Code: 9A04601

R09

III B. Tech II Semester (R09) Supplementary Examinations, November/December 2012

DIGITAL COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) State sampling theorem for low pass signals and band pass signals and prove it.
(b) What do you mean by over sampling?

2 (a) Explain about CCITT hierarchy.
(b) What is meant by bandwidth efficiency of a digital multiplexing system?

3 (a) With the help of a block diagram explain baseband binary data transmission system.
(b) Explain the design and analysis of M-ary signaling schemes. List the waveforms in quaternary schemes.

4 (a) Name the quantity that is used as figure of merit in digital communications. How do you compare the above with the figure of merit of the analog communication system?
(b) Using Nyquist criteria pulses, binary data at a rate of 8 kbps is to be transmitted over a channel of 6 kHz bandwidth. What is the maximum value of the rolloff factor ρ that can be used?

5 (a) Explain in detail about sequential decoding for convolutional codes.
(b) Give the advantages and disadvantages of cyclic codes and convolutional codes.

6 Derive an expression for the channel capacity of continuous channel in the presence of white Gaussian noise.

7 (a) Derive an expression for probability of bit error of a binary coherent FSK receiver.
(b) Derive an expression for probability of bit error of a binary non-coherent ASK.

8 Explain about QPSK in detail with an example and draw the waveforms.

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Code: 9A04602

R09

III B. Tech II Semester (R09) Supplementary Examinations, November/December 2012

MICROPROCESSORS & MICROCONTROLLERS

(Common to EEE, ECE, CSE, EIE & E.Con.E)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Differentiate between overlapping and non-overlapping segmentation in 8086 microprocessor.

(b) Explain the special functions of general purpose registers.

2 (a) Write an ALP in 8086 to add five 16-bit numbers and result is 24 bit.

(b) Write an ALP in 8086 to add two 16 bit decimal numbers.

3 (a) Briefly explain the maximum mode configuration of 8086.

(b) What is the purpose of MN/MX pin? Explain.

4 (a) Explain about internal registers of 8259.

(b) With neat block diagram explain briefly about PPI.

5 (a) Explain control word format of 8251.

(b) Define frame in asynchronous communication and draw it.

6 (a) Discuss about the programming model of 8259.

(b) It is necessary to serve 18 interrupt requests using 8259's. The address map for the 8259's is given from 0A00H to 0A0FH. Show the complete interface with 8086 system bus. These 18 interrupts are to be requested from interrupt type 040 H on words, with edge trigged mode and auto end of interrupt. Give the initialization sequence for all 8259's.

7 (a) Explain in brief about programming 8051 timers.

(b) What are the steps involved in programming the 8051 to transfer data serially?

8 (a) Explain the instruction set of MCS-96 microcontrollers with simple example.

(b) List the applications of ARM cores.

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Code: 9A04603

R09

B. Tech III Year II Semester (R09) Supplementary Examinations, November/December 2012

DIGITAL SIGNAL PROCESSING

(Common to CSS, EIE, E.Con.E, ECC & ECE)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the classification discrete signals.
(b) With mathematical expressions sketch the elementary discrete signals.

2 Given the two sequences of length '4' as under
$x(n) = \{1,2,3,1\}$
$h(n) = \{4,3,2,2\}$.
Verify the answer using DFT method.

3 Discuss in detail the concept of decimation in frequency FFT. Also sketch the necessary flow graph for N=8.

4 (a) State and prove time shifting property of z-transform.
(b) Determine z-transform, ROC and pole-zero locations of
$x(n) = \alpha^n u(n) + \beta^n u(-n-1)$.

5 Discuss the approximation of IIR filter design using derivatives.

6 (a) What are the advantages and disadvantages of digital filters over analog filters?
(b) Sketch and explain the frequency response of non ideal digital low pass filter.

7 Consider the following specifications for a band pass filter

$$|H_d(e^{j\omega})| \le 0.01 \qquad 0 \le |\omega| \le 0.2\pi$$

$$0.92 \le |H_d(e^{j\omega})| \le 1.02 \qquad 0.3\pi \le |\omega| \le 0.7\pi$$

$$|H_d(e^{j\omega})| \le 0.02 \qquad 0.8\pi \le |\omega| \le \pi$$

Design a linear phase FIR filter to meet these specifications using Bartlett window.

