S–4066

Sub. Code
23MEL1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Electronics

EMBEDDED SYSTEMS DESIGN WITH PIC

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. What is the purpose of 8-bit register PCL in program counter?

2. Recall the PIC 18 devices will provide program memory sizes is starts from _____ to _____ Kbytes.

3. Define the reading registers in PIC microcontroller.

4. What does the availability of LCD in 16×2 typical value indicate?

5. Which bit range is used for analog channel select bit for ADC control register?

6. What is the basic idea to generate PWM signal in microcontroller?

7. Find out the count needed for a delay of 1 ms with $0.5\,\mu$s of time period.

8. What are the steps involved programming for PIC18F timer?

9. What is the 12c communication protocol?

10. How to connect GSM module to PIC microcontroller?

Part B $(5 \times 5 = 25)$

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

11. (a) Classify the PIC microcontroller types.

Or

(b) State and express the embedded C variables.

12. (a) Categorize the PIC port B functions.

Or

(b) Manipulate the program for 16 × 2 LCD interface with PIC.

13. (a) Elucidate operation of built-in DAC modules.

Or

(b) Deliberate in detail about the PWM for DC motor speed control.

14. (a) Draw the block diagram and explain the Timer-4 module.

Or

(b) Illustrate the function of counter programming for PIC microcontroller.

15. (a) Evaluate the use of UART interrupt of PIC.

Or

(b) In what way to help the serial communication using PIC?

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

Answer any **three** questions.

16. Show the syntax for array and user defined functions and elucidate it.

17. Draw circuit diagram for stepper motor interface with PIC.

18. Discuss about the IC18F4550 microcontroller ADC programming.

19. Briefly explain the function of clock source in PIC microcontroller timers.

20. Deliberate in detail about the working principle of Bluetooth interfacing.

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S–4067	Sub. Code
	23MEL1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Electronics

DIGITAL COMMUNICATION SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Hartley theory of communication?

2. State the Shannon law.

3. In order delta modulation, the slope overload distortion can be minimized by ———————— step sizes.

4. What are the difference between unipolar NRZ and polar NRZ?

5. Give one example for baseband signals.

6. What are the advantages of matched filter?

7. Define signal space of representation of signals.

8. List out the BPSK receiver four section.

9. Expression for channel coding theorem formula.

10. What type of decoding is used for Viterbi algorithm?

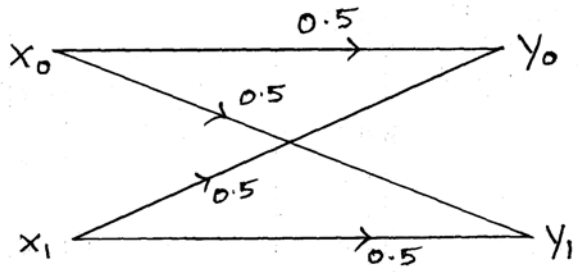
Part B (5 × 5 = 25)

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

11. (a) A discrete memoryless source produces 3 independent symbols with probabilities 1/2,1/4 and 1/4. Find out the entropy of the 4th order extension.

Or

(b) The binary symmetric channel transition probability is shown in given figure. And what is the channel capacity?



12. (a) Draw and explain the functional block diagram of ADM transmitter.

Or

(b) Explain the working principles of bipolar NRZ coding with pulse waveform.

13. (a) What is another name of correlative coding? And describe it.

Or

(b) Explain the characteristics of adaptive equalization two modes.

14. (a) Describe the digital modulation schemes and its applications.

Or

(b) Draw the BFSK and QPSK wave form representation.

15. (a) Describe the function of linear block codes.

Or

(b) Explain the property of right cyclic Shift with example.

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

Answer any **three** questions.

16. State the source coding theorem and proof for symbol codes methods.

17. Why need of line coding? and analyze the six types of properties.

18. Briefly explain the inter symbol interference mathematical expression for Nyquist first method.

19. Draw the functional block diagram for non-coherent receivers.

20. Explain the hamming codes and encode the decimal value of 12 (binary 1100) it can be expressed as chart.

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S–4068	Sub. Code
	23MEL1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Electronics

Elective : DIGITAL SIGNAL PROCESSING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. List the applications of digital signal processing.

