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17ES/CE/TE/EI/BM/ML51

Fifth Semester B.E. Degree Examination, July/August 2021
Management and Entrepreneurship Development

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. Define management. Explain the various roles of a manager. **(10 Marks)**
b. Analyse management as Science, Art and profession. **(10 Marks)**

2 a. Compare management and administration. **(05 Marks)**
b. List and explain the various steps in planning. **(08 Marks)**
c. Briefly explain the various steps in decision making process. **(07 Marks)**

3 a. Explain the various principles of organizing. **(10 Marks)**
b. Explain various sources of recruitment. **(10 Marks)**

4 a. What do you mean by leadership? Explain various styles of leadership. **(10 Marks)**
b. Explain the steps involved in selection process. **(10 Marks)**

5 a. Explain social audit and describe the social responsibilities of business man towards different groups in a society. **(10 Marks)**
b. Explain the types of entrepreneurship. **(10 Marks)**

6 a. Explain in brief the business Ethics. **(10 Marks)**
b. Explain the myths of entrepreneurship. **(10 Marks)**

7 a. Define small scale industry and state the characteristics of a SSI. **(10 Marks)**
b. Explain the effect of WTO|GATT on Indian SSI. **(10 Marks)**

8 a. Explain the steps to start an SSI. **(10 Marks)**
b. Explain in brief All India Instruction supporting entrepreneurs. **(10 Marks)**

9 a. Define project. State and explain the project characteristics. **(10 Marks)**
b. Define project formulation and steps involved in project formulation. **(10 Marks)**

10 a. Explain steps involved in PERT and CPM. **(10 Marks)**
b. Discuss briefly the project life cycle. **(10 Marks)**

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17EC52

Fifth Semester B.E. Degree Examination, July/August 2021
Digital Signal Processing

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. Explain the frequency domain sampling and reconstruction of discrete time signals. **(09 Marks)**

b. Determine the circular convolution of the sequences $x_1(n) = \{1, 2, 3, 1\}$ and $x_2(n) = \{4, 3, 2, 2\}$ using the time domain formula. **(05 Marks)**

c. Compute the N-point DFT of the signal $x(n) = \cos\frac{2\pi}{N}k_0 n$, $0 \le n \le N-1$ **(06 Marks)**

2 a. Establish the relationship between:
i) DFT and Fourier Transform
ii) DFT and Fourier series coefficients. **(08 Marks)**

b. Show that the multiplication of two DFT's leads to circular convolution of respective time sequences. **(07 Marks)**

c. The first three samples of 4-point DFT of a real sequence x(n) is $X(k) = \{2, 1+j, 0\}$. Find the remaining sample and also determine the sequence x(n). **(05 Marks)**

3 a. State and prove Parseval's theorem. Express the energy of the sequence interms of DFT. **(06 Marks)**

b. x(k) denote the 6-point DFT of the sequence $x(n) = \{1, 2, -1, 3, 0, 0\}$ without computing the IDFT, determine the sequence y(n)if
i) $y(k) = W_3^{2k}x(k)$
ii) $y(k) = X((k-2))_6$ **(06 Marks)**

c. Using overlap save method, compute the output y(n) of an FIR filter with impulse response $h(n) = \{1, 2, 3\}$ and input $x(n) = \{2, -3, 1, 0, -2, -1, 3, 5\}$. Use 6-point circular convolution. **(08 Marks)**

4 a. State and prove the property of circular time shift of a sequence. **(06 Marks)**

b. The 5-point DFT of a complex valued sequence x(n) is given by $X(k) = \{1 + j, 2 + j2, j, 2-j2, 1-j\}$. Compute y(k) if i) $y(n) = x^+(n)$ ii) $y(n) = x((-n))_N$ **(06 Marks)**

c. Find the response of an LTI system with an impulse response $h(n) = \{1, -1, 2\}$ for the input $x(n) = \{3, 2, -1, 1, 4, 5, -2, -3\}$, using overlap add method. Use n-point circular convolution with the input data block segment length L = 4. **(08 Marks)**

5 a. Compute the 8-point DFT of the sequence $x(n) = \{2, 2, 2, -1, -1, -1, -2, 1\}$ using decimation in time-FFT algorithm. **(08 Marks)**

b. Find the number of complex additions and multiplications required for 256-point DFT computation using i) Direct method ii) FFT method. What is the speed improvement factor? **(05 Marks)**

c. Explain the Goertzel algorithm and obtain the direct form-II realization. **(07 Marks)**

