Hall Ticket Number :										

R-15

Code: 5G364

III B.Tech. II Semester Supplementary Examinations Nov/Dec 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 causality and stability of the following systems:
   (i) $y(n) = n\,x(n) + x(n+2) + y(n-2)$
   (ii) $y(n) = x(n^2) + x(-n)$ 7M

   b) The difference equation of the DT system is given by
   $y(n) = 3\,y(n-2) + 2\,y(n-1) + x(n)$,
   $x(n) = (1/2)^n\,u(n)$ and $y(-1) = 1$
   $y(-2) = 0$.
   Find the total response of the system. 7M

OR

2. a) State and prove the following DFT properties
   i) Time reversal (ii) Circular time shift
   iii) Circular frequency shift 7M

   b) Find the linear convolution of the following sequences:
   $x(n) = 3\,\delta(n+1) - 2\,\delta(n) + \delta(n-1) + 4\,\delta(n-2)$
   $h(n) = 2\,\delta(n-1) + 5\,\delta(n-2) + 3\,\delta(n-3)$ 7M

UNIT–II

3. a) Explain radix-2 DIT FFT algorithm, develop 3 stages of computations and draw the butterfly diagram for 8 - point DIT-FFT. 7M

   b) Compute the DFT of the sequence $x(n) = \{2, 2, 2, 2, 1, 1, 1, 1\}$. 7M

OR

4. a) Show the procedure to compute IDFT using radix-2 FFT 4M

   b) Compute the IDFT of the square wave sequence $X(k) = \{12, 0, 0, 0, 4, 0, 0, 0\}$ using DIF algorithm. 10M

UNIT–III

5. a) Design a digital Butterworth filter satisfying the following constraints:
   $0.8 \le |H(\omega)| \le 1; \quad 0 \le \omega \le 0.2\pi$
   $|H(\omega)| \le 0.2; \quad 0.32\pi \le \omega \le \pi$
   With T = 1s. Apply inverse invariant transformation. 8M

   b) Obtain the cascade form realization of the LTI system governed by the equation
   $y(n) = -(13/12)\,y(n-1) - (9/24)\,y(n-2) - (1/24)\,y(n-3)\,x(n) + 4\,x(n-1) + 3\,x(n-2)$. 6M

OR

6. Design a linear phase low-pass FIR filter with a cutoff frequency of $\pi/2$ rad/sec using frequency sampling technique. Take N = 13. 14M

UNIT–IV

7. Sketch the following signals:

$x_1(n) = n, n > 0$

$= 0$ otherwise

$x_2(n) = n^2, n > 0$

$= 0$ otherwise

Also sketch decimator and interpolated version of above systems with a factor of '2'. 14M

OR

8. a) Explain multistage implementation of sampling rate conversion. 10M

b) Summarize the advantages of multirate signal processing. 4M

UNIT–V

9. a) How non-stationary signals are analyzed with the help of DFT? 7M

b) Discuss about musical sound processing. 7M

OR

10. a) Explain the process of signal compression and decompression 7M

b) Discuss about oversampling of A/D Converter 7M

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Hall Ticket Number :										

R-15

Code: 5G365

III B.Tech. II Semester Supplementary Examinations Nov/Dec 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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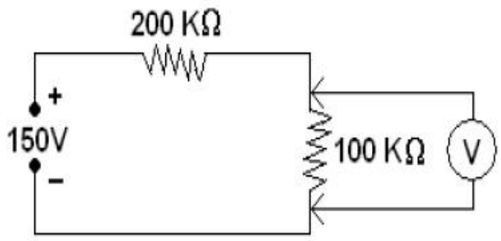
UNIT–I

1. a) What is effect of loading on DC voltmeter? 4M

   b) It is desired to measure the voltage across the 100KΩ resistor in the circuit given below figure. Two voltmeters are available for this measurement. Voltmeter1 with a sensitivity of 1KΩ/V and voltmeter2 with a sensitivity of 20KΩ/V. Both meters are used on their 50V range.



10M

OR

2. a) Explain about the construction and principle of operation of PMMC instrument. 10M

   b) Write advantages of PMMC instrument. 4M

UNIT–II

3. a) Explain the principle and working of Spectrum analyser with necessary block diagram. 7M

   b) Write the differences between wave analyzer and harmonic distortion analyzer. 7M

OR

4. a) Explain the construction of Heterodyne wave analyzer. 9M

   b) What is meant by distortion? Mention few types of harmonic distortion caused by an electronic amplifier. 5M

UNIT–III

5. a) Explain the operation of Digital Storage oscilloscope with necessary diagrams. 9M

   b) In a CRT, anode to cathode voltage is 2000V. The parallel deflector plates are 1.5cm long and spaced 5mm. The screen is 50cm from the centre of deflection plates. Find the deflection sensitivity of the CRT. 5M

