about parity generator with neat diagram 7M

   b) With the help of a block diagram explain the principle and operation of standard cells. 7M

OR

8. a) Compare PLAs, PALs, CPLDs, FPGAs, and standard cells in all respects 8M

   b) What are the circuit design considerations in the case of static adder circuits 6M

UNIT–V

9. a) How layout design can be done for improving testability? Explain. 7M

   b) Explain about chip level test techniques? 7M

OR

10. a) What do you mean by synthesis? Explain the circuit synthesis design methods. 8M

    b) What are the issues to be considered while implementing BIST? Explain. 6M

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Hall Ticket Number :										

R-15

Code: 5G366

III B.Tech. II Semester Regular & Supplementary Examinations May 2019

Radar Engineering

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Obtain the radar equation in terms of minimum detectable power and gains of transmitting and receiving antenna. 10M

   b) Compute the maximum detectable range of a radar system specified below:
   Operating wavelength = 3.2 cm, Peak pulse transmitted power = 500 kW., Minimum detectable power = 10^{-3} W, Capture area of the antenna = 5 sq.m., Radar cross-sectional area of the targe t = 20 sq.m. 4M

OR

2. a) Discuss about the integration of radar pulses in detail. 7M

   b) List major applications of radar in civil and military systems 7M

UNIT–II

3. a) What is Doppler frequency shift? Establish a relation between Doppler frequency shift and radial velocity of a moving target. 8M

   b) List the limitations of CW radar. 6M

OR

4. a) With a neat block diagram, explain the operation FM-CW Altimeter. 7M

   b) Explain how isolation between transmitter and receiver of a radar system can be achieved if single antenna is used for transmission and reception. 7M

UNIT–III

5. a) With the aid of a block diagram, explain fully the operation of an MTI system using a power amplifier in the transmitter. 7M

   b) Discuss the factors limiting the performance of an MTI system. 7M

OR

6. a) Calculate the lowest blind speed of an MTI system operating at 3.6cm wavelength and transmitting at a pulse repetition time of 330µsec 8M

   b) Write the description of Range gate Doppler filters. 6M

UNIT–IV

7. a) With the help of a suitable block diagram, Sequential lobing type of tracking technique in a tracking radar system. 8M

   b) Describe automatic tracking of a target through range gating technique. 6M

OR

8. a) Draw and explain the following with respect to Tracking in range:
   i. Echo pulse **ii**. Early-late range gates
   iii. Difference signal between early and late range gates 8M

   b) Compare the different trackers. 6M

UNIT–V

9. a) Derive the frequency response characteristics of matched filter receiver. 7M

   b) Discuss the relation between the matched filter characteristics and correlation detection. 7M

OR

10. a) Differentiate branch-type duplexers and balanced duplexers. 7M

    b) Explain the functioning and characteristics of PPI display and A-Scope. 7M

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Hall Ticket Number :										

R-15

Code: 5G362

III B.Tech. II Semester Regular & Supplementary Examinations May 2019

Microwave Engineering

(Electronics & Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Define Cut-off frequency and dominant mode in a rectangular waveguide with expression. 6M

   b) Why TEM Mode cannot exist in a rectangular waveguide. 8M

OR

2. a) What do you mean by Group and Phase velocity in a waveguide and relate them. 6M

   b) Compare between different Microwave transmission lines and their modes of propagation. 8M

UNIT–II

3. a) Compare Rectangular and circular waveguide. 7M

   b) Explain Cavity resonator in detail. 7M

OR

4. a) A TE_{11} mode is propagating through circular waveguide. The diameter of guide is 10cm and the guide is air filled. Determine Cut off frequency, Wavelength for 3G Hz frequency and wave impedance in the guide. 7M

   b) Explain power losses in a waveguide transmission media with expression in various propagating modes. 7M

UNIT–III

5. a) What is a Directional Coupler and its coupling factor and directivity? 7M

   b) What is the principle of working underlying any microwave attenuator? 7M

OR

6. a) A waveguide load has a VSWR of 1.1 and is used to absorb an average power of 5W. Find the Reflected power and return loss in microwave network. 6M

   b) Derive S Matrix of a Magic Tee. 8M

UNIT–IV

7. a) Describe the two cavity klystron amplification with the aid of schematic diagram. 7M

   b) Obtain expression for round trip transit angle in reflex klystron. 7M

OR

8. a) Compare between Linear and cross field microwave amplifiers. 6M

   b) Explain Oscillation mechanism in a Magnetron. 8M

UNIT–V

9. a) What is IMPATT diode and draw its schematic diagram with equivalent circuit. 7M

   b) Draw the band diagram of Ga As and explain the Gunn effect, whereby negative resistance and therefore oscillations are obtainable under certain conditions from bulk gallium arsenide. 7M

OR

10. a) What do you mean by Parametric Amplifier and operation with applications in communication system? 7M

    b) Explain Microwave Test Bench with its all components and their features. 7M

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Hall Ticket Number :										

R-15

Code: 5G363

III B.Tech. II Semester Regular & Supplementary Examinations May 2019

Microprocessors and Interfacing

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the queue structure of 8086 and its limitations 9M

   b) What is addressing mode? Explain the following addressing modes of 8086 with suitable examples: (i) Register addressing, (ii) Based indexed addressing, (iii) Indirect addressing, (iv) Immediate addressing 5M

