F–6352	Sub. Code
	7MEL1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021

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. Define continuous time signal.

2. What is signal processing?

3. Define System.

4. What is meant by Stable System?

5. What is the relationship between cosine and trigonometric representation?

6. State Fourier series.

7. Define Fourier transform.

8. State time convolution properties of Fourier transform.

9. Define Laplace transform.

10. State final value theorem.

Part B (5 × 5 = 25)

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

11. (a) Explain the periodic and Aperiodic signals.

Or

(b) Determine the signal $x(t) = e^{-3t}u(t)$ is power or energy signal.

12. (a) What are the classification of Systems?

Or

(b) Explain any two properties of Convolution.

13. (a) Describe the Exponential Fourier series.

Or

(b) Explain any two properties of Continuous time Fourier series.

14. (a) Explain any two properties of Fourier transform.

Or

(b) Determine Fourier transform of the signal $x(t) = \sin(\Omega_0 t)$.

15. (a) Determine the Laplace transform of the signal $x(t) = \begin{cases} \sin(\pi t); & 0 < t < 1 \\ 0 & otherwise \end{cases}$

Or

(b) Determine Inverse Laplace transform of $X(s) = \frac{1}{(s+5)(s+1)}$.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the basic operation of Continuous signals.

17. Determine whether the system $y(t)=x(t+1)+x^2(t)$ is time invariant.

18. Determine the Fourier series coefficients for continuous time periodic signal $x(t) = \begin{cases} 1.5 & for\ 0 \le t < 1 \\ -1.5 & for\ 1 \le t < 2 \end{cases}$ with fundamental frequency $\Omega_0 = \pi$.

19. Discuss the Analysis of LTI Continuous Time System using Fourier Transform.

20. Solve the differential equation using Laplace transform,

$$\frac{d^2y(t)}{dt^2}+11\frac{dy(t)}{dt}+24y(t)=5\frac{dx(t)}{dt}+3x(t).$$

———————

F–6353	Sub. Code 7MEL1C4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021

First Semester

Electronics

NANOELECTRONICS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is negative photoresist?
2. Define nanoelectronics.
3. Define semiconductors.
4. What is bandgap in semiconductor?
5. Define epitaxial growth.
6. What is bulk crystal?
7. Describe physical statistics.
8. What is artificial atom?
9. Write short note on LED.
10. What is tunneling effect?

Part B (5 × 5 = 25)

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

11. (a) What is top down and bottom-up approach? Explain.

Or

(b) Elaborate spin and angular momentum.

12. (a) Explain energies of an electron in a crystalline potential.

Or

(b) Explain bonding in crystals.

13. (a) Describe the crystal growth techniques.

Or

(b) Describe single crystal growth process with neat diagram.

14. (a) Explain electrons in quantum well.

Or

(b) Explain bulk materials / crystals.

15. (a) Explain FET.

Or

(b) Describe the operation of tunneling diode.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain electrons in potential well.

17. Explain bonding in crystals.

18. Discuss nanolithiography with suitable diagram.

19. Explain time and length scales of the electrons in solids.

20. Explain cellular automata in detail.

———————

F–6517	Sub. Code
	7MEL3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

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** questions.

1. What is MAC block in the DSP system?

2. Define resolution and precision.

3. What is Harvard architecture?

4. Define parallelism.

5. What is barrel shifter?

6. What is the role of the linker in software development tools?

7. What are the external bus interfacing signals?

8. Why McBSP programming is used for DSP?

9. How is the PPM signal employed for the modulation of ECG signals?

10. Define discrete cosine transform (DCT).

Part B (5 × 5 = 25)

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

11. (a) With the help of a block diagram, describe the basic DSP system.

Or

(b) What are the sources of error in an A/D converter? Explain.

12. (a) Discuss the bus architecture of programmable DSPs.

Or

(b) List the features of external interfacing.

13. (a) Briefly explain the on-chip peripherals in TMS320C54xx.