6 a. Given $x(n) = n + 1$, $0 \le n \le 7$, find the 8-point DFT of $x(n)$ using radix-2 decimation in frequency FFT algorithm **(08 Marks)**

b. Perform the 4-point circular convolution of the sequences $x_1(n) = (2\ 1\ -1\ 2\}$ and $x_2(n) = \{1, 2, 3, -1\}$ using decimation in time FFT algorithm. **(07 Marks)**

c. What is chirp-z transform? Draw the contours on which Z-transform is evaluated. **(05 Marks)**

7 a. Obtain the direct form-II and cascade realization of the system function

$$H(z) = \frac{2(1 - z^{-1})(1 + \sqrt{2}z^{-1} + z^{-2})}{(1 + 0.5z^{-1})(1 - 0.9z^{-1} + 0.81z^{-2})}$$ **(07 Marks)**

b. Determine the order for a digital Butterworth filter design using bilinear transformation to meet the following specifications.

i) Passband ripple of 3dB at 1000Hz
ii) Stopband ripple of 20dB at 2000Hz
iii) Sampling frequency of 10kHz
iv) Indicate the steps to obtain the digital system function H(z). **(09 Marks)**

c. Describe the frequency transformations from low pass filter to any other types in the analog domain. **(04 Marks)**

8 a. Obtain the parallel realization for the system function

$$H(z) = \frac{\left(1 + \frac{1}{4}z^{-1}\right)}{\left(1 + \frac{1}{2}z^{-1}\right)\left(1 + \frac{1}{2}z^{-1} + \frac{1}{4}z^{-2}\right)}$$ **(06 Marks)**

b. An IIR digital lowpass filter is required to meet the following specifications:
Passband ripple ≤ 0.5dB
Passband edge = 1.2kHz
Stopband attenuation ≥ 40dB
Stopband edge = 2kHz
Sampling rate = 8kHz
Determine the filter order for

i) A digital Butterworth filter
ii) A digital Chebyshev filter, which uses bilinear transformation. **(09 Marks)**

c. An ideal analog integrator system function $H_a(s) = 1/s$. Obtain the digital integrator system function H(z) using bilinear transformation. Write the difference equation for the digital integrator. Assume T = 2. **(05 Marks)**

9 a. Consider an FIR filter with system function $H(z) = 1 + 2.88z^{-1} + 3.4z^{-2} + 1.74z^{-3} + 0.4z^{-4}$. Obtain the lattice filter coefficients. Sketch the direct form and lattice realization. **(10 Marks)**

b. An FIR filter is to be designed with the following desired frequency response:

$$H_d(w) = \begin{cases} e^{-j4w}, & |w| < \frac{\pi}{4} \\ 0, & \frac{\pi}{4} \le |w| < \pi \end{cases}$$

Find the frequency response H(w) of the filter using Hamming window function. **(10 Marks)**

10 a. Determine a direct form realization for the linear phase FIR filter impulse response $h(n) = \{1, 2, 3, 4, 3, 2, 1\}$. **(04 Marks)**

b. Consider an FIR lattice filter with coefficients $K_1 = 0.65$, $K_2 = -0.34$ and $K_3 = 0.8$.
   i) Find its impulse response by tracing a unit impulse input through the lattice structure.
   ii) Draw the equivalent direct-form structure. **(08 Marks)**

c. Determine the impulse response of the low pass FIR filter to meet the following specifications using a suitable window function:
   Passband edge frequency = 1.5kHz
   Stopband edge frequency = 2kHz
   Minimum stopband attenuation = 50dB
   Sampling frequency = 8kHz. **(08 Marks)**

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17EC53

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

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. Explain the typical design flow for designing VLSI IC circuits. **(10 Marks)**
b. Discuss the evaluation of computer aided design. **(05 Marks)**
c. Explain top-down design methodology. **(05 Marks)**

2 a. Discuss modules, instances with the help of 4-bit ripple carry counter example. **(10 Marks)**
b. Describe instance and instantiation with example. **(05 Marks)**
c. Explain stimulus and design block with an example. **(05 Marks)**

3 a. Discuss the data types used in verilog with an example. **(10 Marks)**
b. Explain system task and compiler directives in verilog. **(10 Marks)**

4 a. Explain components of verilog module with an example. **(10 Marks)**
b. Explain port declaration, port connection rules and connecting ports to external signals. **(10 Marks)**