OR

6. a) Draw and explain the horizontal deflection system in a CRO. 10M

   b) What is the significance of time base generator in CRO. 4M

UNIT–IV

7. a) Draw the circuit of Wein bridge and derive the expression for frequency? 8M

   b) Determine equivalent parallel resistance and capacitance that causes a Wein bridge to balance with the following component values: R1=2.7KΩ, C1=5μF, R2=22KΩ, R4=100KΩ. The operating frequency is 2.2KHz? 6M

OR

8. a) Explain the working of Wheatstone bridge and derive the equation for balance condition and unbalance condition. 10M

   b) What are the errors made in the measurement of resistance using Wheatstone bridge? 4M

UNIT–V

9. a) What is transducer? Write in detail the classification of transducers. 6M

   b) What is force? Explain how stain gauges can be used for measurement of force. 8M

OR

10. a) What is the need of data acquisition system? Explain DAS with necessary diagram. 7M

    b) Where is strip chart recorder used? Explain the functionality with diagrams. 7M

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Hall Ticket Number :										

R-15

Code: 5G363

III B.Tech. II Semester Supplementary Examinations Nov/Dec 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) Draw the architecture of 8086 microprocessor and explain the functionality of each unit in detail. 7M

   b) With examples, explain how multiplexing is implemented in 8086 7M

OR

2. a) List out the flag bits in the Flag register of 8086 and describe the functionality of each flag bit. 6M

   b) Explain the following 8086 instructions with examples

      (i) MUL, (ii) IMUL, (iii) DIV, (iv) IDIV 8M

UNIT–II

3. a) Interface a 12 bit DAC with 8255 and write a program to generate a triangular waveform of period 10 ms. The CPU runs at 5 MHz clock frequency. 7M

   b) What do you mean by a DMA data transfer? Explain the implementation in 8086 system using 8257/8237 DMA controller. 7M

OR

4. a) Draw a block diagram to interface two 16K X 8 SRAM (62128) to the 16-bit data bus of 8086 based system. Design the address decoder for the address range from 00000H - 07FFFFH for both the SRAMs. 10M

   b) How DRAM's are different from SRAM's? Why DRAMs are said to employ address multiplexing? 4M

UNIT–III

5. a) What are the advantages of using 8259? Draw and explain the interfacing of cascaded 8259s with 8086. 7M

   b) Explain the significance of different bits of control word register format of 8253 PIT/PIC. 7M

OR

6. a) Explain the interrupt acknowledgement sequence of 8086 with timing diagram 7M

   b) Draw the interrupt vector table 0f 8086. Explain the maskable and non- maskable interrupts 7M

UNIT–IV

7. a) Describe the Asynchronous transmission and reception schemes of 8251 in detail 7M

   b) Draw the block diagram of 8251 and explain each block. 7M

OR

8. a) Draw the flowchart showing how synchronous serial data can be sent from a port line of 8251 using software routine. 7M

   b) Discuss about the various serial communication standards for data transmission 7M

UNIT–V

9. a) Compare and contrast the salient features of 80286 and 80386 6M

   b) Discuss the register organisation of 80286 8M

OR

10. a) Discuss about real and protected mode of 80386. 6M

    b) What is paging? Draw the block diagrammatic representation of complete 80386 paging mechanism. 8M

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Hall Ticket Number :										

R-15

Code: 5G362

III B.Tech. II Semester Supplementary Examinations Nov/Dec 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) Differentiate between TE & TM modes in Rectangular waveguide with its physical significance. 7M

   b) Write short note on Micro strip and Strip Transmission lines. 7M

OR

2. a) Derive the expressions for E_X & H_Y components under TM modes in rectangular waveguide. 7M

   b) A TE_{10} mode is propagating through rectangular waveguide and has the dimension 7x3.5cm. Determine Cut off frequency, Phase Velocity , group velocity and guide wavelength for 2GHz frequency. 7M

UNIT–II

3. a) An air filled circular waveguide is to be operated at a frequency of 6 GHz and is to be have dimension such that fc = 0.8 f for dominant mode, Determine Diameter of guide, wavelength and Phase velocity. 8M

   b) Explain Circular wave guide importance and derive its characteristics equation. 6M

OR

4. a) Derive an expression for E & H components of rectangular cavity resonator. 7M

   b) Define the Q-factor of resonator and obtain expression for Q of Rectangular cavity resonator. 7M

UNIT–III

5. a) What is working principle of Ferrite Devices and Faraday rotation in Microwave devices? 7M

   b) Derive S Matrix of a Directional Coupler. 7M

OR

6. a) Show using S matrix theory that a loss non-reciprocal two port microwave devices cannot be constructed. 7M

   b) The Incident power in a directional coupler is 520 mW. If the power in an auxiliary arm is 325 micro W. Calculate coupling factor. 7M

