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| R-15 |
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Code: 5G364

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018

Digital Signal Processing

(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)

UNIT-I

1. a) Test the following systems for Linearity, Time Invariant, Stability and Causality
i) $y(n) = x(-n+2)$ ii) $y(n) = |x(n)|$ 7M
b) Determine the zero input response $y(n)$, $n \geq 0$ of the system described by the homogeneous second order difference equation $y(n)-3y(n-1)-4y(n-2)=0$ 7M

OR

2. a) Determine the eight-point DFT of the signal: $x(n) = \{1,1,1,1,1,1,0,0\}$ 7M
b) Prove the following DFT properties :Periodicity, Circular Convolution 7M

UNIT-II

3. a) What is FFT? Why FFT is preferred compared to DFT. 5M
b) Calculate DFT of the sequence $x(n)=\{1,2,3,4,4,3,2,1\}$ using DIT-FFT algorithm. 9M

OR

4. a) Discuss about DIF-FFT algorithm. 7M
b) Compute 8 point DFT of the sequence $x(n)=\{1/2,1/2,1/2,1/2,0,0,0,0\}$ using DIT-FFT algorithm. 7M

UNIT-III

5. a) Explain the concept of Analog filter approximations using Butterworth and Chebyshev. 7M
b) Determine Direct form II Realization for following system.
 $Y(n)=0.2y(n-1)+0.52y(n-2)+0.4x(n)- 0.25x(n-2)$ 7M

OR

6. a) Compare IIR and FIR filters. 5M
b) Explain the Design of FIR digital filters using frequency sampling technique. 9M

UNIT-IV

7. a) Explain Decimation by a factor D. 7M
b) Given $D=100$; PB: 0 F 50; TB:50 F 55; PB ripple: 10^{-2} ; SB ripple: 10^{-4} . Design Two stage Decimator. 7M

OR

8. a) Discuss Interpolation by a factor I. 7M
b) Discuss Multistage implementation of Sampling rate conversion. 7M

UNIT-V

9. a) Discuss spectral analysis of non stationary signals in DSP. 7M
b) Explain the major blocks in Musical sound processing. 7M

OR

10. a) Discuss Oversampling A/D conversion in signal processing applications. 7M
b) Write Short notes on signal compression technique. 7M

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Code: 5G365

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018

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)

UNIT-I

1. a) Explain about D' Arsonval Galvanometer with neat diagram. 6M
- b) Why PMMC meter cannot be used to measure the AC voltage or Current. Is there any way to measure AC voltage and Current using PMMC meters 8M

OR

2. a) A person using an ohm meter reads measured value as 470 ohms, when the actual value is 472 ohms. What kind of error does this represent 7M
- b) Describe the Dual slope integrator type DVM. 7M

UNIT-II

3. a) Explain the operation of harmonic distortion analyzer 7M
- b) Explain the different techniques of Spectrum Analyzers 7M

OR

4. a) List out the functions of elements of Sweep frequency generator 7M
- b) Explain about Frequency synthesized signal generator. 7M

UNIT-III

5. a) Write about the construction of Cathode ray tube. 7M
- b) Explain in detail of basic elements of Cathode ray tube 7M

OR

6. a) With a neat sketch Explain about Digital Storage Oscilloscope. 7M
- b) Explain in detail about the dual beam oscilloscope 7M

UNIT-IV

7. a) How to calculate the low Q-factor of Hay's Bridge 7M
- b) Explain the operation of Kelvin bridge using relevant diagram. 7M

OR

8. a) Explain balanced wheat stone bridge and derive necessary expressions with neat diagram 7M
- b) Draw the circuit diagram of Schering bridge and derive conditions for balance? 7M

UNIT-V

9. a) Write the construction and operation of photo electric transducer 7M
- b) List two types of Temperature transducers and describe the principle of operation of each with diagrams 7M

OR

10. a) With a neat sketch Explain X-Y Recorder 7M
- b) Describe the methods of recording in magnetic tape recorders 7M

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Code: 5G363

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018

Microprocessors & 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)

UNIT-I

1. a) Explain the following instruction (i) DAA (ii) MOV (iii) PUSH (iv) CMPS (v) LEA (vi) ROR (vii) JNZ (viii) TEST (ix) NEG (x) MOVSB 10M
- b) Compare macros and procedures? Write a macro and procedure to produce a delay of 100 msec? 4M

