F–1192

Sub. Code
7MEL2C3

M.Sc. DEGREE EXAMINATION, APRIL 2021 &
SUPPLEMENTARY / IMPROVEMENT / ARREAR EXAMINATIONS
Second Semester

Electronics

AVR MICROCONTROLLER AND EMBEDDED SYSTEM

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is purpose of program counter?

2. What are functions of Lable field?

3. List the operands used in AVR assembly statement.

4. What is an array?

5. What are the classifications of Interrupt?

6. Define PWM modes.

7. List the various types of ports in AVR.

8. What are the advantages of SPI bus protocol?

9. What is Relay?

10. What are uses of sensor interfacing?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write a note on status register.

Or

(b) Discuss the three types of memory used in AVR.

12. (a) Explain the Data serialization in C.

Or

(b) Write an instruction sequence to create time delay of 1 second.

13. (a) Write a note on Input Capture programming.

Or

(b) Explain the different types of Timers with an example.

14. (a) Discuss the TWI (12C) in the AVR in detail.

Or

(b) How the ATMEGA32 connection made to RS 232.

15. (a) Explain The ADC Interfacing in detail.

Or

(b) Write a note on optoisolators interfacing.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the functions of PORTx Registers in AVR.

17. Write a program to find the total number of elements in an array of 8-bit integers that are larger than 20 using for – loop.

18. Discuss the programming timer Interrupts in detail.

19. Describe the AVR Serial port programming in C using Interrupts in detail.

20. Write instruction sequence for stepper motor interfacing. Explain.

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F–1954

Sub. Code
7MEL1C4

M.Sc. DEGREE EXAMINATION, APRIL 2021 &
SUPPLEMENTARY / IMPROVEMENT / ARREAR EXAMINATIONS
First Semester

Electronics

NANO ELECTRONICS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Nano optics?
2. State the importance of Nanotechnology.
3. How conduction does takes place in ionic crystals?
4. List the binding energies for different types of crystals.
5. What is reactive-ion etching?
6. What is intrinsic material?
7. Give the classification of transport regimes.
8. Define work function.
9. Why Single Electron Transistor is important?
10. What is coulomb blockade?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write a short note on spin and angular momentum.

Or

(b) Derive the time independent Schrodinger equation.

12. (a) Write a note on covalent crystals.

Or

(b) How does conduction take place in insulators and ionic crystals?

13. (a) Explain the Czochralski method for the growth of bulk semiconductors.

Or

(b) Briefly explain about the chemical-vapor-deposition growth.

14. (a) Explain the two types of band diagram of double hetero structure in quantum well.

Or

(b) Briefly explain Single modulation-doped heterojunctions.

15. (a) Draw the schematic representation of the conduction band of a resonant tunnel diode for (i) no voltage applied (ii) increasing applied voltages.

Or

(b) Explain its I-V characteristics of Resonant-tunneling Diode.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail operators for Quantum Mechanics.

17. Elaborate on Symmetry of crystals and properties of Electron Spectra.

18. Discuss the die-pen nanolithography as a technique for nanofabrication.

19. Describe the density states of electrons in a system of different dimensionalities.

20. Discuss about Laser-diodes.

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F–5408	Sub. Code
	7MEL1C1

M.Sc. DEGREE EXAMINATION, APRIL 2021 &

Supplementary/Improvement/Arrear Examinations

First Semester

Electronics

CONTINUOUS TIME SYSTEMS AND SIGNAL PROCESSING

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is a system?
2. Draw the block diagram of an digital signal processing system.
3. Give the diagrammatic representation of continuous time system.
4. What is an inverse system?
5. What is Fourier series?
6. Find the Fourier series coefficient of the signal $x(t) = \sin\omega t$.
7. What are non-periodic signals? Give example.
8. Define Fourier transform.
9. Define inverse Laplace transform.
10. What is the connection between LT and FT?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain about

(i) sinusoidal

(ii) unit pulse

(iii) triangular pulse

(iv) signum signal with diagrams.

Or

(b) Determine whether the following signals are periodic. If signals are periodic, determine their functional period.

