F–8487	Sub. Code
	7MEL2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

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** the questions.

1. Define Discrete Time Signal.

2. What is power signal?

3. Define Fourier Transform of a sequence.

4. What is meant by region of convergence?

5. State sampling theorem.

6. What is frequency-domain?

7. What is the main advantage of FFT?

8. What is twiddle factor?

9. What are the techniques of designing FIR filters?

10. What is an IIR filter?

Part B (5 × 5 = 25)

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

11. (a) Classify the Discrete Time Signal.

Or

(b) Classify the DT LTI System.

12. (a) Explain any four property of Discrete time Fourier series.

Or

(b) Explain any four property of Discrete time Fourier Transform.

13. (a) Explain the periodic sampling.

Or

(b) Explain the discrete time processing of continuous time signal.

14. (a) Explain the any four properties of discrete Fourier transform.

Or

(b) Perform the linear convolution of the two sequences $X_1(n)=(1,1,2,2)$ and $X_2(n)=(1,2,3,4)$.

15. (a) Discuss the linear phase FIR low pass Filter.

Or

(b) Explain the design procedure of IIR filter.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe the basic operation of system with example.

17. Determine the Z-Transform of the discrete time signals.

$$x(n)=[-\frac{1}{5}]^n\, u(n)+5[\frac{1}{2}]^{-n}\, u(-n-1)$$

18. Explain the frequency domain representation of sampling.

19. Determine the 8 point DFT of the sequence X(n) ={1,1,1,1,1,1,0,0}

20. Discuss the Kaiser window filter design method.

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F–8488	Sub. Code
	7MEL2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

Second Semester

Electronics

VLSI DESIGN

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is the channel length modulation effect?
2. Define n-well process.
3. Define the logical effort of a gate.
4. What is Dynamic Voltage Scaling (DVS)?
5. What is cascade voltage switch logic?
6. Define Arbiters.
7. What are the three main categories of testing?
8. What is Ad Hoc testing?
9. Define zero delay control.
10. Define resistive switches (RMOS).

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Describe the basic structure of a MOS transistor.

Or

(b) Explain the design rules of the CMOS layout.

12. (a) Discuss the static power dissipation in CMOS circuits.

Or

(b) Determine the skin depth for copper wire in a chip with 25ps edge rates.

13. (a) Explain the skewed gates with diagrams.

Or

(b) Write short notes on Klass Semi-dynamic Flip-Flop (SDFF).

14. (a) Describe the test programs.

Or

(b) Explain the principles of logic verification.

15. (a) Write an HDL description of the NAND latch using gate level modeling.

Or

(b) Discuss the VHDL operators.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the DC transfer characteristics of CMOS inverter.

17. Explain the RC delay model for transistors in detail.

18. With a suitable diagram describe the synchronizer.

19. Explain in detail the Built-In Self-Test (BIST).

20. Write a VHDL code of a D-latch using behavioral model.

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F–8489	Sub. Code
	7MEL2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

Second Semester

Electronics

AVR MICROCONTROLLER AND EMBEDDED SYSTEM

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What are the three categories of AVR microcontrollers?
2. What is the function of ROL instruction?
3. Define unions in C.
4. What is the use of AVR fuse bits?
5. Name the sources of AVR interrupts.
6. How to choose PWM mode in AVR timers?
7. Find the value of the baud rate register if Fosc=8 MHz and required baud rate=9600 bps.
8. Define TWI in AVR.
9. If DDRB register having '0b00001111', what about the direction of port pins?
10. What is a stepper motor?

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Describe the format of status register in AVR microcontroller.

Or

(b) List the branch instructions of the AVR microcontroller and describe them.

12. (a) Explain the pointers in C with an example.

Or

(b) Explain the three registers associated with I/O ports in ATmega32 Microcontroller.

13. (a) Write notes on interrupt priority in AVR Microcontroller.

Or

(b) Describe the PWM modes in AVR timers.

14. (a) Draw and explain the connection of ATmega32 Microcontroller with MAX232.

Or

(b) Write short notes on the I2C bus protocol.

15. (a) Write the C program to interface LCD with AVR microcontroller.

Or

(b) Draw the typical circuit to interface MAX7221 7-segment driver with AVR microcontroller.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the architecture of AVR Microcontroller with a neat diagram.

17. Explain the following:

    (a) Structures in C (b) Memory allocation in C

18. Discuss in detail the block diagram of AVR Timer 1 and write the C programming to create 100ms time delay.

19. Explain how to interface two ATmega32 microcontrollers using SPI protocol.

20. Describe the interfacing of real-time clock RTC DS1307 with AVR ATmega32 with a neat diagram.

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F–8491	Sub. Code
	7MEL3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

Third Semester

Electronics

DIGITAL SIGNAL PROCESSOR PROGRAMMING AND APPLICATIONS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define digital filters.
2. What is quantization?
3. Define the SHARC processor.
4. What are the two methods to increase the speed of operation in the DSP system?
5. What is memory mapped registers?
6. Define code composer studio.
7. Define wait states.
8. What is the operation of DMA?
9. How is the unvoiced sound produced?
10. Define CODEC.

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Calculate the dynamic range and precision of the 16-bit single precision fixed-point number.

Or

(b) Explain the frequency response of the compensation FIR filter.

12. (a) Explain the typical bus architecture in a DSP system.

Or

(b) Write short notes on pipelining.

13. (a) List the features of TMS320C54xx.

Or

(b) Discuss DSP development tools.

14. (a) Explain the memory space organization.

Or

(b) Describe the parallel I/O interacting.