OR

2. a) Draw the 8086 minimum mode bus timing diagram for an input transfer operation that requires no wait states and explain? 10M
- b) Write an 8086 ALP to perform signed Multiplication of two 8-bit numbers. 4M

UNIT-II

3. a) Explain the internal architecture of 8255 and explain its modes of operation in detail. 10M
- b) Show the interfacing of DAC with 8086 microprocessor and relevant ALP to generate Square Waveform. 4M

OR

4. a) Interface a stepper motor to 8086 microprocessor and write an assembly language program (ALP) to rotate 100 teeth, 4-phase stepper motor five rotations clockwise and five rotations anticlockwise. 10M
- b) State the differences between SRAM and DRAM cell structure in detail. 4M

UNIT-III

5. a) Explain the operating modes of 8253 timer/counter in detail with suitable diagrams. 10M
- b) Distinguish between programmed I/O and Interrupt driven I/O. 4M

OR

6. a) Draw the block diagram of 8259 PIC and gives its interrupt priority modes? 10M
- b) Discuss the Interrupt structure of 8086 microprocessor. 4M

UNIT-IV

7. a) Draw the block diagram of 8251 USART and explain each block. 10M
- b) Write about asynchronous data transfer schemes with suitable examples. 4M

OR

8. a) With the help of a flowchart, write a program to transmit 200 bytes of serial data. 10M
- b) Draw and Explain TTL to RS232 & RS232 to TTL conversion circuits 4M

UNIT-V

9. Explain Real and Virtual mode in 80286? Also explain the mapping of virtual memory with physical memory and also tell the phenomenon of using page table in microprocessor? Draw and discuss the register organization of 80386? 14M

OR

10. Draw the architecture of a Pentium processor, and list out some salient features of Pentium and Pentium pro processors. 14M

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Code: 5G362

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018

Microwave 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)

UNIT-I

1. a) Justify the impossibility of TEM mode in Rectangular Waveguide. 6M
- b) List the Advantages and Applications of Microwaves. 8M

OR

2. a) Derive the wave equation for a TE wave and obtain all the field components in a rectangular waveguides. 7M
- b) A hollow rectangular waveguide has dimensions =1.5 cm, calculate the amount of attenuation if the frequency of the signal is 6GHz. 7M

UNIT-II

3. a) For the dominant mode of operation in an air filled circular waveguide of inner diameter 4 cms. Find: (i) Cut off wavelength. (ii) Guided wave length. (iii) Cut off frequency 6M
- b) List the Advantages and Application of Circular Waveguides. Also discuss about Attenuation in Circular Waveguides. 8M

OR

4. a) An air filled rectangular cavity with brass walls has $\sigma = 1.54 \times 10^7$ (s/m) and the following dimensions $a=4$ cm, $b=3$ cm and $d=5$ cm. Determine: (i) The dominant mode and its resonant frequency for this cavity. (ii) Find the Q and the time average stored electric and magnetic energies at resonant frequency, assuming H_0 to be 0.1A/m. 7M
- b) Derive an expression for Q of a cavity supporting TE₁₀₁ mode. Calculate the resonant frequency of the cavity if each side of the guide is 3cm. 7M

UNIT-III

5. a) Determine the S-Matrix of the H-plane tee Junction. Justify the various possibilities of power transfer. 8M
- b) Describe in detail the operation of a 2-hole directional coupler, Calculate the coupling factor if the power in the primary waveguide is 72mw and the power delivered to the directional coupler is 8mw. 6M

OR

6. a) Write short notes on: (a) Waveguide Irises. (b) Rat Race hybrid. (c) Dielectric phase shifters 6M
- b) Why S - parameters are used at microwave frequencies explain. Give the properties of S parameters and Derive S - matrix for Gyrator using the properties of S parameters. 8M

UNIT-IV

7. a) List and explain the limitations and losses of conventional tubes at microwave frequencies? 8M
- b) Draw the structure and explain the velocity modulation process in two cavity klystron amplifier. 6M

OR

8. a) What is Hartree condition in Magnetron? Derive the equation for Hartree voltage of Magnetron. 7M
- b) With a neat diagram, describe the operation of helix TWT. 7M

