

SUBJECT CODE NO: E-8001
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (EC/ECT/CE/DC/ES) Examination Nov/Dec 2017
Advanced Optimization Techniques
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- (i) **Question No.1 and 6 are compulsory.**
- (ii) Answer any two questions from remaining questions each from Section A and Section B.
- (iii) Figures to the right indicate full marks.
- (iv) Assume suitable data, wherever necessary and mention it clearly.

Section A

- Q.1 a) What are the types of constraints? Explain any two with a practical engineering problems example. 05
- b) What are the conditions for a point to be an optimal point in a single variable optimization? 05
- Q.2 (a) Write an algorithm of multivariable optimization using a Hooke-Jeeves pattern search method. 07
- (b) What is meant by multi-modal, multi-objective, nested, deterministic and dynamic optimization? 08
- Q.3 (a) Explain root finding using optimization techniques. 07
- (b) Use two iterations to find optimum minimum point using Box's evolutionary method for function, $f(x_1, x_2) = x_1^3 - x_1x_2 + x_2^2$. Consider initial point $x^0 = (1, 1)^T$ and increment $\Delta = (0.5, 05)^T$. 08
- Q.4 (a) What are the steps involved in an optimal design formulation process? 07
- (b) Consider a single variable optimization objective function, Minimize $f(x) = x^2 + 8/x$ Consider the variable range $x \in (0,4)$. Determine the optimum x Using Golden Section search method. Use only three iterations. 08
- Q.5 (a) What is meant by descent direction? Find whether the given direction d at point x is decent for the respective function. 07
- a) $f(x_1, x_2) = 2x_1^2 + 2x_2^2 - 2x_1x_2 + 4$; $d = (1, 1)^T$; $x = (2, 3)^T$
- b) $f(x_1, x_2) = x_1^2 + x_2^3 + 10/x_2$; $d = (-1, 2)^T$; $x = (0, 1)^T$
- (b) Explain any one gradient based method in single variable optimization with algorithm. 08

Section - B

- Q.6 (a) What are Kuhn-Tucker conditions? Write down Kuhn-Tucker conditions for the following problem: 05
- Maximize $3x_1^2 - 2x_2$
- Subject to, $2x_1 + x_2 = 4$
 $x_1^2 + x_2^2 \leq 19.4$
 $x_1 \geq 0$
- (b) What type of sensitivity analysis can be performed for linear programming? 05
- Q.7 (a) What are the similarities and differences between Genetic Algorithm (GA) based methods and traditional methods of optimization? 07
- (b) Consider the NLP problem: 08
- Minimize $x_1^2 - x_2$
Subject to, $x_1^2 - x_2 + 12 \geq 0$
 $x_1 + 2x_2^2 - 5 \geq 0$
 $x_1, x_2 \geq 0$
- Complete one-iteration of cutting-plane method optimization.
- Q.8 (a) What is meant by basic variable, non-basic variables, slack variables and artificial variables in linear programming? 07
- (b) Solve the following NLP problem using Geometric Programming (GO) method – 08
- Minimize $f(x) = 10 - x_2$
Subject to, $g(x) = 26 - (x_1 - 5)^2 - x_2^2 \geq 0, x_1, x_2 > 0$
- Q.9 (a) Explain Gradient Projection Method of constrained optimization. 07
- (b) Explain simplex method in linear programming. 08
- Q.10 (a) Write short note on – Method of Multipliers in constrained optimization. 07
- (b) In a genetic algorithm simulation, the following population is observed at generation four: 08

Strings	Fitness
0101101	10
1001001	8
1010110	14
0111101	20
1110111	2
0111100	12

If roulette-wheel selection, single-point crossover with probability 0.9, and a bit-wise mutation with probability 0.01 are used, how many copies of the schema (*1*11**) are expected in generation five?

