CBCS SCHEME

USN | | | | | | | | | | | 17EE52

Fifth Semester B.E. Degree Examination, July/August 2021
Microcontroller

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

1 a. Distinguish between microprocessor and micro controller's. **(04 Marks)**
b. Briefly discuss the features of 8051 microcontroller. **(06 Marks)**
c. With neat diagram, explain the internal architecture of 8051. **(10 Marks)**

2 a. Identify the addressing mode's of the following instruction and byte-size:
(i) XCHD A, @ R_O
(ii) MOVC A, @A+DPTR
(iii) SUBB A, #55H
(iv) DA A.
(v) MOV A, @R_O **(10 Marks)**
b. Explain the bit pattern of P.S.W **(05 Marks)**
c. Interface 8051 to external ROM and RAM and explain how 8051 access them. **(05 Marks)**

3 a. What are assembler directives? Explain them with an example. **(06 Marks)**
b. Briefly explain about what are the steps for assembly and running of 8051 program. **(06 Marks)**
c. Write an 8051 assembly program to find average of 5 numbers stored from internal data memory address 40 h. **(08 Marks)**

4 a. Explain the following instruction with an example:
(i) CJNE A, #n, radd
(ii) SWAP A
(iii) RRC A **(06 Marks)**
b. Consider 10 bytes of data from data RAM location 45h to 54h. Add 02 to each of them and save the result, in data RAM location 79h to 70h. **(06 Marks)**
c. Write an ALP to subtract two 16 bit no's. **(08 Marks)**

5 a. Explain the different data type's supported by 8051 microcontroller. **(08 Marks)**
b. Write an 8051C program to toggle. The bit of P_1 ports continuously with 250 msec delay. **(06 Marks)**
c. Write an 8051C program to convert packed BCD no's of 29 to ASCII and display the bits on P_1 and P_2. **(06 Marks)**

6 a. Explain Mode-2 programming on 8051 timer. Describe the different steps to program in Mode-2. **(10 Marks)**
b. Write an ALP in 8051 which generate and a square wave of frequency 10 kHz on P1.2 using timer 1 mode 1. Assume crystal frequency of 11.0592 MHz. **(10 Marks)**

7 a. What is the need for serial communication? Explain simplex, half duplex and full duplex transmission with the help of figures. **(08 Marks)**
b. Briefly explain about DB-9 connector pins function. **(06 Marks)**
c. Write a C program for the 8051 to transfer. The letter 'C' serially at 9600 baud rate continuously. Use 8-bit data and one stop bit. **(06 Marks)**

8 a. What is an Interrupt? List the various interrupts of the 8051 with their corresponding vector address. **(08 Marks)**

b. Explain the bit status of IP Register. **(06 Marks)**

c. Write the steps required for programming 8051 to receive data serially. **(06 Marks)**

9 a. Draw the block diagram to show how 8051 is connected to DAC 0808 at Port 1, using output buffer for DAC and explain. **(10 Marks)**

b. Write an 8051 C-program to send letter's M, D and E to the LCD using delay's. **(10 Marks)**

10 a. Explain how a Stepper. Motor can be connected to 8051 micro controller with neat diagram. **(10 Marks)**

b. Write a program of switch SW is connected to pin P0.0. Write a program to do the following:

(i) When SW = 0, the DAC output give's stair case waveform.

(ii) If SW = 1, the DAC output gives a triangular waveform. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

17EE54

Fifth Semester B.E. Degree Examination, July/August 2021
Signals and Systems

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. Explain the classification of signals. **(08 Marks)**

b. Find and sketch the even and odd components of the following:

$$x(t) = \begin{cases} t & 0 \le t \le 1 \\ 2-t & 1 \le t \le 2 \end{cases}$$ **(06 Marks)**

c. Check whether the following signals are periodic or not. If periodic, find the fundamental period. i) $x_1(n) = \cos 2\pi n$ ii) $x_2(n) = \cos 2n$. **(06 Marks)**

2 a. Explain the properties of systems. **(06 Marks)**

b. Determine whether the system $y(t) = x(t^2)$ is i) Linear ii) Time-invariant iii) Casual iv) Stable. **(08 Marks)**

c. A continuous time signal x(t) show in Fig.Q.2(c). Draw the signal $y(t) = \{x(t) + x(2-t)\}\, u(1-t)$. **(06 Marks)**