Or

(b) Discuss the assembler and assembly source file.

14. (a) Explain the memory interface with a neat diagram.

Or

(b) Describe the CODEC interfacing circuit.

15. (a) Discuss the speech processing.

Or

(b) Explain the basic function of the power meter.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the IEEE-754 floating point format with an example.

17. Explain the operation of the following units in programmable DSPs.

    (a) Address generation unit

    (b) Program control unit

18. Explain the architecture of TMS320C54xx DSP.

19. Describe the parallel I/O interface and programming I/O devices in detail.

20. With a block diagram explain the DSP based biotelemetry receiver.

———————

F–6518	Sub. Code
	7MEL3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

Third Semester

Electronics

ARM MICROCONTROLLER AND EMBEDDED SYSTEMS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. List the applications of the ARM processor.

2. Write about on-chip flash memory in LPC2148.

3. What is the function of a wake-up timer?

4. What is VPB?

5. What is the use of the pre-scalar in the timer?

6. Define RS232.

7. What are the signal lines in I2C bus?

8. Define the watchdog timer.

9. Define optocoupler.

10. List the PWM registers in LPC2148.

Part B (5 × 5 = 25)

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

11. (a) Describe the architectural overview of LPC2148.

Or

(b) Write a note about "on-chip static RAM".

12. (a) Explain the clocking ARM with an external crystal oscillator and PLL.

Or

(b) Discuss the power saving modes of the ARM controller.

13. (a) Explain how to program interrupt in LPC2148 microcontroller.

Or

(b) List the features of UART in LPC2148.

14. (a) Define SPI protocol and explain how to initialize LPC2148 as a master.

Or

(b) Write a note on the real-time clock.

15. (a) Draw and explain the DC motor interface.

Or

(b) Describe how to interface a DAC to the LPC2148.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the pin configuration of LPC2148 with neat diagram.

17. Describe the operation of 32-bit general purpose I/O ports.

18. Write a code for generating a delay of 50ms and blink LEDs using the LPC2148 timer.

19. Describe how to interface SD memory card to LPC2148.

20. Explain the interfacing of LCD display with LPC2148.

———————

F–6519	Sub. Code
	7MEL3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

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. Define sampling.

2. Define the Haar transform.

3. What is Image enhancement?

4. What is Homomorphic filtering?

5. What do you understand by image data redundancy?

6. What is the JPEG standard?

7. Define the region growing.

8. Define shape numbers.

9. What is the image degradation process?

10. What is inverse filtering?

Part B (5 × 5 = 25)

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

11. (a) Write a note on the relationship between pixels and distance measurements.

Or

(b) Write the expression for slant and hotelling transforms.

12. (a) Write a short note on the Histogram equalization technique.

Or

(b) Explain the steps involved in color transformation on the gray level values of an image.

13. (a) Explain the inter-pixel redundancy.

Or

(b) Write short notes on Huffman coding.

14. (a) Describe the concept of edge linking and boundary detection.

Or

(b) Explain the regional descriptors.

15. (a) Discuss the discrete degradation model.

Or

(b) Explain the inverse filtering approach for image restoration.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the following transforms with suitable equations

    (a) Discrete Cosine Transform

    (b) Walsh Transform

17. Explain in detail the derivative filter approach used for image enhancement.

18. Explain the lossy compression techniques.

19. Describe the following.

    (a) Edge detection

    (b) Boundary representations using chain codes

20. Discuss in detail the least mean square filter for restoring images.

———————

F–6520	Sub. Code
	7MELE4A

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

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. What is the history of biometrics?

2. List the applications of biometrics.

3. Define a neural network.

4. List the advantages of face biometrics.

5. Define the Retina.

6. What are the disadvantages of Iris biometrics?

7. List the features of the fingerprint sensor.

8. What are the advantages of fingerprint biometrics?

9. Define API.

10. Define smart card technology.

Part B (5 × 5 = 25)

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

11. (a) Explain the types of biometrics.

