

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION
NOVEMBER 2020**

(CBCSS)

Electronics

ELS 3E 01C—VLSI DESIGN AND VHDL PROGRAMMING

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section / Part.*
2. *The minimum number of questions to be attended from the Section / Part shall remain same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to maximum weightage of the Section / Part.*

Part A*Answer four out of seven questions.**Each question carries 2 weightage.*

1. What is meant by channel length modulation ?
2. Draw the schematic diagram of inverter and explain.
3. Draw the stick diagram and layout for CMOS NAND gate.
4. Define body bias effect.
5. What is ternary operator in Verilog ?
6. What are the two general types of statements used in behavior Verilog ?
7. Write Verilog code to implement D flip-flop.

(4 × 2 = 8 weightage)

Part B*Answer any four questions.**Each question carries 3 weightage.*

8. Explain MOS diffusion capacitance modes with geometry.
9. What are second order effects ?
10. Write short notes on design rules and their necessity.

Turn over

11. Explain twintub process.
12. Explain beta ratio effects.
13. Explain casex and casez statements in Verilog.
14. What are the basic components of a module ? Explain all the components of a Verilog module with a neat block diagram.

(4 × 3 = 12 weightage)

Part C

*Answer any two questions.
Each question carries 5 weightage.*

15. Explain I-V characteristics of ideal nMOS and pMOS transistor.
16. Explain P well and N well process with neat diagrams.
17. Write a Verilog program for 8-1 multiplexer using case statement.
18. Write a Verilog data flow description for encoder with carry look ahead.

(2 × 5 = 10 weightage)

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR)
EXAMINATION, NOVEMBER 2020**

(CBCSS)

Electronics

ELS 3C 11—INTERNET OF THINGS

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section/Part.*
2. *The minimum number of questions to be attended from the Section/Part shall remain same.*
3. *There will be an overall ceiling for each Section/Part that is equivalent to maximum weightage of the Section/Part.*

Part A

Answer any four questions.

2 weightage each.

1. Explain different components of IOT and how they are inter-connected with each other ?
2. What is Machine to Machine communication (M2M) ?
3. Explain layered architecture of IOT.
4. What is relation between WSN and IOT ? Explain.
5. Explain briefly OGC architecture.
6. What are the functions of IOT Domain model.
7. What is cloud computing ?

(4 × 2 = 8 weightages)

Part B

Answer any four questions.

3 weightage each.

8. Explain the Architecture reference model for IOT.
9. Explain CoAP protocol for M2M/IOT.

Turn over

10. What are different IOT protocols ?
11. Explain the IETF architecture for IOT.
12. What is Zigbee ? Explain its architecture.
13. What is RFID ? Explain principles of RFID.
14. Differentiate between Raspberry PI and Arduino.

(4 × 3 = 12 weightage)

Part C

*Answer any two questions.
5 weightage each.*

15. Explain layered architecture of IOT. Explain IOT system management with NETCONF-YANG.
16. Explain ETSI M2M high-level architecture for IOT in detail.
17. What are the four pillars of IOT ? Describe each tower with the help of example.
18. Explain the generic M2M System Solution with a neat diagram.

(2 × 5 = 10 weightage)

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION
NOVEMBER 2020**

(CBCSS)

Electronics

ELS 3C 10—ADVANCED DIGITAL SIGNAL PROCESSING

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section / Part.*
2. *The minimum number of questions to be attended from the Section / Part shall remain same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to maximum weightage of the Section / Part.*

Part A*Answer any four questions.**2 weightage each.*

1. What is significance of selection of model order in parametric methods ?
2. What is periodogram averaging ?
3. Perform circular convolution of the two sequences $x(n) = \{1, 2, 3, 1\}$ and $h(n) = \{1, 1, 1\}$.
4. Compute the 4-point DFT of the sequence $x(n) = 1/3; 0 \leq n \leq 2$
 $= 0; \text{ else}$
5. Explain, what is Simulink ?
6. Describe the sum decomposition theorem.
7. Explain the application of sub band coding.

(4 × 2 = 8 weightages)

Part B*Answer any four questions.**3 weightage each.*

8. State and prove the Parseval's Theorem.
9. Explain the AR, MA, ARMA models.

Turn over

10. What are the difficulties in non-parametric methods for measuring the spectral density ?
11. Design a Butterworth digital IIR low pass filter using bilinear transformation by taking $T = 0.1$ second, to satisfy the following specifications

$$0.6 \leq |H(e^{j\omega})| \leq 1.0; \text{ for } 0 \leq \omega \leq 0.35\pi$$

$$|H(e^{j\omega})| \leq 1.0; \text{ for } 0.7\pi \leq \omega \leq \pi$$

12. Explain the Barlett spectrum estimation.
13. Describe M-files.
14. Explain decimation and interpolation.

(4 × 3 = 12 weightages)

Part C

Answer any **two** questions.