OR

2. a) Differentiate between procedure and Macros 6M

   b) Describe the significance of following pins of 8086

   (i) ALE , (ii) $RESET$,(iii) $\overline{TEST}$, (iv) $M / \overline{IO}$ 8M

UNIT–II

3. a) Write a program to interface stepper motor to 8086 5M

   b) Interface ADC 0800 with 8086 using 8255 ports. Use port A of 8255 for transferring digital data output of ADC to the CPU and port C for control signals. Assume that an output is present at I/P2 of the ADC and a clock input of suitable frequency is available for ADC. Draw the schematic and write the required ALP. 9M

OR

4. a) Interface an 8255 with 8086 at 80H as an I/O address of port A. Interface five 7 segment displays with the 8255. Write a sequence of instructions to display 1, 2, 3, 4, and 5 over the five displays continuously as per their positions starting with 1 at the least significant position. 9M

   b) Discuss the transfer modes of 8237 5M

UNIT–III

5. a) Distinguish between programmed I/O and interrupt driven I/O. 5M

   b) What are the sequence of action taken by 8086 and the device, when a device interrupts 8086 over INTR line? Explain about the software and reserved internal interrupts of 8086. 9M

OR

6. a) Explain the modes of operation of 8253 PIT with necessary diagram 7M

   b) Demonstrate the initialization command words of 8259A PIC 7M

UNIT–IV

7. a) Design a hardware interfacing circuit for interfacing 8251 with 8086. Set the 8251A in asynchronous mode as a transmitter and receiver with even parity enabled, 2 stop bits, 8-bit character length, frequency 160 kHz and baud rate 10 K. Write an ALP to transmit 100 bytes of data string starting at location 2000:5000H 7M

   b) From the above data in Q.7 (a), Write an ALP to receive 100 bytes of data string and store it at 3000:4000 H. 7M

OR

8. a) Draw the architectural block diagram of 8251A and explain the function of each block 9M

   b) What is current loop? Explain how 20 mA current loop is used to provide serial data communication between 8086 and a peripheral. 5M

UNIT–V

9. List the salient features of Pentium and Pentium pro processors 14M

OR

10. Draw and explain architecture of 80286 processor. 14M

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Hall Ticket Number :										

R-15

Code: 5G365

III B.Tech. II Semester Regular & Supplementary Examinations May 2019

Electronic Measurements and Instrumentation

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) What are errors? Define the following errors with examples
   (i) Instrumental Errors (ii) Gross Errors (iii) Calibration Error 6M
   b) Define the following
   (i) Accuracy (ii) Precision (iii) Sensitivity (iv) Resolution 8M

OR

2. a) Explain the construction and operation of series type ohmmeter. 7M
   b) A basic d'Arsonval movement with an internal resistance R_m = 100 Ω and full scale deflection current I_{fsd} = 1 mA is to be converted in to a multirange DC voltmeter with voltage ranges 0 – 10 V, 0 – 50 V, 0 – 250 V and 0 – 500 V. Calculate the resistance values required to achieve corresponding ranges. 7M

UNIT–II

3. a) Draw the block schematic of AF Wave analyzer and explain its principle and Working? 7M
   b) Explain the working of the harmonic distortion analyzer. 7M

OR

4. a) Explain the working of heterodyne wave analyzer with neat diagram. 6M
   b) Discuss in detail about frequency selective wave analyzer with a neat sketch. 8M

UNIT–III

5. a) With a neat block diagram, Explain the Cathode Ray Oscilloscope. 8M
   b) Draw the block diagram of Sampling oscilloscope and explain its working. 6M

OR

6. a) With neat block diagram, explain the analog storage oscilloscope. 7M
   b) Explain the working of Dual trace CRO with neat block diagram. 7M

UNIT–IV

7. a) Explain the working of Wheatstone bridge and derive the equation for balance condition and unbalance condition. 7M
   b) An unbalanced Wheatstone bridge is supplied with a 8 V DC and the resistances are 7 KΩ, 2 KΩ, 4 KΩ and 20 KΩ in the clockwise direction starting from the junction of resistors connected to positive terminal of the DC supply. If the galvanometer has an internal resistance of 200 Ω, calculate the current through the meter. 7M

OR

8. a) Draw the circuit of Maxwell's bridge and derive its balance equation? 8M
   b) The four arms of a Maxwell's bridge are:
   Arm AB - unknown inductance L_x with inherent resistance R_x,
   Arm BC - a non-inductive resistance of 1000Ω,
   Arm CD - a capacitor of 0.5μF in parallel with a resistance of 1000Ω
   Arm DA - resistance of 1000Ω
   Derive the equations for balance and determine the values of R_x and L_x. 6M

UNIT–V

9. a) What is Displacement? How LVDT can be used for measurement of displacement. 7M
   b) Explain how temperature is measured using RTD. 7M

OR

10. a) Explain general Data Acquisition System (DAS) with a neat block diagram. 7M
    b) What are recorders? With necessary diagrams explain the functionality of X-Y recorder. 7M

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