2. Classify the discrete time signals.

3. Find the DFT of $x(n) = \{1, 1, 1, 1\}$.

4. Express the term radix-2 inverse FFT?

5. Define z-transform.

6. What is ROC in z-transform?

7. Write the magnitude response of Chebyshev low pass filter.

8. What are the advantages of FIR filter?

9. Define adaptive filter.

10. State the advantages of LMS adaptive algorithm.

Part B (5 × 5 = 25)

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

11. (a) Explain the sampling theorem.

Or

(b) Classify the various types of signals.

12. (a) List the difference between linear convolution and circular convolution.

Or

(b) Explain the importance of power and energy spectral density.

13. (a) Write the z-transform of the sequence $x(n)=[3, 8, 2, 1, -1, 4]$.

Or

(b) Explain the properties of z-transform.

14. (a) Explain the impulse invariant method of designing IIR filter.

Or

(b) Explain the steps involved in FIR filter design using windows.

15. (a) Compare adaptive filter in system identification and noise cancellation.

Or

(b) Discuss the function of computing the coefficients of an adaptive filter.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. How are DT LTI systems classified? Explain each system with suitable example.

17. Find the linear convolution sequence x(n) and h(n) using DFT x(n) = {–1, 1, 2, –2} h(n) = {0.5, 1 ,–1 , 2, 0.75}

18. Explain the elements of a digital filter and its importance.

19. Explain design procedure of Chebyshev and Butterworth IIR filter.

20. Discuss steepest descent algorithm used in adaptive filtering.

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S–4070

Sub. Code
23MEL1E3

M.Sc., DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Electronics

Elective: FUNDAMENTALS OF PYTHON PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** the questions

1. List out the applications of python?
2. Write about python numbers?
3. What is linked list.
4. How to create a tuple python.
5. Write a note on python order set operations.
6. What is python dictionary?
7. List out the advantages of while loop statement.
8. What is lambda function?
9. Write a note on object in python.
10. Define the term inheritance.

Part B (5 × 5 = 25)

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

11. (a) Explain about python IDE.

Or

(b) Describe the methods of file handling.

12. (a) State the function of linked list in python.

Or

(b) Explain the python List functions and methods.

13. (a) Write a detailed note on python order set.

Or

(b) Discuss about sort dictionary by value in python.

14. (a) Write a note on break statement.

Or

(b) Explain about 2-D arrays in python.

15. (a) Write a note on python concrete class.

Or

(b) Describe about python partial class.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the python file handling procedures with examples.

17. Discuss the indexing of tuples in python and write its demerits.

18. What is set in python? Compare set and list in python.

19. Explain the various main function in python? And write its advantages.

20. Explain about python polymorphism with examples.

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S–4074	Sub. Code
	23MEL2E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Electronics

Elective: DIGITAL SIGNAL PROCESSOR PROGRAMMING AND APPLICATIONS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. Recall the fixed-point format.
2. Indicate the role of DSP computational errors.
3. Recognize the meaning of the program control.
4. State parallelism.
5. Memorize about internal memory.
6. Review the process of the pipeline.
7. Observe the concept of a parallel I/O interface.
8. Tell about the sources in McBSP.
9. List out eh useful types of files.
10. Recite in detail about C/C^{++} compiler.

Part B $(5 \times 5 = 25)$

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

11. (a) Discuss an overview of the double precision fixed-point format.

Or

(b) Generalize the process of compensating filter.

12. (a) Write a short note on bus architecture and memory.

Or

(b) Observe the concepts in hardware architecture.

13. (a) Connect and explain the operation of the bus structure.

Or

(b) Infer the characteristics of memory space organization

14. (a) Estimate the function of interrupts and I/O.

Or

(b) Describe the operation of CODEC.

15. (a) Show the principles of DSP support tools.

Or

(b) Examine the principles of the linker and memory allocation.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Differentiate the functions of the sources of error in DSP implementation.