5 a. Write a verilog gate level description for 4:1 multiplexes also write stimulus block. **(10 Marks)**
b. Explain rise delay, fall delay, turn off delay, min value, typical value and max value. **(10 Marks)**

6 a. Describe continuous assignment statement and implicit continuous assignment statement. **(10 Marks)**
b. Explain arithmetic and logical operators with example. **(10 Marks)**

7 a. Explain blocking and non blocking procedural assignment in behavioral modeling. **(10 Marks)**
b. Describe event-based-timing control mechanism in behavioral modeling. **(10 Marks)**

8 a. Explain conditional statements. Using if and else write a verilog HDL program for D_FF. **(10 Marks)**
b. Describe multiway branching. Use case statement and write verilog program for 3-bit binary counter. **(10 Marks)**

9 a. Why we use VHDL? What are the short comings of VHDL? **(10 Marks)**
b. Describe the design in VHDL. **(10 Marks)**

10 a. Discuss the basic building block of VHDL design with an example of dataflow/behavioral description. **(10 Marks)**
b. Write a VHDL description for 4 bit ripple carry adder, also write the circuit diagram for same. **(10 Marks)**

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17EC54

Fifth Semester B.E. Degree Examination, July/August 2021
Information Theory and Coding

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. A code is composed of dots and dashes. Assuming that a dash is 3 times as long as a dot and has one-third the probability of occurrence. Calculate:
(i) The information in a dot and a dash
(ii) The entropy of dot-dash code
(iii) The average rate of information if a dot lasts for 10 m-sec and this time is allowed between symbols. **(08 Marks)**

b. A zero-memory source has a source alphabet. S = {s_1, s_2, s_3} with P = {½, ¼, ¼}. Find the entropy of this source and its 2nd extension. Also verify that $H(s^2) = 2H(s)$. **(06 Marks)**

c. Derive the expression to show that n^{th} extension entropy of the basic binary source $H(s^n) = n\,H(s)$. **(06 Marks)**

2 a. The state diagram of a Markoff source is shown in Fig.Q2(a):
(i) Find the entropy H of the source
(ii) Find G_1, G_2 and G_3 and verify that $G_1 > G_2 > G_3 > H$

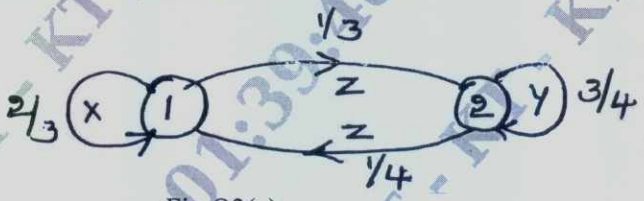

Fig.Q2(a) **(12 Marks)**

b. Suppose that s_1 and s_2 are two zero memory sources with probabilities p_1, p_2....p_n for source s_1 and q_1, q_2....q_n for source s_2. Show that the entropy of source s_1.

$$H(s_1) \le \sum_{k=1}^{n} p_k \log \frac{1}{q_k}$$ **(08 Marks)**

3 a. Explain properties of codes. **(08 Marks)**

b. Apply Shanon's encoding algorithm to the following message

S =	S_1	S_2	S_3
P =	0.5	0.3	0.2

Find code efficiency and redundancy for the basic source and its 2nd order extension source. **(12 Marks)**

4 a. Construct a binary and ternary Huffman code for the source with 8 alphabets A to H with respective probabilities 0.22, 0.20, 0.18, 0.15, 0.10, 0.08, 0.05, 0.02. Determine efficiency for both the codes. **(12 Marks)**

b. Explain:
(i) Arithmetic coding
(ii) Lempel-Ziv algorithm **(08 Marks)**

5 a. Show that the mutual information of a channel is symmetric. **(08 Marks)**

b. For the JPM given below, compute individually H(X), H(Y), H(X, Y), H(X/Y), H(Y/X) and I(X, Y)

$$P(X,Y)=\begin{bmatrix}0.05 & 0 & 0.20 & 0.05\\ 0 & 0.10 & 0.10 & 0\\ 0 & 0 & 0.20 & 0.10\\ 0.05 & 0.05 & 0 & 0.10\end{bmatrix}$$

(12 Marks)

6 a. Derive the expression of channel capacity for binary symmetric channel. **(08 Marks)**

b. Find the channel capacity of the channel matrix shown using Murgoa's method. The data transmission rate is 10,000 symbols/sec.

