S–1124

Sub. Code
23MEL1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Electronics

Core Course 1 – EMBEDDED SYSTEMS DESIGN WITH PIC

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write about file register.
2. What is the advantages of array in C?
3. Write a note on reading registers of PIC.
4. Write about the advantages of LED over LCD.
5. What is PWM?
6. List out the ADC registers.
7. Compare timer and counter.
8. Define code generator.
9. Write the use of SPI module.
10. Write the application of 12C communication.

Part B (5 × 5 = 25)

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

11. (a) Explain the PIC 18 status register with diagrams.

Or

(b) Describe the flash program memory in detail.

12. (a) Write about parallel ports and its advantages.

Or

(b) Explain about LCD interfacing with PIC.

13. (a) Describe the PIC 18F ADC module.

Or

(b) With diagrams explain about PWM DC motor speed control.

14. (a) Write the detailed note on the various timers of PIC microcontroller.

Or

(b) Discuss the PIC 18 external hardware interrupts.

15. (a) Write a detailed note on UART and its uses.

Or

(b) Explain PIC Bluetooth module with diagrams.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. With examples, Describe the condition and looping statements in embedded C.

17. Discuss the 7 —segment display interfacing with PIC.

18. With neat sketch, write about PWM duty cycles and its applications.

19. Design a timer program for 2 Sec delay calculation for PIC.

20. Discuss the USB interfacing with PIC.

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S–1125

Sub. Code
23MEL1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Electronics

DIGITAL COMMUNICATION SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write a note on channel capacity.

2. Write the advantages of Hartley oscillator.

3. Show the DPCM.

4. Write the use of SHANNON theorem.

5. List out the application of Nyquist criterion.

6. Define the term eye pattern.

7. Compare the pulse shaping circuit with PWM.

8. Write a note on carrier synchronization.

9. List out the applications of channel coding.

10. Define the term 'convolutional codes'?

Part B (5 × 5 = 25)

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

11. (a) Discuss about digital communication system.

Or

(b) Show and explain fano and Huffman codes.

12. (a) Write a note on ADPCM principles.

Or

(b) Design a bipolar NRZ representation with examples.

13. (a) Derive the term correlative coding in detail.

Or

(b) Explain about adaptive equalization and write its advantages.

14. (a) Explain about QPSK.

Or

(b) Describe the term QDPSK.

15. (a) Write a note on linear block codes and its uses.

Or

(b) Explain the Viterbi codes and its advantages.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Illustrate the discrete memory less source and mutual Information.

17. Discuss the DM and ADM and compare it.

18. Design pulse shaping and matched filters and compare it.

19. Compare the BPSK, BFSK and QPSK.

20. Illustrate the cyclic codes and Hamming codes with examples.

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S–1126	Sub. Code 23MEL1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Electronics

Elective – DIGITAL SIGNAL PROCESSING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. List the applications of digital signal processing.

2. What is meant by periodic and aperiodic signals?

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

4. What is a decimation in time algorithm?

5. Define z-transform.

6. Write the methods to find inverse z-transform.

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

8. Write the generic equation for IIR filter.

9. Define adaptive filter.

10. List the significance of adaptive filter in signal processing.

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 discrete time signals.

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

Or

(b) State and prove any 4 properties of DFT.

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

Or

(b) Discuss the properties of z-transform.

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

Or

(b) Outline design procedure of Butterworth IIR filter.

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

Or

(b) Discuss the function of LMS adaptive algorithm.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. How signals are classified? Explain each type of signal 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–1128

Sub. Code
23MEL1E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Electronics

Elective – FUNDAMENTALS OF PYTHON PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write the features of python.
2. List out the datatypes of python.
3. Define the term linked list.
4. Write about slicing operator in python.
5. Show the order set in python.
6. Define: Dictionary in python.
7. Show the if-else structure in python.
8. Write a note on main function in python.
9. Write the various build in function of python.
10. Compare array and list in python.

Part B (5 × 5 = 25)

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

11. (a) Explain the identifiers in python with examples.

Or

(b) Explain the methods in file handling process in python.

12. (a) Create a python program for indexing of tuples.

Or

(b) Write the steps of list to string in python.