SUBJECT CODE NO: E-8018
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (EC/ECT/CE/DC/ES) Examination Nov/Dec 2017
Audio Signal Processing & Coding
(Revised)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Q.No.5 from section A & Q.No.10 from Sect. B are compulsory.
 - ii) Solve any two questions from Q.No.1,2,3,4 from Section-A & two questions from Q.No.6,7,8,9 section B.
 - iii) Assume Suitable data, if necessary.

Section –A

- | | | |
|-----|--|----|
| Q.1 | a) Give the fundamentals of speech processing. | 08 |
| | b) Describe Cepstral Analysis of speech processing. | 07 |
| Q.2 | a) What are various digital models available for speech signals, explain in brief. | 08 |
| | b) Explain time domain approach for speech processing. | 07 |
| Q.3 | a) Explain Spectral parameters of speech in terms of log freq. power coefficients. | 08 |
| | b) Write a note on estimation of formats. | 07 |
| Q.4 | a) What is linear prediction in speech processing? Explain in brief. | 08 |
| | b) What is Non-Uniform Quantization? Explain in detail. | 07 |
| Q.5 | Write short notes on: (any two) | 10 |
| | i) Companding Effect | |
| | ii) Lossless tube model in speech | |
| | iii) Companded Quantizer | |

Section –B

- | | | |
|------|---|----|
| Q.6 | a) Explain Linear filtering interpretation of short time spectral analysis. | 08 |
| | b) Compare various waveform Coding Techniques. | 07 |
| Q.7 | a) What is Adaptive Delta modulation? Explain in brief. | 08 |
| | b) Explain different types of Uniform Quantization in detail. | 07 |
| Q.8 | a) Give designing steps of Digital filter Bank. | 08 |
| | b) Write a note on spectrographic displays. | 07 |
| Q.9 | a) Explain Loudness perception in speech processing Application. | 08 |
| | b) Explain the working of Dolby AC-3 system with the help of diagram. | 07 |
| Q.10 | Write short notes on: (any two) | 10 |
| | i) Audio coding standard | |
| | ii) Adaptive echo cancellation | |
| | iii) Homomorphic vocoder | |

Total No. of Printed Pages:1

SUBJECT CODE NO:- E-8036
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (Electronics) Examination Nov/Dec 2017
Advanced Power Electronics
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- 1) Q.no.1 from section A and Q.no.5 from section B are compulsory
 - 2) Attempt any two question from remaining question of section A and B each
 - 3) Assume suitable data whenever necessary
- Section - A

- Q.1 Solve any two of the following 10
- i) Explain EMI due to switching in power devices
 - ii) Explain turn – on mechanism in SCR
 - iii) What are recent trends in development of variable speed drives
- Q.2 a) Discuss protection of SCR against over voltages and over current 08
b) What is power handing capability? Why it is important? 07
- Q.3 a) With neat diagram and wave forms explain UJT triggering circuit 07
b) Explain the ratings of SCR and IGBT 08
- Q.4 a) Explain the operation of ZCS resonant switch convertor 07
b) Explain speed control scheme for DC motor using four quadrant convertor 08

Section – B

- Q.5 Solve any two of the following 10
- 1) Explain phase control inverter
 - 2) Explain need of PWM techniques
 - 3) Explain displacement factor and distortion factor
- Q.6 a) Explain the operation of half bridge series resonant convertor 07
b) Explain with block diagram digitally controlled DC drive 08
- Q.7 a) Explain SPWM in detail 07
b) Give detail classification of inverter 08
- Q.8 a) With neat block diagram explain the operation of UPS 07
b) What are different power factor correction methods? Explain 08

2017

SUBJECT CODE NO:- E-8056
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (EC/ECT/CE) Examination Nov/Dec 2017
Image & Video Processing
(Revised)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- Q.No.4 from section A and Q.No.8 from section B are compulsory.
 - Attempt any two questions from Q.No.1 to Q.No.3
 - Attempt any two questions from Q.No.5 to Q.No.7
 - Figures to the write indicate full marks
 - Assume suitable data if necessary and mention it clearly.