8 (a) With the help of illustrations explain zero interpolation, step interpolation and linear interpolation.
(b) Explain the precedence rule used in the combination of decimation and interpolation.

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Code: 9A04604

R09

B. Tech III Year II Semester (R09) Supplementary Examinations, November/December 2012

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) How do we determine the performance characteristics of an instrument?
(b) Explain the process of calibration.

2 (a) Explain the working of RC phase shift oscillator.
(b) List out the advantages of Wien bridge oscillator.

3 (a) Define distortion.
(b) Explain the function of harmonic distortion analyzers.

4 (a) Explain the basic principle of an oscilloscope.
(b) What is the use of post deflection acceleration?

5 What is oscilloscope probe compensation? How is this adjusted? What effects are noted when the compensation is not correctly adjusted?

6 Describe the working of Hay's bridge for measurement of inductance. Derive the equations for balance and draw the phasor diagram under conditions of balance. Why is this bridge suited for measurement of inductance of high Q coils?

7 (a) Define piezoelectric effect. Write the applications of piezoelectric transducer.
(b) Write about IC sensors and smart sensors.

8 Explain the developments of PC families.

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Code: 9A04605

R09

B. Tech III Year II Semester (R09) Supplementary Examinations, November/December 2012

VLSI DESIGN

(Common to ECE, EIE & E.Con.E)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 Explain clearly about twin tub CMOS fabrication process with neat diagrams.

2 (a) What is the working principle of MOS transistors?
(b) Draw the physical structure of a NMOS transistor. What is meant by depletion mode and enhancement mode operations of a MOSFET? Write the expression of threshold voltage and explain about each parameter in it.

3 Draw the CMOS inverter, its physical lay out with its stick diagram.

4 (a) What are the sources of capacitance that contribute to the overall wiring capacitance? Explain.
(b) Define fan-in and fan-out. Explain their effects on propagation delay.

5 (a) Discuss about the tradeoff between power-delay in optimizing a good design of an IC.
(b) Draw the schematic and logic diagram for a zero/one detect system and explain its working.

6 (a) Design an 8:1 multiplexer using dynamic CMOS NOR-NOR PLA implementation.
(b) Implement the 8:1 multiplexer using EPROM.

7 (a) Write about timing analysis and optimization of IC design.
(b) Explain with an example how timing analysis differ from simulation.

8 (a) What are the objectives of BIST?
(b) Explain the working of signature analysis as one of the BIST technique.

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Code: 9A04606

R09

B. Tech III Year II Semester (R09) Supplementary Examinations, November/December 2012

MICROWAVE ENGINEERING

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Derive the wave equation for a TM wave and obtain all the field components in rectangular wave guide.
(b) A rectangular wave guide with dimension of 3 × 2 cm operates in the TM11 mode at 10 GHz. Determine the characteristic wave impedance.

2 (a) Draw the rectangular cavity resonator and derive equation for resonant frequency.
(b) Explain the methods of exciting a resonator cavity.

3 (a) Explain the properties of E-plane tee and give reasons why it is called series tee.
(b) Describe Bethe-hole coupler and explain its working.

4 (a) Write the properties of scattering matrix.
(b) Obtain scattering matrix of E-plane tee junction.

5 (a) What are the assumptions for calculation of RF power in Reflex Klystron? Explain.
(b) How the klystron amplifier can act as klystron oscillator? What are the applications of klystron amplifier?

6 (a) What are the desirable properties of slow wave structures to be used in TWT amplifiers?
(b) Draw a neat sketch of traveling wave tube and explain its principle of operation with bunching diagrams.

7 (a) Describe the relationship between electron drift velocity and electric field and explain with a neat graph.
(b) Describe briefly the quenched and delayed modes of oscillation in Gunn diode. Which mode is more suitable and why?

8 Discuss about the various methods for the measurement of Q of a cavity resonator.

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