$$P(Y/X)=\begin{bmatrix}0.8 & 0.2 & 0\\ 0.1 & 0.8 & 0.1\\ 0 & 0.2 & 0.8\end{bmatrix}$$

(08 Marks)

c. Define the terms:
(i) PRIORI Entropy
(ii) Posteriori (conditional) entropy
(iii) Equivocation
(iv) Mutual information **(04 Marks)**

7 a. For a systematic (7, 4) linear block code, the parity check matrix P is given by

$$[P]=\begin{bmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 1 & 0 & 1\\ 0 & 1 & 1\end{bmatrix}$$

(i) Find all possible code vectors.
(ii) Draw the encoder and syndrome calculation circuit.
(iii) Direct and correct the single errors in the received vector R_A = [0111110] and R_B = [1010000]. **(12 Marks)**

b. Design a single error correcting code with a message block size of 11 and show that by an example that it can correct single error. **(08 Marks)**

8 a. For the (7, 4) single error correcting code g(x) = 1 + x + x3. Find the code vector for the message vectors D = [1001] and D = [1101]. Using systematic method. Also draw the encoder for (7, 4) cyclic code. **(10 Marks)**

b. A (15, 5) linear cyclic code has a generator polynomial $g(x)=1+x+x^2+x^4+x^5+x^8+x^{10}$
(i) Draw the encoder and syndrome calculation circuit.
(ii) Find the code polynomial for $D(x) = 1 + x^2 + x^4$ using shift registers.
(iii) Is $V(x)=1+x^4+x^6+x^8+x^{14}$ a code polynomial? **(10 Marks)**

9 a. Consider the (3, 1, 2) convolutional code with $g^{(1)} = (110)$, $g^{(2)} = (101)$ and $g^{(3)} = (111)$.
(i) Draw the encoder block diagram.
(ii) Find the code word to the information sequence (11101) using time-domain and transform domain approach. **(10 Marks)**

b. Write short notes on:
(i) Golay codes
(ii) BCH codes **(10 Marks)**

10 a. For the (2, 1, 2) convolutional encoder $g^{(1)} = 111$, $g^{(2)} = (101)$. Draw the encoder diagram. Also write the state table, state transition table, state diagram and the corresponding code tree. Using the code tree, find the encoded sequence for the message (10111). Verify the output sequence so obtained using transform domain approach. **(14 Marks)**

b. For the convolutional encoder shown in Fig.Q10(b), find the encoded sequence for the information sequence 10111 using both time domain and transform domain approach.

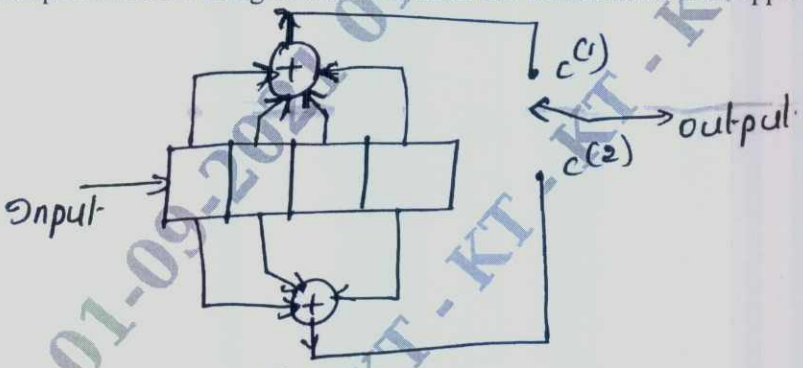

Fig.Q10(b) **(06 Marks)**

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17EC553

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

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. Explain resource allocation techniques. **(10 Marks)**

b. Explain various classes of operating system. With an emphasis on prime concern and key concepts used. **(10 Marks)**

2 a. Explain multiprogramming operating system with the help of timing diagram. **(10 Marks)**

b. List the features of real time operating system. **(05 Marks)**

c. Explain key concepts used in distributed operating system. **(05 Marks)**

3 a. With the help of state transition diagram, explain process states. **(10 Marks)**

b. Explain Kernel level and user level threads. **(10 Marks)**

4 a. Apply SRN and LCN scheduling policies to find mean turnaround time $\overline{ta}$ and mean weighted turnaround time $\overline{w}$ for the processes shown in Table.Q4(a). Use $\delta = 1$ second.