Section A

- Q.1 a) Explain the basic methods for image restoration 07
- b) Explain the basic filtering & write the application of linear filtering. 08
- Q.2 a) Explain the basic concept of multistate image decompositions and wavelet. 08
- b) Explain statistical methods for image segmentation. 07
- Q.3 a) Describe JPEG lossless image compression standards in details. 08
- b) Draw and explain block truncation coding in detail 07
- Q.4 Write short note on (Any two) 10
- Image restoration algorithm
 - Multi-scale image decomposition
 - Image zooming

Section B

- Q.5 a) What do you mean by object base video coding? Explain in detail. 08
- b) With the help of neat sketch explain processing steps in removal of noise blotches and intensity flickers from video. 07
- Q.6 a) Explain the process of dilation and erosion with example 08
- b) Explain region filling in detail 07

Q.7 a) Explain in detail fundamentals of human perception and image quality

08

b) What is medical imaging? Explain it

07

Q.8 Write a short note on (Any two)

10

a) Image sampling and quantization

b) Halfoning

c) Discrete cosine and wavelet.

Total No. of Printed Pages:02

SUBJECT CODE NO:- E-8136
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (Electronics & Telecomm.) Examination Nov/Dec 2017
Wireless & Mobile Communication System
(Revised)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Question No.5 from section A and Question No.10 from section B are compulsory.
 - ii) Solve any two Questions from the remaining Questions in each section.
 - iii) Figure to the right indicates full Marks.
- Section A**
- | | | |
|-----|---|----|
| Q.1 | a) Explain Handoff strategies in cellular radio system | 07 |
| | b) Explain Interim standard 95 CDM access in detail. | 08 |
| Q.2 | a) Explain channel planning for wireless system. | 05 |
| | b) If a signal to interference ratio of 15db is required for satisfactory forward channel performance of a cellular system, what is the frequency resource factor and cluster size that should be used for maximum capacity if the path loss exponent is (a). $n = 4$, (b). $n = 3$? Assume that there are six cochannel cells in the first tier, and all of them are at the same distance from the mobile, use suitable approximation. | 10 |
| Q.3 | a) Explain development of wireless network with example. | 07 |
| | b) What are the advantages of common channel signaling over conventional signaling | 08 |
| Q.4 | a) Explain the concept of Distributed data base for mobility management and UMTS | 07 |
| | b) Explain advantages and disadvantages of WLAN compared to their wired counterparts. | 08 |
| Q.5 | a) Compare IEEE 802.11 Hiper LAN 2 and Bluetooth with regard to their adhoc capabilities, where is the focus of these technologies? | 05 |
| | b) Draw and explain the basic structure of an IEE 802.11 MAC data frame. | 05 |

Section B

- Q.6 a) What are advantages and problems of forwarding mechanisms in Bluetooth networks regarding security, power saving, and network stability? 07
- b) Explain different attributes of service discovery protocol 08
- Q.7 a) Explain traditional TCP improvement and snooping TCP in detail. 07
- b) Explain the following terminology of Mobile IP; 08
- i) Mobile node
 - ii) Care of address
 - iii) Home agent
 - iv) Foreign agent
- Q.8 a) Explain Tunneling and encapsulation 07
- b) What are general problems of mobile IP regarding security and support of quality of service? 08
- Q.9 a) Explain resource allocation and mobility management in cellular network. 07
- b) Explain Tele-traffic modeling and queuing theoretic analysis of cellular mobile. 08
- Q.10 Write short note on any two 10
- a) DSDV and DSR
 - b) IP Packet delivery
 - c) IP-in-IP encapsulation

SUBJECT CODE NO: E – 8140
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (EC/ECT/CE/DC/ES) Examination Nov/Dec 2017
Advanced Digital Signal Processing
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- 1) Solve three questions from each section.
 - 2) Q.1 and Q.6 are compulsory.
 - 3) Assume suitable data if necessary.
 - 4) Draw neat diagrams wherever required.