13. (a) Write a program for set operation in python with examples.

Or

(b) Explain about nested dictionary in python with examples.

14. (a) Explain about if-else statement in python with examples.

Or

(b) Write a note on properties of lumbda functions in python.

15. (a) Write a program in python using dynamic array.

Or

(b) Explain the 2D arrays in python with examples.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the assignment statement in python with examples.

17. Design a program for list functions in python.

18. Write and explain a program for set to list in python.

19. Explain the calling function of python with examples.

20. Discuss the array elements in python with examples.

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S–1137

Sub. Code
23MEL3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Electronics

EMBEDDED SYSTEM DESIGN WITH ARM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What does the architectural overview of the LPC2148 include?

2. What is the significance of the block diagram in microcontroller design?

3. Describe the purpose of the Reset and wake-up Timer.

4. What is code security in microcontrollers?

5. What is the role of USB in microcontroller communication?

6. Define the function of the external interrupt.

7. What is the purpose of interfacing a microcontroller with an external memory card?

8. What are the benefits of using SPI for memory card interfacing?

9. Define the function of a relay in microcontroller circuits.

10. What is the purpose of a DAC in digital-to-analog conversion?

Part B (5 × 5 = 25)

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

11. (a) Explain the role and applications of ARM processors in embedded systems.

Or

(b) Describe the key features and benefits of using the LPC2148 ARM7 microcontroller.

12. (a) Explain the process and significance of memory mapping in microcontrollers.

Or

(b) Discuss the role and operation of the Brownout Detector in system control.

13. (a) What is the function of a general-purpose timer in microcontrollers?

Or

(b) Explain the timer AS an external event counter.

14. (a) Explain the operation and applications of the SPI bus in microcontroller interfacing.

Or

(b) Discuss the role of PWM in microcontroller-based control systems, including an example application.

15. (a) Describe the process of interfacing a seven-segment display with a microcontroller.

Or

(b) Discuss the role of optocouplers and relays in microcontroller-based control systems.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the architectural overview of the LPC2148 ARM7 microcontroller.

17. Provide a comprehensive overview of system control components in the LPC2148 microcontroller, including their functions and interactions.

18. Explain the timer operation in the ARM7 microcontroller, including its configuration and applications.

19. Provide a comprehensive explanation of the SPI in microcontrollers

20. Describe the process and challenges of interfacing various digital input and output devices with a microcontroller, with examples.

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S–1138

Sub. Code
23MEL3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Electronics

MOBILE SATELLITE COMMUNICATION SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is the evolution of mobile telecommunications?

2. What is handover in mobile telecommunications?

3. What is satellite coverage?

4. What is a polar constellation?

5. What is Coded Orthogonal Frequency Division Multiplexing (COFDM)?

6. What is trellis-coded modulation (TCM)?

7. What are inter-satellite links?

8. Define frequency bands in satellite communication.

9. What is the space segment in satellite broadcast systems?

10. Define OSI architecture in the context of satellite broadcasting.

Part B (5 × 5 = 25)

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

11. (a) Explain the tolerable delay in data delivery for satellite communications.

Or

(b) Discuss the challenges in radio link reliability in mobile systems.

12. (a) Explain the role of orbital debris in satellite constellations.

Or

(b) Discuss the use of spot beams in satellite constellations.

13. (a) Describe the spread spectrum modulation technique and its applications.

Or

(b) Discuss the importance of multiple access schemes in mobile telecommunications.

14. (a) Describe the satellite component of UMTS/IMT-2000.

Or

(b) Discuss the significance of antennas in hand-held and mobile terminals.

15. (a) Describe the system configuration and its importance in mobile broadcast systems.

Or

(b) Discuss the architecture and components of the DVB-SH system.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the evolution of mobile telecommunications, focusing on the transition from terrestrial systems to satellite systems.

17. Provide a detailed explanation of satellite constellations, including the design considerations and the differences between polar, inclined orbit, and hybrid constellations.

18. Explain the modulation techniques used in mobile satellite systems, including COFDM and spread spectrum modulation.

19. Describe the components and functions of fixed earth stations, user terminals, and spacecraft in mobile satellite systems.

