3 /16 **2704N376** Candidate's Seat No :_____

M.Sc. Semester-4 Examination

510

Electronics Science

Time : 2-30 Hours] **April-2023** **[Max. Marks : 70**

Q-1 (A) Obtain the filter transfer function using impulse – invariant transformation method for given [7]

$$H(s) = \frac{s+1}{(s+3)(s+5)}$$

Show the DSP set up for it.

(B) Design a Butterworth digital low pass filter for the following specifications: [7]

1. Pass band gain required = 0.85
2. Frequency up to which pass band gain must remain more or less steady, ω_1 = 1000 rad/s.
3. Amount of attenuation required = 0.1
4. Frequency from which the attenuation must start, ω_2 = 3000 rad/s.

OR

Q-1 (A) What is Chebyshev filter? Discuss the procedure used for the design of Chebyshev low – pass digital filter. [7]

(B) Implement the following filter transfer function using the direct form – I structure: [7]

$$H(z) = \frac{1-2z^{-1}}{1+z^{-1}+3z^{-2}}$$

Q-2 (A) Discuss the basic principles involved in the design of FIR filters. [7]

(B) Explain with neat sketches the implementation of FIR filters in the [7]

(a) Direct form

(b) Cascade form

OR

Q-2 (A) Design a low pass FIR digital filter without using Window function, for the following specifications: [7]

Cut off frequency = 500 Hz

Sampling frequency = 2000 Hz

Order of the filter N = 10

Filter length required L = N +1 = 11

(B) Draw the direct form and lattice form implementation of the following FIR transfer function: [7]

$H(z) = (a_0 + a_1z^{-1} + a_2z^{-2})(b_0 + b_1z^{-1})$

Q-3 (A) Write a detail note on: "The **monopulse** tracking radar system". [7]

(B) Discuss in detail: "**Geosynchronous satellite**". [7]

OR

Q-3 (A) Explain in the brief, "**MTI radar** system" with necessary block diagram. [7]

(B) Explain in the brief, "**FDMA**". [7]

Q-4 (A) Discuss in detail, **"Cell splitting and Sectoring"**. [7]

(B) Explain in detail, **"Roaming and Handoff Process"**. [7]

OR

Q-4 (A) Write the introduction about "first generation analog cellular telephone" and explain in brief, **"AMPS frequency allocation"**. [7]

(B) Discuss in detail, **"Global System for Mobile (GSM) communications"**. [7]

Q-5 Answer in brief **Any Seven** questions from the following: (Each question is of **two** mark). [14]

(i) Obtain a digital processor to solve an IIR expression: $H(z) = \frac{1}{1-0.368\,z^{-1}}$

(ii) What are the types of Chebyshev digital IIR filters?

(iii) Why is the Butterworth response called a maximally flat response?

(iv) What is the difference between Butterworth and Chebyshev filters?

(v) What is the inverse Laplace transform of the first order transfer function $H(S) = \frac{1}{s+a}$?

(vi) In a series RC filter if the output is taken across a capacitor C, then what will be the response of the filter?

(vii) How the limit of visibility can affect the satellite communication?

(viii) What is maximum unambiguous range?

(ix) Determine the geostationary satellite round trip delay time using Kepler's law?

(x) What is co=channel interference?

(xi) Why IS-41 relies on a feature known as autonomous registration?

(xii) What is the importance of system identifier (SID) provided by FCC?

***** PAPER ENDS *****

N 3776-3

M. Sc. (Electronics) - Semester-IV
April, 2023
ELE-510: (Electronic Communication - II)
(OLD Course)

Q-1 (A) Briefly explain different types of Data acquisition configurations [7]
(B) Discuss structure of GPIB interface. How is GPIB implemented? [7]

OR

Q-1 (A) What is Programmable gain amplifier (PGA) in DAQ system? Explain the operation of a digitally controlled PGA with suitable diagrams. [7]
(B) Why Expanders are used in GPIB system? Explain the use of Expanders in GPIB interfacing in detail [7]

Q-2 (A) What are the two data transfer formats in serial communication? Discuss them briefly. [7]
(B) What is MODEM ? List and discuss various types of MODEMS. [7]

OR

Q-2 (A) Write a short note on **RS-232.** [7]
(B) What are serial communication modes? Discuss briefly. [7]

Q-3 (A) Write a detail note on: "The **monopulse** tracking radar system". [7]
(B) Discuss in detail: "**Geosynchronous satellite**". [7]

OR

Q-3 (A) Explain in the brief, "**MTI radar** system" with necessary block diagram. [7]
(B) Explain in the brief, "**FDMA**". [7]

Q-4 (A) Discuss in detail, "**Cell splitting and Sectoring**". [7]
(B) Explain in detail, "**Roaming and Handoff Process**". [7]

OR

Q-4 (A) Write the introduction about "first generation analog cellular telephone" and explain in brief, "**AMPS frequency allocation**". [7]
(B) Discuss in detail, "**Global System for Mobile (GSM) communications**". [7]

Q-5 Answer in brief **Any Seven** questions from the following: (Each question is of **two** mark). [14]
(i) What are the main blocks of a DAQ system.
(ii) The max data transfer rate on GPIB bus is _____.
(iii) For a DAQ systems, name TWO methods used for ISOLATION.
(iv) Is GPIB a parallel interfacing system?
(v) Give two important features of **IEEE 488.2.**
(vi) Write two disadvantages of **RS-232** interface.
(vii) How the limit of visibility can affect the satellite communication?
(viii) What is maximum unambiguous range?
(ix) Determine the geostationary satellite round trip delay time using Kepler's law?
(x) What is co=channel interference?
(xi) Why IS-41 relies on a feature known as autonomous registration?
(xii) What is the importance of system identifier (SID) provided by FCC?

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