5 weightage each.

15. Derive the Yule-Walker equation for ARMA, AR and MA model in detail.
16. Show that the Barlett estimate of the power spectral density is asymptotically unbiased that the variance of the estimate decreases with the number of data sections and the spectrum estimates are consistent.
17. Explain the concept of filters in DSP.
18. Compute the 8-point DFT of the sequence $x(n) = \{2, 2, 2, 2, 1, 1, 1, 1\}$ using (i) DIT FFT algorithm (ii) DIF FFT algorithm.

(2 × 5 = 10 weightages)

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION
NOVEMBER 2020**

(CBCSS)

Electronics

ELS 3C 09—SOFT COMPUTING AND OPTIMIZATION TECHNIQUES

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section / Part.*
2. *The minimum number of questions to be attended from the Section / Part shall remain same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to maximum weightage of the Section / Part.*

Part A*Answer any four questions.**2 weightage each.*

1. What is a multilayer feed forward network ?
2. What are the operations that apply to fuzzy relations ?
3. What is a fuzzy set ?
4. What is the drawback for inverse learning in ANFIS controller ? How is it overcome in specialized learning ?
5. What do you mean by rate of convergence ?
6. What is interior penalty function method ?
7. What are genetic algorithms ?

(4 × 2 = 8 weightage)

Part B*Answer any four questions.**3 weightage each.*

8. Briefly explain the ART system.
9. What is triangular MF ? Explain.

Turn over

10. Explain the compositional rule of inference.
11. What are the steps involved in the determination of cluster center and membership matrix of a Fuzzy C-means clustering algorithm?
12. What are the primary issues involved in the structural identification of a fuzzy model ?
13. Explain the classification of unconstrained optimization methods.
14. Explain particle swarm optimization.

(4 × 3 = 12 weightage)

Part C

Answer any two questions.

5 weightage each.

15. What are the three essential processes involved in the formation of the selforganizing map ? Explain.
16. Explain the Fuzzy If-then rules.
17. Explain the architecture of an Adaptive Neuro Fuzzy Inference system.
18. Explain the three operators use in genetic algorithm.

(2 × 5 = 10 weightage)

**THIRD SEMESTER M.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION
NOVEMBER 2020**

(CUCSS)

Electronics

SC 3E 04—SATELLITE COMMUNICATION

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

*Answer all fourteen questions.
Each question carries a weightage of 1.*

1. List any applications of Satellites.
2. Define : Azimuth Angle.
3. What is meant by S/N ratio ?
4. Mention the different methods of Multiple Access Techniques.
5. Define : Frequency reuse.
6. Give the concept of low noise amplifiers in satellite communication.
7. Mention few applications of VSAT.
8. Define Look Angle.
9. What is Low earth orbit ?
10. What are uses of high power transmitters in satellite earth station ?
11. What are T_1 and T_2 carrier systems ?
12. What is Carrier to Noise Ratio ?
13. What is Video conferencing ? Mention few applications.
14. Give the principle of GSM.

(14 × 1 = 14 weightage)

Part B

*Answer any seven questions.
Each question carries a weightage of 2.*

15. Mention about the future trends of Satellite communications.
16. Briefly discuss about Polarization.

Turn over

17. List out the advantages of SPADE Access techniques.
18. Write short note on "Reflector Antenna".
19. Explain about INMARSAT.
20. Explain differentiate Low earth and Medium earth orbits.
21. Write short notes on Frequency selection.
22. Define System Noise.
23. Explain about TDMA.
24. Write short notes on Reflector Antennas.

(7 × 2 = 14 weightage)

Part C

Answer any two questions.

Each question carries a weightage of 4.

25. Narrate the Operation of Klystron with neat sketch.
26. Explain the operation of a GPS receiver with a neat diagram.
27. Narrate about Spread spectrum communication.
28. What are the different primary power test methods at the earth station ? Explain.

(2 × 4 = 8 weightage)

**THIRD SEMESTER M.Sc. DEGREE (SUPPLEMENTARY)
EXAMINATION, NOVEMBER 2020**

(CUCSS)

Electronics

VL 3C 03—VLSI DESIGN, TOOLS AND TECHNOLOGY

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

Answer all fourteen questions.

Each question carries a weightage of 1.

1. Mention the applications of SOI CMOS.
2. List the different types of oxidation.
3. Discuss about Channel-length modulation.
4. What is channel-stop implantation ?
5. What is switch level modeling?
6. Define vector in Verilog.
7. What is the fundamental goal in Device modeling ?
8. Abbreviate SWAMI ?
9. List out the different types of programmable devices ?
10. What is a task in Verilog ?
11. Mention the four key words used for looping in Verilog.
12. What do you mean by latch up problem ?
13. What is pull down device ?
14. What is Stick Diagram ?

