F–2953

Sub. Code
7MEL1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

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** the questions.

1. Define system.

2. What are continuous time signals? Give their classification.

3. What is continuous time real exponential signal?

4. What is continuous time unit step and unit impulse?

5. Write down the exponential form of the Fourier series representation of a periodic signal.

6. Write short notes on dirchlets conditions for Fourier series.

7. What is Fourier transform?

8. Give the difference between periodic and non-periodic signal.

9. Give the Laplace transform of $x(t)=3e^{-2t}u(t)-2e^{-t}u(t)$ with ROC.

10. What is Inverse Laplace transform?

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

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

11. (a) Describe the basic operations on continuous signals.

Or

(b) Find the fundamental period T of the signal $x(n) = \cos\ n\pi/2 - \sin\ n\pi/8 + 3\cos\ (n\pi/4 + \pi/3)$.

12. (a) What is continuous time system? Explain its classification with suitable examples.

Or

(b) Determine whether the following system are time variant or time invariant.

(i) $y(t)=tx(t)$;

(ii) $y(n)=x(2n)$.

13. (a) Explain how a continuous time periodic signals are represented using Fourier series.

Or

(b) Determine the Fourier series co-efficient for a system periodic square wave and represent the same in frequency domain.

14. (a) Explain the Fourier transform of periodic signals.

Or

(b) Explain the Fourier transform of non-periodic signals.

15. (a) Explain the properties of Laplace transform.

Or

(b) Write a note on the region of convergence.

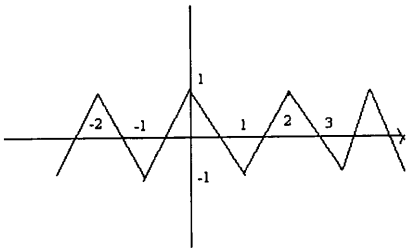
Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss the classification of the signals with examples.

17. Describe about deconvolution process in detail.

18. Obtain the Fourier series co-efficients and plot the spectrum for the given waveform.



19. Give the analysis of LTI continuous time systems using Fourier transform.

20. Discuss the Laplace transform of periodic signal with suitable example.

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F–2954

Sub. Code
7MEL1C4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

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 Top-Down approach of Nanotechnology?

2. What is Nano optics?

3. Draw the three types of cubic lattice and diamond lattice.

4. What is Epitaxial growth?

5. List down the methods available for Epitaxial growth.

6. What is an intrinsic material?

7. Define Diffusion.

8. What are the two ways to create nanostructures using self-assembly of block copolymers?

9. What makes Resonant-tunneling diode so attractive?

10. Define any two characteristic lengths associated with nanoelectronic devices.

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) Write a note on Hermitian operators.

12. (a) Write a note on ionic crystals and give the binding energies for different types of crystals.

Or

(b) Explain, how the band gaps of III-IV alloys and effective masses of $Al_xGa_{1-x}As$ alloys are calculated.

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

Or

(b) Explain the chemical vapor deposition method of growth of carbon nanotubes.

14. (a) Write the brief review of classical statistics for electrons.

Or

(b) Briefly explain Single modulation-doped heterojunctions.

15. (a) Write a note on Light Emitting Diodes.

Or

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

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the interaction of photons with electrons in solids.

17. Discuss the structural and electrical properties of Carbon Bucky balls.

18. Discuss the techniques used to fabricate clusters and Nanocrystals.

19. Describe about amino acids with examples.

20. Illustrate the working of a Parametric Resonator NEMs.

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F–2955

Sub. Code
7MEL2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

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. What is meant by system?
2. State convolution.
3. State Fourier Series.
4. Define R.O.C
5. What is sampling?
6. What is Nyquist frequency?
7. State periodicity property of DFT.
8. List the different types of FFT.
9. Write the step involved in FIR filter Design.
10. List the different types of filters based on frequency response.

Part B (5 × 5 = 25)

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

11. (a) Describe the basic operation on Discrete Time Signal.