17. Infer in detail about the purpose of the address generation unit.

18. Focus on the main categories of external bus interfacing signals.

19. Organize the operation of the timing sequence for external memory access.

20. Judge the working function of the DSP system design kit.

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S–4079	Sub. Code
	23MEL3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Electronics

EMBEDDED SYSTEM DESIGN WITH ARM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A ($10 \times 2 = 20$)

Answer **all** questions

1. Name two applications of ARM processors.
2. Define the function of On-Chip Flash Program Memory.
3. What is the purpose of the crystal oscillator in a micro controller?
4. Define the function of the PLL in the system control.
5. Define an external event counter.
6. What are interrupts, and why are they important in micro controllers?
7. Define Pulse Width Modulation (PWM).
8. What is the function of a watchdog timer in micro controllers?
9. What is a seven-segment display, and where is it used?
10. What is the role of the LM3S temperature sensor in embedded systems?

Part B (5 × 5 = 25)

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

11. (a) Discuss the importance of On-Chip Flash Program Memory.

Or

(b) Compare the ARM7 micro controller with other ARM processor families.

12. (a) Describe the function and importance of GPIO in micro controller operations.

Or

(b) Explain the function of the crystal oscillator and PLL in micro controller timing.

13. (a) Compare and contrast RS232 and RS485 in terms of their use in serial communication.

Or

(b) Describe the process of serial communication using UART in the LPC2148 micro controller.

14. (a) Describe the function and importance of the watchdog timer in micro controller operation.

Or

(b) Explain the process of interfacing an SD memory card with the LPC2148 micro controller using SPI mode.

15. (a) Describe the operation and interfacing of a stepper motor with the LPC2148 micro controller.

Or

(b) Illustrate the process of digital-to-analog conversion using a DAC in micro controller applications.

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

Answer any **three** questions.

16. Discuss the importance of ARM micro controllers in modern electronics and compare the LPC2148 with other ARM micro controllers in terms of performance and applications.

17. Explain in detail the memory mapping process in LPC2148 micro controller.

18. Discuss the architecture and functioning of serial communication interfaces in micro controllers

19. Discuss the process and challenges of interfacing external memory cards with LPC2148 micro controller.

20. Discuss the operation and interfacing techniques for controlling stepper motors using a micro controller.

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S–4080	Sub. Code
	23MEL3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Electronics

MOBILE SATELLITE COMMUNICATION SYSTEM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define a terrestrial system in mobile telecommunications.
2. What is a satellite system?
3. What is a satellite orbit?
4. Define orbital mechanics in the context of satellites.
5. Define the land mobile channel.
6. What is modulation in the context of radio communication?
7. What is a fixed earth station?
8. Define a gateway in satellite communication.
9. What are the requirements for a mobile broadcast system?
10. Define service requirements in mobile satellite broadcast systems.

Part B (5 × 5 = 25)

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

11. (a) Describe the satellite system architecture and its components.

Or

(b) Discuss the importance of mobility management in mobile telecommunications.

12. (a) Describe the considerations in designing satellite constellations.

Or

(b) Explain the effects of the sun's interference on satellite communication.

13. (a) Discuss the performance comparison of conventional digital modulation schemes.

Or

(b) Explain the role of COFDM in satellite communication.

14. (a) Discuss the effect of orbital characteristics on spacecraft design.

Or

(b) Explain the role of the satellite radio interface standards.

15. (a) Discuss the prevalent transmission systems used in mobile satellite broadcasting.

Or

(b) Explain the role of the space segment in mobile satellite broadcast systems.

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

Answer any **three** questions.

16. Explain the architecture and functions of the satellite system.

17. Discuss the impact of orbital mechanics and the space environment on satellite operations.

18. Describe the role of coding and multiple access schemes in ensuring reliable communication in mobile satellite systems.

19. Discuss the standards and frequency bands used in mobile satellite systems, including their impact on system performance.