UNIT-V

9. a) Describe the Two Valley Model Theory of GUNN Diode. Also list the limitations of LSA mode of GUNN Diode. 8M
- b) Suggest procedures to measure Frequency and Quality factor using Microwave Bench Setup. 6M

OR

10. a) Suggest a procedure to measure attenuation of a given microwave device using microwave bench setup. Also list the various precautions to be taken. 7M
- b) What are Avalanche transit time devices? Explain the principle of operation and characteristics of TRAPATT diode with neat sketches? 7M

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Code: 5G366

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018

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)

UNIT-I

1. a) Explain the principle of operation of Radar with the help of block diagram and derive the general radar range equation. 8M
- b) A pulse radar has peak power $P_t = 5$ KW and uses two PRFs given by $PRF_1 = 10$ KHz and $PRF_2 = 20$ KHz. Find the required (i) duty cycle, (ii) peak repetition intervals, (iii) pulse widths for each PRF to make constant average transmitted power of 1 KW. 6M

OR

2. a) Define radar cross section of a target and find the expression for a complex target cross section? 7M
- b) Discuss about the integration of radar pulses in detail. 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. 8M
- b) List the limitations of CW radar. 6M

OR

4. a) With the help of suitable block diagram, explain the operation of a FM-CW altimeter. 8M
- b) List out the possible errors for measurement of altitudes accurately using a FM-CW altimeter. 6M

UNIT-III

5. a) With a neat block diagram, explain fully the operation of an MTI system using a power amplifier in the transmitter. 8M
- b) Discuss the factors limiting the performance of an MTI system. 6M

OR

6. a) Describe the method of staggering pulse repetition frequency to reduce the effect of blind speeds in an MTI system 8M
- b) Write the description of Range gate Doppler filters. 6M

UNIT-IV

7. a) Describe the operation of conical scan with the help of neat block diagram 8M
- b) Compare and contrast conical scan and sequential lobing type tracking techniques. 6M

OR

8. a) Describe the phase comparison mono pulse tracking technique in a radar system with the help of necessary block diagram. 8M
- b) Compare different trackers. 6M

UNIT-V

9. a) Derive the frequency response characteristics of matched filter receiver. 8M
- b) Discuss the relation between the matched filter characteristics and correlation detection. 6M

OR

10. a) Substantiate the requirement of duplexers in efficient radar systems. Describe the operation of branch and balanced type duplexers with necessary diagrams. 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

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R-15

Code: 5G361

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018

VLSI Design

(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)

UNIT-I

1. a) Discuss the steps involved in N – well CMOS process. 7M
- b) Derive the expression for the threshold voltage of MOSFET. 7M

OR

2. a) Discuss the steps involved in Bi-CMOS fabrication in an n-well process. 7M
- b) Define the following with necessary expressions. (i) gm (ii) gds (iii) Figure of Merit. 7M

UNIT-II

3. a) Explain step-by-step procedure for drawing stick diagram for single metal single polysilicon nMOS technology. 10M
- b) Draw a stick diagram for two input CMOS NAND gates. 4M

OR

4. a) Draw and explain about stick diagram of CMOS 3 – input NOR gate & NAND gate. 8M
- b) Draw and explain the significance of various pull up forms. 6M

UNIT-III

5. a) Discuss about following MOS Capacitances (i) MOS Structure Capacitances (ii) Channel Capacitance (iii) Junction Capacitance (iv) Capacitive device Model. 8M
- b) Explain in detail about formal estimation of CMOS Inverter delay. 6M

OR

6. a) What is meant by standard unit of capacitance? Give some area capacitance calculations. 7M
- b) Describe three sources of wiring capacitances. Explain the effect of wiring capacitance on the performance of a VLSI circuit. 7M

UNIT-IV

7. a) Draw a four-bit Braun multiplier and give its subsystem level design considerations. 7M
- b) Draw the barrel shifter architecture and explain its operation. 7M

OR

8. a) What are Wallace tree elements? Give and explain an example of the Wallace tree approach. 8M
- b) Discuss in detail about the FPGA design flow. 6M

UNIT-V

9. a) Explain about the Design for Testability. 7M
- b) Write short notes on design verification tools 7M

OR

10. a) Write short notes on VLSI synthesis and design flows 9M
- b) Discuss the necessity of testing in VLSI field 5M