15. (a) Explain the speech production model with a diagram.

Or

(b) Discuss the design of a position control system for the hard disk drive.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the sources of errors in DSP implementation.

17. Explain the computational building blocks of DSP devices with a neat diagram.

18. With a suitable diagram describe the architecture of TMS320C54xx.

19. Explain in detail the synchronous serial interface.

20. Describe the DSP-based electric power meter.

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F–8492	Sub. Code
	7MEL3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

Third Semester

Electronics

ARM MICROCONTROLLER AND EMBEDDED SYSTEM

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is an ARM processor?
2. How to configure the P0.0 for the PWM 1 output?
3. Define PLL.
4. What are the three registers of pin connect block?
5. What is VIC in ARM7 CPU?
6. Define USB.
7. What are the two modes of 12C?
8. Define the SD memory card.
9. What are the types of seven segment display?
10. Write the function of LM35.

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) List the key features of LPC2148.

Or

(b) Write a note on on-chip flash memory.

12. (a) Explain the typical bus architecture in a DSP system.

Or

(b) Write short notes on pipelining.

13. (a) Write a delay program using Timer 0 in LPC2148.

Or

(b) Discuss RS485 with a diagram.

14. (a) Explain the interfacing of serial EEPROM 25LC040 with LPC2148.

Or

(b) Write the steps for PWM generation in LPC2148.

15. (a) Explain the interfacing of a relay with LPC2148.

Or

(b) List the features of 10-bit ADC.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the block diagram of LPC2148.

17. Explain the on-chip memory mapping control logic in detail.

18. With a suitable diagram describe the serial communication in LPC2148.

19. Explain in detail the I2C bus serial I/O controller.

20. Draw and explain the interfacing of stepper motor with LPC2148.

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F–8493	Sub. Code
	7MEL3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

Third Semester

Electronics

DIGITAL IMAGE PROCESSING

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is a pixel in an image?
2. Give the properties of one-dimensional DFT.
3. Write the expression for image average.
4. What is Pseudo color image?
5. What do you understand by image compression?
6. Define neural networks.
7. What is the Laplacian mask?
8. What is a texture?
9. What are the ways to estimate the degradation function for the image restoration?
10. List the application of constrained least square estimation to image restoration.

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Explain how to represent an image.

Or

(b) Write the properties of Hadamard transform.

12. (a) Write a note on gray level slicing.

Or

(b) Explain the filter approach used for color image processing.

13. (a) Distinguish between lossy and lossless compression techniques.

Or

(b) Explain the process of vector quantization.

14. (a) Discuss the concept of line detection.

Or

(b) Explain the topological descriptors.

15. (a) Explain the degradation model for continuous functions.

Or

(b) Describe the interactive image restoration.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. With a neat block diagram, explain the various steps involved in digital image processing.

17. Describe the various spatial domain filter approaches for image enhancement.

18. Draw the standard image compression model and explain the functions of each block.

19. Explain the region-orientated segmentation in detail.

20. Explain the Wiener filter algorithm for image restoration.

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F–8494	Sub. Code
	7MELE4A

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

Third Semester

Electronics

Elective: BIOMETRIC SYSTEM

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define biometrics.
2. What are the errors may occur in a biometric system?
3. What is face recognition?
4. List the advantages of face biometrics.
5. Define Retina.
6. What are the applications of Iris biometrics?
7. Define histogram equalization.
8. What are the disadvantages of fingerprint biometrics?
9. Define information security.
10. What is the use of smart card technology?

Part B (5 × 5 = 25)

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

11. (a) Explain the basic operation of biometric matching.

Or

(b) Discuss the benefits of biometrics.

12. (a) Illustrate the concept of neural network.

Or

(b) What are the challenges in face biometrics? Explain.

13. (a) Describe the Image acquisition in the Iris recognition system.

Or

(b) Explain the experimental results of Iris localization.

14. (a) Explain the fingerprint image enhancement using Fourier transform.

Or

(b) Discuss the fingerprint indexing.

15. (a) Describe the API of the AADHAAR Scheme.

Or

(b) Discuss the biometrics in border security.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the general architecture of the biometric system with a neat diagram.

17. With a neat diagram explain the design of the face recognition system.

18. Explain the Canny edge detection and k-means clustering algorithm of Iris segmentation.

19. Explain the Minutiae extraction in detail.

20. Describe in detail the digital standard development organizations.

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F–8497	Sub. Code
	7MELE5A

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

Third Semester

Electronics

Elective: NETWORKING TECHNOLOGY

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is meant by MAN?
2. List out the features of Hubs.
3. Describe the functions of Token ring.
4. What is DQDB?
5. Mention the functions of Internet Protocol.
6. What is an intelligent network?
7. List out the features of ATM.
8. Give the advantages of wireless networks.
9. What is WDM in optical network?
10. Distinguish between circuit switching and packet switching.

Part B (5 × 5 = 25)

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

11. (a) List out the uses of Internet.

Or

(b) Briefly explain communication protocol and standards.

12. (a) Write a short note on Token ring - 802.5.

Or

(b) Explain about SMDS.

13. (a) Discuss Internet Protocol in briefly .

Or

(b) Give the details about DSL.

14. (a) Discuss signaling in ATM

Or

(b) Explain channel access in wireless networks.

15. (a) Discuss optical LAN's.

Or

(b) Explain Packet switches.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain (a) Bridges (b) Routers.

17. Explain in detail about TCP/IP protocol.

18. Discuss CATV architecture in detail.

19. Explain network design and wireless networks.

20. Discuss Optical links and WDM systems.

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