UNIT–IV

7. a) Discuss the working principle of Reflex Klystron with generation and amplification with the aid of schematic diagram. 8M

   b) Write a short note on Backward Wave Oscillator. 6M

OR

8. a) Describe the principle of operation for a normal circular magnetron. Explain Mode of Oscillations. 8M

   b) How the function of TWT does differs from its function in Magnetron. 6M

UNIT–V

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

   b) Give the mechanism of GUNN diode Oscillator. 7M

OR

10. a Discuss importance of PIN diode at microwave frequencies. 7M

    b) Explain VSWR Measurement using Microwave Test Bench. 7M

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Hall Ticket Number :										

R-15

Code: 5G366

III B.Tech. II Semester Supplementary Examinations Nov/Dec 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) Draw the block diagram of radar and explain its operation. 10M

   b) What is the peak power and duty cycle of radar whose average transmitter power is 200W, pulse width of 1μs and a pulse repetition frequency of 1000Hz? 4M

OR

2. a) What are the different range frequencies that a radar can operate and give their applications? 7M

   b) Explain the System losses in radar. 7M

UNIT–II

3. a) With the help of a suitable block diagram, explain the operation of a CW Doppler radar in a sideband super heterodyne receiver. 10M

   b) Calculate the Doppler frequency of stationary CW radar transmitting at 6 MHz frequency when a moving target approaches the radar with a radial velocity of 100 kmph. 4M

OR

4. a) Describe methods to achieve isolation between transmitter and receiver of a CW Doppler radar if same antenna is to be used for transmission and reception. 7M

   b) List out the possible errors for measurement of altitudes accurately using a FM-CW altimeter. 7M

UNIT–III

5. a) Explain briefly about coherent MTI radar. 10M

   b) Calculate the lowest blind speed of an MTI system operating at 4.2 cm wave length and transmitting at a pulse repetition time of 286 μS. 4M

OR

6. a) Explain the principle and process of binary moving window detector. 7M

   b) Write a short note on staggered PRF's. 7M

UNIT–IV

7. a) Describe the phase comparison mono pulse tracking technique in a radar system with the help of necessary block diagram. 10M

   b) Compare and contrast conical scan and sequential lobing type tracking techniques. 4M

OR

8. a) Explain the amplitude comparison mono pulse tracking technique. 8M

   b) Why does tracking radar have poor accuracy at low elevation angles? Explain. 6M

UNIT–V

9. a) Discuss in detail about Matched-filter Receiver with necessary expressions. 10M

   b) A radar receiver is connected to a 50 ohm resistance antenna that has an equivalent noise resistance of 30 ohms. Calculate the noise figure of the receiver and the equivalent noise temperature of the receiver. 4M

OR

10. a) Explain various types of radar displays. 7M

    b) Write notes on circulators. 7M

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Hall Ticket Number :										

R-15

Code: 5G361

III B.Tech. II Semester Supplementary Examinations Nov/Dec 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 Enhancement mode 7M

   b) List out the processing steps involved in the manufacturing of an IC. 7M

OR

2. a) Describe in detail about integrated passive components 5M

   b) Explain CMOS fabrication using N-well process with neat diagrams. 9M

UNIT–II

3. a) Interpret and discuss the limits of scaling. Justify the need of scaling for VLSI circuits? 5M

   b) Design a layout for CMOS 3-input NOR gate. 9M

OR

4. a) Write stick encoding for : i. n diffusion ii. Polysilicon iii. Metal-1 iv. Contact cut 4M

   b) Determine the pull up to pull down ratio of an nMOS inverter driven by another nMOS transistor 10M

UNIT–III

5. a) Explain about the concepts of Sheet Resistance and how its concept is applied to MOS transistors for calculation of sheet resistance 8M

   b) Define fan-in and fan-out. Explain their effects on propagation delay. 6M

OR

6. a) What do you mean by inverter delay? Explain. 6M

   b) Explain different switch logic used for designing of VLSI circuits? 8M

UNIT–IV

7. a) Draw the logic diagram of zero/one detector and explain its operation with the help of stick diagram. 9M

   b) Explain about Design Rule Check. Why is it employed? 5M

OR

8. a) Explain the architectural issues of subsystem design 6M

   b) With the help of a schematic explain the principle of Tree Multiplier. 8M

UNIT–V

9. a) Explain the concept of design verification and design capture tools used in VHDL synthesis. 10M

   b) What is Built in self-Test , explain it in detail its objectives 4M

OR

10. a) Give the Architecture of a boundary scan test and explain the same 8M

    b) Write short notes on

    (i) Circuit design flow (ii) Circuit synthesis 6M

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