(i) $x(t) = e^{(j2\pi t)/10}$

(ii) $x(t) = \cos(t+\pi/2)$

12. (a) Explain the properties of convolution.

Or

(b) For the system y(t)=(cos4t)x(t), determine whether the system is linear, casual, stable, time variant and static.

13. (a) Explain about trigonometric Fourier Series in detail.

Or

(b) Explain the frequency domain representation of a sinusoidal signal.

14. (a) Explain the properties of Fourier Transform.

Or

(b) Explain Fourier transform for periodic signal with an example.

15. (a) Write notes on the region of convergence of LT.

Or

(b) Define LT and derive an expression for LT.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the classification of continuous time signals in detail.

17. Discuss the differential equation representation for LTI systems and its solution with an example.

18. Explain the properties of continuous time Fourier series.

19. Give an analysis of LTI continuous time system using Fourier Transform.

20. Discuss about the time convolution property of the Laplace transform in detail.

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F–5412	Sub. Code
	7MEL2C1

M.Sc. DEGREE EXAMINATION, APRIL 2021 &

Supplementary/Improvement/Arrear Examinations

Second Semester

Electronics

DISCRETE TIME SYSTEMS AND SIGNAL PROCESSING

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. State sampling theorem and explain.

2. What are energy and power signals?

3. Define Z- transform.

4. List any four properties of Discrete Fourier transform.

5. What is the need for multirate signal processing?

6. Define quantization.

7. How many multiplications and additions are required to compute N-point DFT using radix-2 FFT?

8. How we can calculate IDFT using FFT algorithm?

9. What is filter?

10. How phase distortion and delay distortion are introduced?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain about exponential and impulse sequence with example.

Or

(b) (i) Compare and contrast between FIR and IIR system.

(ii) Determine the system $h(n) = b^n u(n)$.

12. (a) Give the properties of discrete time Fourier series.

Or

(b) Explain pole-zero description of discrete time systems.

13. (a) Explain the frequency domain representation of sampling with an example.

Or

(b) Write notes on reconstruction of a band limited signal from its sample.

14. (a) Compute linear convolution of the two sequences $x_1(n) = \{1,1,2,2\}$ and $x_2(n) = \{1,2,3,4\}$ using DFT and IDFT.

Or

(b) Explain about Fast Fourier transform with an example.

15. (a) Compare and contrast between FIR and IIR filter.

Or

(b) Write a brief note on linear phase FIR low pass filter.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss about the basic operations on Discrete time signals with examples.

17. What is inverse system? If a LTI system is described by the difference equation

$$y(n) - y(n-1) + \frac{1}{4}y(n-2) = x(n) + \frac{1}{5}x(n-1) - \frac{1}{6}x(n-2).$$

Find the transverse function of the inverse system.

18. Describe about discrete time processing of continuous time signals with example.

19. Explain in detail about the implementation of DFT using convolution.

20. Describe the Kaiser Window filter design method with an example.

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F–5413

Sub. Code
7MEL2C2

M.Sc. DEGREE EXAMINATION, APRIL 2021 &

Supplementary/Improvement/Arrear Examinations

Second Semester

Electronics

VLSI DESIGN

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Give the different types of CMOS process.

2. Define Tunneling.

3. What is a logical effort?

4. Define the Miller coupling factor (MCF).

5. Define Cascode Voltage Switch Logic (CVSL).

6. What is Klass Semidynamic Flip-flop (SDFF)?

7. Define test benches.

8. What is Ad hoc testing?

9. Define entity.

10. What is the MIPS processor?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain briefly about Current-Voltage characteristics of MOS subsystem.

Or

(b) Discuss briefly technology-related CAD issues.

12. (a) Write a short note on switch-level RC delay models.

Or

(b) Explain the transistor scaling in the MOS device.

13. (a) Explain briefly the low power logic design.

Or

(b) Illustrate the concept of synchronizers.

14. (a) Discuss the test program with an example.

Or

(b) Describe the scan-design strategy for testing.

15. (a) Distinguish conditional signal assignment statement and selected signal assignment statement in VHDL.