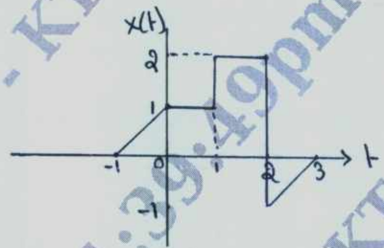

Fig.Q.2(c)

3 a. Derive the equation for convolution integral. **(06 Marks)**

b. A continuous time LTI system with unit impulse response $h(t) = u(t)$ and input $x(t) = e^{-at}u(t)$; $a > 0$, find the output y(t) of the system. **(08 Marks)**

c. A difference equation of a discrete time system is given $y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) + \frac{1}{2}x(n-1)$. Draw direct form-I and direct form-II structures. **(06 Marks)**

4 a. Find the response of the system described by the difference equation $y(n) - \frac{1}{9}y(n-2) = x(n-1)$ with $y(-1) = 1, y(-2) = 0$ and $x(n) = u(n)$. **(10 Marks)**

b. Find the total response of the system given by

$$\frac{d^2y(t)}{dt^2} + 3\frac{dy(t)}{dt} + 2y(t) = 2x(t) \text{ with } y(0) = -1 \text{ ; } \left.\frac{dy(t)}{dt}\right|_{t=0} = 1 \text{ and } x(t) = \cos t\, u(t).$$

(10 Marks)

5 a. Find the Fourier transform of rectangular pulse shown below:

$$x(jw) = \frac{1}{(a+jw)^2}$$ (08 Marks)

b. Obtain the Fourier transform of $x(t) = te^{-at}\,u(t)$. (06 Marks)

c. State any six properties of the continuous time Fourier transform. (06 Marks)

6 a. State and prove the following properties of Fourier transform i) Time Shifting Property ii) Parseval's theorem. (10 Marks)

b. The impulse response of a continuous-time LTI system is given by $h(t) = \frac{1}{Rc} e^{-t/Rc}\,u(t)$. Find the frequency response and plot the magnitude and phase response. (10 Marks)

7 a. Find the OTFT of the signal, $x(n) = \alpha^n\,u(n)$; $|\alpha| < 1$. Draw the magnitude spectrum. (06 Marks)

b. Obtain the frequency response and the impulse response of the system described by the difference equation given by $y(n) + \frac{1}{2}y(n-1) = x(n) - 2x(n-1)$ (06 Marks)

c. Compute the DTFT of the following signals:

i) $x(n) = 2^n u(-n)$ ii) $x(n) = a^{|n|}$; $|a| < 1$ (08 Marks)

8 a. State and prove Parseval's theorem in discrete time domain. (08 Marks)

b. Obtain the frequency response and the impulse response of the system having the output y(n) for the input x(n) as given below.

$$x(n) = \left[\frac{1}{2}\right]^n u(n)\ ;\ y(n) = \frac{1}{4}\left[\frac{1}{2}\right]^n u(n) + \left[\frac{1}{4}\right]^n u(n)$$ (06 Marks)

c. Obtain the difference equation for the system with frequency response.

$$H(e^{j\Omega}) = 1 + \frac{e^{-j\Omega}}{\left(1 - \frac{1}{2}e^{-j\Omega}\right)\left(1 + \frac{1}{4}e^{j\Omega}\right)}$$ (06 Marks)

9 a. Define ROC and explain its properties. (06 Marks)

b. Find the z-transform of the following:

i) $x(n) = \alpha^{|n|},\ 0 < |\alpha| < 1$ ii) $n\left[\frac{1}{2}\right]^n u(n) * \left[\delta(n) + \frac{1}{2}\delta(n-1)\right]$ (08 Marks)

c. Find x(z) if $x(n) = -\alpha^n u(-n-1)$ and find the ROC. (06 Marks)

10 a. Solve the following difference equation using Z-transform $x(n-2) - 9x(n-1) + 18x(n) = 0$. Initial conditions are $x(-1) = 1$, $x(-2) = 9$. (10 Marks)

b. Find inverse z-transform of the following using partial fraction expansion method.

$$X(z) = \frac{\left(1 + 2z^{-1} + z^{-2}\right)}{\left(1 - \frac{3}{2}z^{-1} + \frac{1}{2}z^{-2}\right)}$$ (10 Marks)

* * * * *