1905E718

Candidate's S.

Time : 3 Hours| May-2017 |Max. Marks : 70

ELE-503: Microcontroller-II and Digital Signal Processing-II

Q-1: A) What is pure software time delay? Write a program *Softime* for pure software time delay, including 1-second LED blink rate. — 7

OR

A) Write a software polled *Timer* program that uses T0 to generate the basic delay. — 7

B) What is the advantage of using lookup table for the 8051? Write a program *Dplook* that holds the square of any number found in the A register using DPTR as a Base address. — 7

OR

B) Write a program *Sendchar* using a 12 MHz crystal for UART timing, with delay of 5 milliseconds between characters. — 7

Q-2: A) Write a program *Svnseg* to display sequence of 0,1,2,3 on four common cathode seven-segment displays, using lookup table and interrupt-driven program using T0. — 7

OR

A) Draw the circuit of A/D converter. Hence write *Adconv* program that can digitize an input voltage by sampling input at every 100 microseconds and stores 1000d samples in external RAM locations starting from 4000h. — 7

B) Discuss following network configurations in brief drawing respective block diagrams: (i) Star,(ii) Loop, (iii) Star-Loop, and (iv) Loop-Star configuration. — 7

OR

B) Discuss pulse width measurement. Write a program *width* that measures the width of a pulse fed to pin 3.3 ($\overline{INT 1}$). — 7

Q-3: A) Design Low-pass FIR Filter for the following specifications: Cut-off frequency=500 Hz Sampling frequency=2000 Hz, Order of the filter N= 8, Filter length required L= N+1 = 9 — 7

OR

A) Design High-pass FIR Filter for the following specifications: Cut-off frequency=500 Hz Sampling frequency=2000 Hz, Order of the filter N= 8, Filter length required L= N+1 = 9 — 7

B) Design an FIR notch Filter for the following specifications: Cut-off frequencies=400 Hz and 800 Hz, Sampling frequency=2000 Hz, Order of the filter N= 6, Filter length required L= N+1 = 7. — 7

OR

B) Design band pass FIR Filter for the following specifications: Cut-off frequencies=400 Hz and 800 Hz, Sampling frequency=2000 Hz, Order of the filter N= 6, Filter length required L= N+1 = 7. — 7

P.T.O.

Q-4: A) What is canonical and non-canonical form of filter structure? Design the direct form-I   **7** and direct form-II structure for IIR filter of transfer function given by,

$$y(n) + 5y(n-1) + 4y(n-2) - 2y(n-3) = 3x(n) - 2x(n-2).$$

OR

A) Obtain the digital filter transfer function and structure using impulse invariant   **7** technique for given $H(s) = \dfrac{1}{(s+3)(s+5)}$.

B) Design a Butterworth digital low-pass filter transfer function for the following   **7** specifications: Pass band gain required=0.89, frequency up to which pass band must remain more or less steady=25 Hz, amount of attenuation required=0.215, frequency from which the attenuation must start=75 Hz, sampling frequency=300 Hz.

OR

B) Obtain the digital filter transfer function and structure using impulse invariant   **7** technique for given $H(s) = \dfrac{1}{\left(s + \frac{1}{\sqrt{2}} + j\left(\frac{1}{\sqrt{2}}\right)\right)\left(s + \frac{1}{\sqrt{2}} - j\left(\frac{1}{\sqrt{2}}\right)\right)}$.

Q-5: **Answer the following questions.**   **14**

1. What is Gibb's phenomenon?
2. The accuracy of FIR filters _____ by increasing number of filter coefficients. (increases, decreases, remains constant, none of above)
3. What is frequency warping and prewarping?
4. What is the basic difference between type-I and type-II Chebyshev filter?
5. Write the location of the first 3 pole for n=3.
6. In Chebyshev filter, we can convert an s-domain equation directly into equivalent in the z-domain. **(TRUE / FALSE)**
7. Design the direct form-I structure for IIR filter of transfer function given by

   $H(Z) = \dfrac{1 + 7Z^{-2}}{1 - 4Z^{-3}}$.

8. In microcontroller design, external memory is added by using port 0 as _____ and port 2 as _____
9. The 8051 uses an active _____ reset pin.
10. The memory access time Taccess means _____
11. The meaning of time Tread means _____
12. The keyboard application program must guard against the following possibilities _____
13. If a counter counts 200 pulses over an interval of 0.1 second, then measured frequency is UF = _____
14. What do you mean by *Rapid key hit?*

********** BEST OF LUCK**********