Section A

- Q.1 a) State the algebraic stability test. 05
 b) Derive transfer function of a decimator. 05
- Q.2 Describe in detail.
 i) Polyphase structures. 07
 ii) Digital sine cosine generator. 08
- Q.3 a) With suitable example explain FIR cascaded lattice structure. 08
 b) What is the inverse system means? Explain with example & their properties. 07
- Q.4 a) Design a sample rate converter that increases the sampling rate by a factor of 2.5. 08
 b) Describe tunable IIR digital filter. 07
- Q.5 Write short notes on (any two) 15
 a) Multistage implementation of multirate system. 08
 b) Computationally efficient FIR filter structures 07
 c) IIR filter design by impulse invariance method. 07

Section B

- Q.6 a) Define periodogram? How can it be smoothed? 05
 b) Why are FIR filters used in adoptive filter application? 05
- Q.7 a) Consider the discrete time signal, 08
 $x(n) = \{1, 2, 3, 4\}$.
 Determine the up sampled version of the signals for the sampling rate multiplication factor.
 $I = 2, I = 3$
 b) Explain sampling by rational factor I/D. 07

- Q.8 a) Derive the expression for solution of normal equations by Levinson – Durbin algorithm. 08
b) Compare AR, MA, ARMA models with respect to complexity. 07
- Q.9 a) Realize $H(Z) = 1 - 1.5Z^{-1} + 3.25Z^{-2} - 3.5Z^{-3} + 1.25Z^{-4} - 0.17Z^{-5}$ as 08
i) Cascade of one third order and second order sections.
ii) Cascade of five first order section.
b) Explain the procedure for the realization of second order lattice structure. 07
- Q.10 Write short notes (on any two) 15
- i) Digital two pairs 08
ii) Welch power spectrum estimation 07
iii) FIR wiener filter. 07

Total No. of Printed Pages:2

SUBJECT CODE NO: E-8158
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (EC/ECT/CE/DC/ES) Examination Nov/Dec 2017
Advanced Digital Communication System
(Revised)

[Time: Three Hours]

[Max.Marks:80]

N.B

Please check whether you have got the right question paper.

- i) Q.No.5 from section – A and Q.no.10 from section-B are compulsory.
- ii) Solve any two questions from remaining questions in each section.
- iii) Assume suitable data, wherever necessary.

Section – A

- | | | |
|-----|--|----|
| Q.1 | a) Explain complex base band representation of signals. | 08 |
| | b) Explain M-ary orthogonal signals. | 07 |
| Q.2 | a) With the help of block diagram and waveforms, explain the working of PAM. | 08 |
| | b) Explain FSK in detail. | 07 |
| Q.3 | a) Explain binary PPM. | 08 |
| | b) What is continuous phase modulation? Explain. | 07 |
| Q.4 | a) Explain the role of a matched filter in a communication channel. | 08 |
| | b) Draw and explain envelop detection. | 07 |
| Q.5 | Write short note on (<u>Any two</u>) | 10 |
| | a) Bit error rate | |
| | b) DPSK | |
| | c) Bi-orthogonal signals | |

Section – B

- Q.6 a) Explain partial response signalling. 08
b) Give the design of transmitting and receiving filters. 07
- Q.7 What is synchronization? Explain ML and spectral line methods. 15
- Q.8 a) Explain Viterbi Algorithm. 08
b) Discuss the characteristics of fading channels. 07
- Q.9 a) Explain Rayleigh channel in detail. 08
b) Explain receiver performance on the basis of outage probability and amount of fading. 07
- Q.10 Write short note on (Any two) 10
a) Rician channels
b) Bit/symbol error rate
c) MMSE

SUBJECT CODE NO:- E-8276
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (EC/ECT/CE/ES) Examination Nov/Dec 2017
VLSI Design (EI-I on EC/ECT/CE)
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

- N.B
1. Attempt any two questions from each section.
 2. Assume suitable data wherever necessary.