(14 × 1 = 14 weightage)

Turn over

Part B

Answer any seven questions.

Each question carries a weightage of 2.

15. Explain the CMOS inverter DC characteristics.
16. Give brief note on latch up prevention techniques.
17. What do you mean by programmable logic array ?
18. Explain the subtypes with examples as are used in VHDL.
19. Compare sequential and combinational circuits.
20. Discuss the complimentary CMOS inverter DC characteristics.
21. Distinguish between array and records types.
22. Explain with neat diagram about Latch up.
23. Discuss about Transmission gate and the tristate inverter briefly.
24. Specify the any two basic statements of behavioral modeling.

(7 × 2 = 14 weightage)

Part C

Answer any two questions.

Each question carries a weightage of 4.

25. Describe the operation of NMOS Enhancement transistor.
26. Give ideas to enhance the CMOS process. Explain about interconnect and a circuit element.
27. Design BCD to Excess-3 code convertor, using minimum number of NAND gate.
28. Describe about *p*-MOS and *n*-MOS ?

(2 × 4 = 8 weightage)

**THIRD SEMESTER M.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION
NOVEMBER 2020**

(CUCSS)

Electronics

DP 3C 02—ADVANCED DIGITAL SIGNAL PROCESSING

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

Answer all fourteen questions.

Each question carries a weightage of 1.

1. Define Cross convolution.
2. Write the relationship between system function and the frequency response.
3. What is MATLAB ?
4. What is walker method ?
5. Why need of FFT ?
6. Name the types of filter banks.
7. Point out the uses of LPF.
8. What is random variable ?
9. Define auto correlation functions.
10. Give the advantage of Barlett Method.
11. Give different between analog and digital signals.
12. Why IIR filters do not have linear phase ?
13. What is the necessary condition and sufficient condition for the linear phase characteristics of a FIR filter ?
14. What is the relation between Fourier transform and Z transform ?

(14 × 1 =14 weightage)

Turn over

Part B

Answer any seven questions.

Each question carries a weightage of 2.

15. Write a short note on correlation sampling.
16. Briefly discuss about the various filters.
17. Explain the concepts of discrete time systems.
18. Write short notes on spectral density.
19. Explain autocorrelation matrix in detail.
20. Discuss the correlation matrix for white noise.
21. Point out the objectives of power spectrum estimation.
22. List the various advantage of sub-band coding.
23. State few applications of DSP ?
24. Explain the role of filter banks in multi-rate signal processing.

(7 × 2 = 14 weightage)

Part C

Answer any two questions.

Each question carries a weightage of 4.

25. Explain the method of design of IIR filters using bilinear transform method.
26. State and proof the properties of Z transform.
27. Explain the discrete random signal processing by linear system.
28. Explain in detail about direct digital domain approach in DSP.

(2 × 4 = 8 weightage)

**THIRD SEMESTER M.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION
NOVEMBER 2020****(CUCSS)****Electronics****ES 3C 01—EMBEDDED SYSTEMS****(2010 Admissions)****Time : Three Hours****Maximum : 36 Weightage****Part A**

*Answer all fourteen questions.
Each question carries 1 weightage.*

1. What is system with example ?
2. Define Flexibility.
3. Give note on Harvard architectures.
4. Define Timer.
5. Discuss concept of pre-scalar in timer.
6. Define priority arbiter.
7. Give various objectives of RTOS.
8. What is compiler ?
9. Give example for ASIP.
10. Explain the advantage of cache memory.
11. Write a short note on RTC.
12. Give general idea of Bluetooth.
13. Different between OS and RTOS.
14. What is linker ?

(14 × 1 = 14 weightage)**Part B**

*Answer any seven questions.
Each question carries 2 weightage.*

15. Differentiates computer system and embedded system.
16. Discuss about Unit Cost.

Turn over

17. Explain ISR.
18. Write a short note on uses of WDT.
19. Discuss resolution in ADC.
20. Discuss about IrDA.
21. Write a short note on Bluetooth.
22. Discuss the following :
 - Response time.
 - Throughput.
23. Narrate superscalar architecture.
24. What is addressing mode explain with examples.

(7 × 2 = 14 weightage)

Part C

Answer any two questions.

Each question carries 4 weightage.

25. Explain about various software tools used to design embedded based gadgets with example.
26. Explain with neat diagram about designing concepts of Digital Camera.
27. Discuss about the compounds of general purpose processor.
28. Explain the Purpose of PWM for controlling a DC motor.

(2 × 4 = 8 weightage)