Or

(b) Classify the DT LTI System.

12. (a) State and prove any four property of Discrete Time Fourier Transform.

Or

(b) Describe the region of coverage (ROC).

13. (a) Explain the reconstruction of a band limited signal from sample.

Or

(b) Explain the changing the sampling rate using Discrete time processing.

14. (a) Explain the property of discrete Fourier Transform.

Or

(b) Find the DFT of a sequence x(n)(1,l,0,0).

15. (a) Analyze the designing of IIR filter.

Or

(b) Explain the Kaiser Window filter design of FIR filter.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss the difference equation representation for LTI system.

17. Determine the inverse Z transform of $X(z) = \frac{1}{1.5z^{-1} + 0.5z^{-2}}$

18. Explain the frequency domain representation of sampling.

19. Find the 8 point DFT of the sequence x(n) ={1,2,3,4,4,3,2,1}using decimation in FFT algorithm.

20. Explain the linear phase FIR low pass filter.

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F–2956

Sub. Code
7MEL2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Electronics

VLSI DESIGN

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write down the equation for describing the channel length modulation effect in NMOS transistors.

2. Compare between CMOS and bipolar technologies.

3. Write the expression for the logical effect and parasitic delay of n input NOR gate?

4. What do you meant by design margin?

5. What are the advantages of differential flip flops?

6. State any two criteria for low power logic design?

7. Write note on functionality tests.

8. What are the approaches in design for testability?

9. Give the comparison between structural and switch level modeling.

10. What are the procedural assignments in verilog?

Part B (5 × 5 = 25)

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

11. (a) Write a note on MOS models.

Or

(b) Explain the latch up prevention techniques.

12. (a) Explain about interconnect.

Or

(b) Explain reliability.

13. (a) Write a brief note on sequencing dynamic circuits.

Or

(b) Compare the sequencing in traditional domino and skew tolerant domino circuits with neat diagram.

14. (a) Write short notes on "need for CMOS testing".

Or

(b) Draw and explain data path test scheme for chip level test methods.

15. (a) Draw the logic diagram of 4 to 1 MUX using NAND gates and write the gate level modeling using Verilog HDL.

Or

(b) Explain the different timing controls available in verilog HDL.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain with neat diagrams the various CMOS fabrication techniques.

17. Explain about logical effort and transistor sizing.

18. Explain detail Low power logic design.

19. List out all the methods of design strategies for test and explain any three methods.

20. Explain the process flow that is followed to develop a project by any HDL with example.

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F–2957

Sub. Code
7MEL2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

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. Write a program to get data from the PINB and send it to the I/O register of PORTC continuously.

2. Compare and contrast between SRAM Vs EEPROM in AVR chips.

3. What is the difference between a structure and an array?

4. Define pointers.

5. What are the operating modes of timing channels?

6. What is meant by interrupt priority?

7. What is synchronous serial transmission?

8. Define Baud rate.

9. What is a sensor?

10. What are relays?

Part B (5 × 5 = 25)

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

11. (a) Explain the role of program counter in AVR.

Or

(b) Write notes on I/O bit manipulation programming.

12. (a) Write short notes on logic operations in C.

Or

(b) Explain about memory allocation in C.

13. (a) Explain about input capture programming.

Or

(b) Briefly explain about counter programming.

14. (a) Explain AVR serial port programming in C.

Or

(b) Explain SPI programming in AVR.

15. (a) Explain about ADC interfacing with AVR.

Or

(b) Explain stepper motor interfacing with AVR.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss about various bits of AVR status register with example.

17. Discuss AVR studio IDE to develop C programs in detail.

18. Give an overview of programming timer 0.

19. Explain about AVR TWI programming in C.

20. Describe DS1307 RTC interfacing and programming with neat diagram.

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F–2958

Sub. Code
7MELE2B

M.Sc. DEGREE EXAMINATION,
NOVEMBER 2019

Second Semester

Electronics

WIRELESS COMMUNICATION

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What does PCN refer?