Section A

- Q.1
- a) Explain MOS device design equation for finding drain current. 10
 - b) Explain following terms for second order effect. 10
 1. Mobility variation
 2. Impact Ionization or Hot electron effect
 3. Body effect
 4. Channel length modulation
- Q.2
- a) Explain CMOS inverter transfer characteristics & condition of CMOS inverter at different region. 10
 - b) Design CMOS logic gate for following. 10
 1. $Y = \overline{AB + CD}$
 2. $Y = \overline{AB + C(D + E)}$
- Q.3
- a) Write short notes on. 10
 1. BiCMOS circuit
 2. Dynamic CMOS design
 - b) Explain static CMOS design with static properties of CMOS Gate. 10

Section B

- Q.4
- a) Explain multiplexer based Latches with neat diagram in details. 10
 - b) Explain static SR flip-flops & dynamic catches & register –C² MOS. 10
- Q.5
- a) Describe partial product generation & partial product accumulation in detail. 10
 - b) Explain Manchester carry –chain adder & logarithmic look ahead adder concept. 10
- Q.6
- a) Describe CMOS design concept of designing memory & array structure. 10
 - b) Explain CMOS DRAM & partitioning of the memory 10

SUBJECT CODE NO: E-8152
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (Electrical Power System) Examination Nov/Dec 2017
Electrical Machine Analysis & Modeling
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i. Attempt any two questions from each section.
- ii. Assume suitable data wherever necessary
- iii. Figures to the right indicate full marks.
- iv. All questions carry equal marks.

Section A

- Q.1 a) Explain the principle of electromechanical. Energy conversion and also explain energy balance equation. 10
 b) Derive the relation for winding inductance in 3 – ph, 2 – pole symmetrical Induction machine. 10
- Q.2 a) Explain elementary direct current machine with its voltage equation. 10
 b) Explain the dynamic performance of permanent magnet D.C. motor during sudden change in load torque. 10
- Q.3 a) Explain the equation of transformations. 10
 b) Apply Qdo transformation to the inductive element. 10

Section B

- Q.4 a) Derive torque equation of induction motor in machine variables. 10
 b) Explain dynamic performance of symmetrical induction motor during sudden change in load torque. 10
- Q.5 a) Derive the stator voltage equation in arbitrary reference frame variables of symmetrical synchronous machine. 10
 b) Explain rotor angle & angle between rotors in symmetrical synchronous machine. 10
- Q.6 a) Explain the modeling & hydroturbines and their governing system. 10
 b) Explain the modeling of transformer. 10

Total No. of Printed Pages:1

SUBJECT CODE NO: E - 8134
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (Electronics) Examination Nov/Dec 2017
Digital System Design
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Q.1 and Q.5 are compulsory.
 - ii. Solve any two questions from the remaining question from each section.
 - iii. Assume suitable additional data if necessary.

Section A

- Q.1 Plot the R – map of the function $f(A, B, C, D) = \sum 0,2,4,6,8,9,11,12,14,15$. and determine hazard free implementation using NOR gates. 10
- Q.2
- a) Describe the structural Modelling. 08
 - b) Explain the design procedure synchronous Sequential circuits. 07
- Q.3
- a) Explain the design of Hazard free networks. 08
 - b) Explain the hazards in combinational networks. 07
- Q.4 Define fundamental mode circuits. What do you understand by critical and non – critical races? How can a critical race be prevented in the design of a circuit? 15

Section B

- Q.5 Explain single and Multiple stack – fault Model with example. 10
- Q.6
- a) Design a parallel Multiplier. 08
 - b) Describe PLA. 07
- Q.7
- a) Design a serial Adder using JK Flip flop. 10
 - b) Explain fast adder. 05
- Q.8 Write short notes on :
- a) Fault detection and redundancy 08
 - b) Describe FGPA with example. 07