Or

(b) Describe the errors of biometric systems.

12. (a) Discuss the background of face recognition.

Or

(b) Write short notes on face detection in video sequences.

13. (a) Explain the design of Retina biometrics.

Or

(b) Discuss the k-means clustering algorithm for the Iris Segmentation.

14. (a) Briefly explain the fingerprint sensors.

Or

(b) Write short notes on false minutiae removal.

15. (a) Write notes on the biometric standards for fingerprints.

Or

(b) Discuss the basics of RFID biometrics.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the design procedure of biometric systems in detail.

17. Describe the various methods of face recognition.

18. Explain the determination of the Iris region by k-means clustering algorithm and Canny edge detection.

19. With a neat diagram explain the fingerprint recognition system.

20. Explain the principle of biometrics in border security with a neat diagram.

———————

F–6523	Sub. Code
	7MELE5A

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

Third Semester

Electronics

Elective — NETWORKING TECHNOLOGY

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. List out the basic components of data communication.

2. What is meant by router?

3. Describe the function of application layer in OSI model.

4. Mention the advantages of SMDS.

5. Why the UDP is important?

6. List out the advantages of CATV in networking.

7. Define signaling in ATM.

8. How does the wireless networks?

9. What is meant by passive optical LAN?

10. What is SDS in circuit switches?

Part B (5 × 5 = 25)

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

11. (a) Give the short notes on LAN.

Or

(b) Explain gateways in networking.

12. (a) Write a short note on Ethernet- IEEE 802.3.

Or

(b) Explain about Frame relays.

13. (a) Discuss UDP.

Or

(b) Give the details DWDM.

14. (a) Discuss routing in ATM.

Or

(b) Explain Link level design in wireless networks.

15. (a) Write a short note on WDM systems.

Or

(b) Explain TDS in circuit switches.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail about ISDN and its transmission technology.

17. Discuss OSI model layer structure and its functions.

18. Explain in detail about SONET.

19. Explain ATM cell header structure and features of ATM.

20. Discuss Optical paths and Networks.

———————

F–5409	Sub. Code
	7MEL1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021

First Semester

Electronics

ANALOG AND DIGITAL COMMUNICATION SYSTEMS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Draw the waveform of AM signal and DSB-SC signal.

2. What is Amplitude Modulation?

3. What are the advantages of BPSK?

4. Differentiate QPSK and BPSK.

5. Define bit rate and baud rate.

6. What is the interpretation obtained from eye pattern?

7. What is the purpose of source coding?

8. Define Jamming Margin.

9. Define Escape velocity.

10. List the limitations of manual switching.

Part B (5 × 5 = 25)

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

11. (a) Explain the difference between phase modulation and frequency modulation.

Or

(b) Write a note on time domain description of VSB wave.

12. (a) Give the Comparison between ASK and FSK.

Or

(b) Write a note on Correlator.

13. (a) What is Companding? What is the need for Companding?

Or

(b) Write a short note on Channel Capacity.

14. (a) Explain the working of Frequency Hopping Spread-Spectrum.

Or

(b) Explain error detection and error connection in data communication.

15. (a) Explain wavelength division multiplexing.

Or

(b) Explain Bell's original plain old telephone set.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. With the help of mathematical expressions explain about Amplitude Modulation, its generation and detection.

17. Describe with neat diagram, the operation of a QPSK modulator. Draw its phasor and constellation diagram.

18. Draw the eye diagram and explain its importance in data transmission.

19. Discuss about Continuous Channel.

20. Discuss about the Satellite Communication principles.

———————

F–5410	Sub. Code
	7MEL1C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021

First Semester

Electronics

PIC MICROCONTROLLER AND EMBEDDED SYSTEM

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write instructions to move value 34H into the WREG register.