20. Explain the architecture of the DVB-SH system, including its role in multimedia broadcast and multicast services.

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S–4081

Sub. Code
23MEL3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Electronics

DIGITAL IMAGE PROCESSING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define a digital image.
2. What is digital image processing?
3. Define image smoothing.
4. What is a mean filter?
5. What is image segmentation?
6. What is a region growing in segmentation?
7. What is edge detection in image processing?
8. Define the first-order derivative in edge detection.
9. Define inter-pixel redundancy.
10. What is the role of a source encoder in image compression?

Part B (5 × 5 = 25)

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

11. (a) Describe the components of a digital image processing system.

Or

(b) Explain the process of image digitization, including sampling and quantization.

12. (a) Compare and contrast the mean filter and Gaussian blur filter.

Or

(b) Discuss the role of high pass filters in image sharpening.

13. (a) Compare intensity-based segmentation and region-based segmentation.

Or

(b) Explain the process of optimal thresholding in image segmentation.

14. (a) Compare the first-order and second-order derivatives used in edge detection.

Or

(b) Explain the steps involved in the Canny edge detection algorithm.

15. (a) Explain the concept of coding redundancy and how it is reduced in image compression.

Or

(b) Describe the Huffman coding process and its application in image compression.

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

Answer any **three** questions.

16. Explain in detail the process of image acquisition and digitization.

17. Explain in detail the various image smoothing techniques.

18. Discuss in detail the techniques used for image segmentation

19. Explain The edge detection techniques, focusing on first-order and second-order derivative methods,

20. Explain the process of JPEG Compression and its importance in digital image processing.

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S–4082

Sub. Code
23MEL3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Electronics

Elective – INTERNET OF THINGS WITH RASPBERRY PI

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions

1. What is meant by IoT Levels?
2. What is YANG in IoT?
3. What is a domain model in IoT?
4. What is the communication model in IoT?
5. What is IEEE 802.15.4?
6. What is Zigbee?
7. What is IoT System Management?
8. What are terminal commands in Raspberry Pi?
9. What is the role of a Pi camera?
10. What is a smart motion detector?

Part B (5 × 5 = 25)

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

11. (a) Discuss any two IoT enabling technologies.

Or

(b) Compare IoT and M2M.

12. (a) Explain the IETF architecture for IoT.

Or

(b) What are the components of the IoT reference model?

13. (a) Explain the significance of SCADA protocols in IoT.

Or

(b) Compare Modbus and BACnet protocols.

14. (a) Describe the design methodology for IoT systems.

Or

(b) What is the role of IoT Servers in IoT System Management?

15. (a) Describe the role of digital and analog sensors in IoT.

Or

(b) Explain how face recognition can be implemented using Raspberry Pi.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain how IoT system management is carried out using NETCONF and YANG.

17. Discuss the IoT reference architecture in detail.

18. Explain the network layer and its significance in 6LoWPAN.

19. Discuss the design methodology and challenges in IoT Design.

20. Explain the working of a smart motion detector using Raspberry Pi.

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S–4085

Sub. Code
23MEL3S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Electronics

RESEARCH METHODOLOGY FOR SCIENTIFIC RESEARCH

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. Define “empiricism”.
2. What is a scientific statement?
3. What is research reliability?
4. What is bias in research?
5. Define “error analysis”.
6. What is hypothesis testing?
7. What is a conference proceeding?
8. What is the role of a literature review in research?
9. What is proofreading?
10. What are end matters in a thesis?

Part B (5 × 5 = 25)

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

11. (a) Describe the qualities of a good researcher.

Or

(b) Compare and contrast scientific realism and empiricism.

12. (a) What are the implications of artifact in research data?

Or

(b) Describe the relationship between research validity and reliability.

13. (a) How is data processed and analyzed in research?

Or

(b) Describe the importance of error analysis in scientific research.

14. (a) Brief the key components of a scientific paper.

Or

(b) Explain the importance of workshops in research development.

15. (a) Brief the key components of a bibliography.

Or

(b) Explain the significance of figures and tables in a thesis.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Analyze the relationship between scientific attitudes and the success of research.

17. Evaluate the importance of planning in the success of a research project.

18. Analyze the role of hypothesis testing in scientific research.

19. Describe the impact of citation indices on a researcher's work.

20. Evaluate the role of editing and proofreading in ensuring the quality of a thesis.

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