Or

(b) Write a VHDL program for flip-flops.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain briefly about the DC characteristics of CMOS inverter.

17. Explain the static and dynamic power dissipations in CMOS circuits.

18. Draw and explain the operation of conventional CMOS latches and flip-flops.

19. Explain the boundary scan architecture in detail.

20. What do you mean by structural gate level modeling in VHDL? Explain with example.

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F–5415	Sub. Code
	7MELE2B

M.Sc. DEGREE EXAMINATION, APRIL 2021 &

Supplementary/Improvement/Arrear Examinations

Second Semester

Electronics

Elective: WIRELESS COMMUNICATION

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Why did the paging transmitters locate on tall buildings?
2. Draw the block diagram of a cellular system.
3. What is co-channel reuse ratio?
4. Give the classification of channel assignment strategy and explain.
5. What are fading models?
6. Define EIRP.
7. Name the types of small scale fading.
8. Consider a transmitter which radiates a sinusoidal carrier frequency of 2000MHz. For a vehicle moving 80mph, compute the received carrier frequency if the mobile is moving directly toward the transmitter.
9. What is CDMA?
10. What is hybrid spread spectrum technique?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) How does a received interference impact end user performance on a WLAN network? Explain.

Or

(b) Write a note on WLL and LMDS.

12. (a) Explain the handoff strategy with an illustration.

Or

(b) If a signal to interference ratio of 15dB is required for satisfactory forward channel performance of a cellular system, what is the frequency value factor and cluster size that should be used for maximum capacity of the path loss exponent is (i) n = 4, (ii) n = 3? Assume that there are six co-channel cells in the I tier and all of them are at the same distance from the mobile.

13. (a) Obtain the relationship between electric field and received power.

Or

(b) Calculate the mean path loss using Okumara's model for $d = 50km$, $h_{fe} = 100m$, $h_{re} = 10m$ in a suburban development. If the base station transmitter radiates an EIRP of 1kW at a carrier frequency of 900MHz. Find EIRP (dBm) and the power at the receiver where gain at receiving antenna is 10dB.

14. (a) Explain the effects of multipath propagation in the radio channel.

Or

(b) Write a note on fading effects due to Doppler spread.

15. (a) Write a note on packet radio.

Or

(b) Briefly explain on capacity of cellular CDMA.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe about 2G cellular networks in detail.

17. Write an essay on channel planning for wireless systems.

18. Describe the ground reflection model of propagation mechanism.

19. Discuss about the statistical models for multipath fading channel.

20. Discuss about pure ALOHA and slotted ALOHA in detail.

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F–5418	Sub. Code 7MELE3B

M.Sc. DEGREE EXAMINATION, APRIL 2021 &

Supplementary/Improvement/Arrear Examinations

Second Semester

Electronics

Elective – MOBILE SATELLITE COMMUNICATIONS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Orbit.
2. What do you mean by mobile systems?
3. Define prograde orbit.
4. What are disturbance forces that affect geostationary orbit?
5. What are the requirements of MSS?
6. What are commonly used methods for multiple access?
7. What are Low Earth Orbiting (LEO) satellites?
8. What do you mean by GMR?
9. What are the satellite mobile services?
10. What is the DVB-SH system?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the terrestrial systems.

Or

(b) Briefly discuss the M-VSAT systems.

12. (a) Write short note on the satellite coverage.

Or

(b) Explain the availability considerations for non-geostationary satellites.

13. (a) Explain the spectrum forecast methodology.

Or

(b) Write a note on Trellis-coded modulation.

14. (a) Why high power amplifiers are necessary for an earth station? What are its characteristics?

Or

(b) Describe briefly the DVB-S2/RCS+M standard.

15. (a) List out the requirements of mobile broadcast systems.

Or

(b) Explain the multimedia broadcast and multicast services (MBMS).

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the satellite system architecture in detail.

17. Explain in detail the polar and hybrid satellite constellations.

18. Discuss in detail the coded orthogonal frequency division multiplexing modulation systems.

19. Give the block diagram of a satellite transponder and explain its operation.

20. Describe the architecture of mobile satellite receiver with suitable diagram.

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