2. What is the difference between the MOVWF and MOVF instructions?

3. What is the advantage of MAX233 over MAX232 chip?

4. Give the importance of TSR register.

5. Give the name of the interrupts in the INTCON register.

6. What are the external hardware interrupts in PIC18? Explain their action.

7. Write any two applications of compare feature.

8. Find the PR2 value for the following PWM frequencies. Assume XTAL = 10MHz and prescaler = 1. (a) 10KHz (b) 25KHz.

9. What does it mean when a given sensor is said to have a linear output?

10. Indicate an advantage and disadvantage of using an IC chip instead of a microcontroller for keyboard scanning and decoding.

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

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

11. (a) Explain the structure of assembly language program.

Or

(b) Write a program to

(i) load the PORTB SFR register with the value 55H, and

(ii) complement PORT B 700 times.

12. (a) Explain about I/O port programming in PIC18.

Or

(b) Write a program to transmit the message "YES" serially at 9600 baud, 8 bit data and 1 stop bit. Do this forever.

13. (a) Explain the purpose of interrupt service routine.

Or

(b) Write notes on interrupt priority in PIC 18 with an example.

14. (a) Assume a pulse is being fed to the CCP1 pin. Write an assembly language program that measures the period of the pulse and puts the result on PORTB and PORTD. The measurement is in terms of the Fosc/4 clock period.

Or

(b) Explain about capture mode programming.

15. (a) Explain how to interface a DAC to the PIC 18 and show how to generate a stair step ramp using it.

Or

(b) Write notes on relays and optoisolators.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Outline the architecture of PIC 18 with necessary diagram.

17. Write an essay on programming timers 2 and 3.

18. Discuss about programming timer interrupts in detail.

19. Describe DC motor control with ECCP.

20. Describe how to program and interface an LCD to a PIC 18 using assembly and C.

———————

F–5649

Sub. Code
7MELE1C

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021

First Semester

Electronics

Elective – NUMERICAL TECHNIQUES WITH C PROGRAMMING

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the fundamental data types available in C?

2. Determine the value of the following expression, if $a = 5$, $b = 3$, $c = 8$

   (a) $a > b \,\&\&\, a > c$

   (b) $a == b \,||\, c < a$

3. Define function.

4. Differentiate Iteration and Recursion.

5. What is an array?

6. Give description for the below string handling library functions

   (a) strcpy (st 1, st 2)

   (b) strcat (st1, st 2)

7. What is a pointer?

8. How does a structure differ from an array?

9. Define order of convergence. What is the order of convergence of Newton-Raphson method?

10. By Gauss elimination method, solve

$x + y = 2$
$2x + 3y = 5$

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

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

11. (a) Explain

   (i) Arithmetic operators

   (ii) Auto increment/decrement operators in C, with suitable examples.

Or

   (b) Explain “Switch" Statement with an illustration.

12. (a) Give applications of recursion with programs.

Or

   (b) Explain the difference between Return statement and exit( ).

13. (a) Explain how the arrays are declared.

Or

(b) Write a program to calculate the standard deviation of an array of values.

14. (a) Write a note on structure within structure.

Or

(b) Write a program to print current date and time using functions.

15. (a) Solve the following system of equations of Gauss Jordan method.

$$5x - 2y + 3z = 18$$
$$x + 7y - 3z = -22$$
$$2x - y + 6z = 22$$

Or

(b) The velocity v of a particle at distance S from a point on its path is given by the table below.

S in metres	0	10	20	30	40	50	60
v in m/sec	47	58	64	65	61	52	38

Estimate the time taken to travel 60 metres by using Simpson's $\frac{1}{3}$ rule.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the following in detail with illustration.

    (a) Goto statement

    (b) While loop

    (c) do-while loop

    (d) for loop

17. Explain the categories of function.

18. Write a program to insert and delete elements in a linear array.

19. Write a note on

    (a) Pointer and functions

    (b) Pointers to pointers

20. Compute $y(0,1)$ and $y(0,2)$ by Runge-Kutta method of 4th order for the differential equation $\frac{dy}{dx} = xy + y^2;\ y(0) = 1.$