2. If 0dBm equal to 1mW (10^{-3}W) over a 500 load, express 10 W in units of dBm.

3. What is the strategy used in fixed channel assignment?

4. What are the various sources of interference in cellular radio systems?

5. What is an isotropic radiator?

6. Define Brewster angle.

7. What are the different types of small scale fading?

8. Consider a transmitter which radiates a sinusoidal carrier frequency of 1850MHz. For a vehicle moving 60mph, compute the received carrier frequency if the mobile is moving directly toward the transmitter.

9. What is FDMA?

10. What are the different types of multiple access technique used in wireless communication?

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

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

11. (a) Give the comparison of mobile communication systems in mobile station and base station.

Or

(b) Write a note on Blue tooth and PANs.

12. (a) Explain the concept of cellular frequency reuse 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) n4, (ii) n3? 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) Arrive at the relationship between the receive power to the received E-field at the receive antenna terminals.

Or

(b) A mobile is located 5km away from a base station and uses a vertical $\lambda/4$ monopole antenna with a gain of 2.55dB to receive cellular radio signals. TheE-field at 1km from the transmitter is measured to be I 03V/m. The carrier frequency used for this system is 900MHz. (a) Find the length and the effective aperture of the receiving antenna. (b) Find the receive power at the mobile using the two ray ground reflection model assuming the height of the transmitting antenna is 50m and the receiving antenna is l,5m above ground.

14. (a) Explain the fading effects due to Doppler spread.

Or

(b) Write brief notes on Rayleigh and Riccean distributions.

15. (a) Explain the hybrid spread spectrum technique in detail.

Or

(b) Explain the capture effect in packet radio.

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

Answer any **three** questions.

16. Discuss about WLAN in detail.

17. What are the three popular capacity improvement techniques in cellular system? Explain each of them in detail.

18. Discuss about indoor propagation model in detail.

19. Describe the impulse response model of a multipath channel with necessary diagrams.

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

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F–2959

Sub. Code
7MELE3B

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

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. What are the main components of a mobile satellite service?

2. List the categories of Orbit. Narrate each of them.

3. What are the various types of perturbations on satellites in Earth orbits?

4. What are the differences in the radio link design of geostationary and non-geostationary satellites from an orbital perspective?

5. Which modulation schemes are generally preferred in mobile satellite systems?

6. Differentiate between coherent and non-coherent demodulation.

7. What are the techniques used in the DVBS2/RCS+M standard to circumvent these constraints?

8. What is duplexer?

9. On what factors the receiver architecture depends?

10. What is the purpose of DBS?

Part B (5 × 5 = 25)

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

11. (a) Write a note on Mobility management.

Or

(b) Compare the main features of terrestrial and satellite mobile services.

12. (a) Determine the inclination of a Sun-synchronous circular orbit of 750 km altitude (Earth radius=6378 km)

Or

(b) How are the parameters of an eccentric orbit adjusted to provide service to high latitude region above 81°N? Suggest limitations of this approach.

13. (a) List the number of approaches used in characterizing land mobile channel. Explain.

Or

(b) Explain the principle of a typical convolution coder.

14. (a) With the suitable diagram, explain the function of transponder.

Or

(b) Compare the lower layer features of GMR-1 release 1 and GMR-2 systems.

15. (a) Write note on Space Segment.

Or

(b) Explain the service features of an advanced mobile broadcast system.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Elaborate on the variety of Satellite systems in communication services.

17. Outline the principle, characteristics and advantages of a Sun-Synchronous orbit.

18. Explain, with reasons, the factors that influence efficiency of multiple accessing schemes for MSS.

19. Describe a generic protocol architecture that can be used in standardization of MSS radio interface.

20. Discuss the feasibility of adapting a hand-held receiver for reception of Ku band direct broadcast transmissions.

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