20. Discuss the mobiles satellite broadcast system requirements, including service requirements, system configuration, and transmission technology.

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S–1139

Sub. Code
23MEL3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Electronics

DIGITAL IMAGE PROCESSING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define Digital Image.

2. What is Histogram in a digital image?

3. Define image Enhancement.

4. What are the features of Spatial Filtering'?

5. What are the advantages of Intensity based segmentation?

6. Define Image Thresholding.

7. Define Morphological Image processing.

8. What is Edge Detection?

9. Define inter - pixel Redundancy?

10. What is a Neural Network?

Part B (5 × 5 = 25)

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

11. (a) Describe about Components of Image Processing.

Or

(b) Illustrate about Sampling and Quantization of Digital Images.

12. (a) Describe the functions of Mean filter.

Or

(b) Analyze the functions of Gaussian High pass filter.

13. (a) Explain about Image Thresholding.

Or

(b) Describe about Histogram based features.

14. (a) Describe about First order Derivative Edge detection.

Or

(b) List the fundamental concepts and operations of Morphological image processing.

15. (a) Analyze about image Compression Models.

Or

(b) Examine the method of Huffman Coding.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain about Histogram Equalization methods.

17. Illustrate the function of Butterworth Low pass filter.

18. Describe about Region based Segmentation.

19. Explain the process of Canny Edge detector.

20. Discuss about Lossy image compression techniques.

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S–1140

Sub. Code
23MEL3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Electronics

Elective – INTERNET OF THINGS WITH RASPBERRY PI

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is the advantages of IoT?

2. Write a note on IoT platform.

3. Write the advantages of ETSI architecture.

4. What is M2M?

5. Describe the IEEE802.15.4.

6. Compare SCADA and RFID.

7. Define the term IoT system management.

8. Write the terminal commands of raspberry pi.

9. Write about pi camera.

10. List out the applications of raspberry pi module.

Part B (5 × 5 = 25)

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

11. (a) Explain the IoT levels.

Or

(b) Derive the domain specific IoT with examples.

12. (a) Write the IETF architecture of IoT and write its applications.

Or

(b) Design a IoT reference architecture.

13. (a) Describe the WSN protocol.

Or

(b) Explain about CoAP with diagrams.

14. (a) Write the detailed procedure for choosing a sensor.

Or

(b) Describe the installation procedure for libraries of raspberry pi.

15. (a) Write a detailed note on LCD interfacing with raspberry pi and write its applications.

Or

(b) List out the procedure for uploading image to gmail.com using Raspberry pi.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the physical design of IoT with diagrams.

17. Explain the OGC architecture in IoT.

18. Design a ZigBee architecture with neat sketch.

19. Discuss a program to run a raspberry pi with flow diagrams.

20. Explain the actuator interfacing concepts with raspberry pi with diagrams.

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S–1143

Sub. Code
23MEL3S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Electronics

RESEARCH METHODOLOGY FOR SCIENTIFIC RESEARCH

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. In what ways are scientific activity and scientific temper connected?

2. What are the qualities of a good researcher?

3. How to plan and design research?

4. What is meant by bias in research?

5. What is meant by hypothesis testing?

6. List out the methods of data collection.

7. Define h index.

8. What is meant by conference proceeding?

9. List out the common error in scientific writing.

10. Define end matters in thesis.

Part B (5 × 5 = 25)

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

11. (a) Explain the classical approach in research.

Or

(b) Compare and contrast in empiricism and scientific realism.

12. (a) Generalize the guidelines for skill and awareness on research.

Or

(b) Explain the artifact and bias in research data.

13. (a) Explain the need for data collection in research.

Or

(b) Explain the importance of presentation of data in research.

14. (a) Describe the key components of reading a scientific paper.

Or

(b) Define the role of literature review in research.

15. (a) Generalize the reasons for rejection of the thesis.

Or

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

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. What is meant by scientific attitude? Illustrate the various scientific attitudes.

17. Analyze and list out the criteria for good research.

18. Point out the importance of hypothesis testing in research.

19. Outline the differences between workshops, seminar and conferences.

20. Elaborate the common error in scientific writing. How to avoid the errors?

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