Process	P_1	P_2	P_3	P_4	P_5
Admission time	0	2	3	4	8
Service time	3	3	5	2	3

Table.Q4(a) **(12 Marks)**

b. Explain functions of long term, medium term and short term schedulers in time sharing system. **(08 Marks)**

5 a. Compare contiguous and non contiguous memory allocation. **(04 Marks)**

b. Explain: (i) Paging (ii) Segmentation **(08 Marks)**

c. Explain memory fragmentation and clearly explain techniques used to overcome external fragmentation. **(08 Marks)**

6 a. With the help of figures, explain demand paging. **(08 Marks)**

b. For the following page reference string apply FIFO and LRU page replacement policies to find number of page faults. Use alloc = 3.
Page reference string: 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5
Reference time string: $t_1, t_2, t_3, t_4, t_5, t_6, t_7, t_8, t_9, t_{10}, t_{11}, t_{12}, t_{13}$ **(12 Marks)**

7 a. List File system and IOCS facilities. **(04 Marks)**

b. List File operations. **(06 Marks)**

c. Explain direct access file organization. **(10 Marks)**

8 a. Explain various fields of FCB. **(10 Marks)**

b. Explain Linked allocation of disk space. **(10 Marks)**

9 a. Explain: (i) Direct naming and indirect naming (ii) Blocking and non blocking send **(10 Marks)**

b. With the help of figure, explain buffering of inter process messages. **(10 Marks)**

10 a. List the events related to resource allocation. **(04 Marks)**

b. Explain various conditions for resource deadlock. **(06 Marks)**

c. With examples, describe: (i) Graph model (ii) Matrix model used to determine if set of processes is deadlocked **(10 Marks)**

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17EC562

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

Object Oriented Programming using C++

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. Explain different control structures in C++. **(09 Marks)**
b. Explain the application of scope resolution operator with an example program. **(07 Marks)**
c. Describe identifiers and constants. **(04 Marks)**

2 a. Explain: i) Input operator ii) Output operator and iii) Comments in C++. **(09 Marks)**
b. Explain user defined data types in C++. **(07 Marks)**
c. Write a program to add first N natural numbers. **(04 Marks)**

3 a. Describe: i) Call by value and ii) Call by reference method of argument passing to a function with example program. **(06 Marks)**
b. Explain friend function. Define a class by name myclass, which has two variables a and b. Write a friend function to find mean of a and b and display the result. **(08 Marks)**
c. Explain the structure of a class with a simple C++ program. **(06 Marks)**

4 a. What is a recursive function? Explain with an example program. **(06 Marks)**
b. Define a class employee with private variables name and age. Write a program to read the name and age of three managers and display them. **(08 Marks)**
c. Explain function overloading with example. **(06 Marks)**

5 a. What is a constructor? Mention the characteristics of constructor function. **(06 Marks)**
b. Write a C++ program to overload binary operator using friend function. **(08 Marks)**
c. Explain copy constructor with an example program. **(06 Marks)**

6 a. Explain multiple constructors in a class using a C++ program. **(06 Marks)**
b. Write a C++ program to demonstrate dynamic constructors in a class. **(08 Marks)**
c. Write a C++ program to overload unary-operator. **(06 Marks)**

7 a. Explain inheritance. Discuss different types of inheritance with diagram. **(06 Marks)**
b. Describe multiple inheritance with example program. **(08 Marks)**
c. Explain this pointer with a program. **(06 Marks)**

8 a. What is a virtual function? Mention the rules for virtual function. **(06 Marks)**
b. Explain single inheritance with suitable program. **(08 Marks)**
c. Explain how ambiguity is resolved in multiple inheritance. **(06 Marks)**

9 a. Explain C++ stream classes. **(06 Marks)**
b. What are put( ) and get( ) functions? Explain with example program. **(08 Marks)**
c. Demonstrate reading from two files simultaneously. **(06 Marks)**

10 a. Explain opening and closing of a single file with example program. **(08 Marks)**
b. Explain: i) width ii) precision iii) fill. **(06 Marks)**
c. Explain getline( ) and write( ) functions. Demonstrate with example program. **(06 Marks)**

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17EC563

Fifth Semester B.E. Degree Examination, July/August 2021
8051 Microcontroller

Time: 3 hrs. Max. Marks: 100

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

1 a. Explain the architecture of 8051 microcontroller with a neat diagram. **(10 Marks)**
b. Compare microprocessor and microcontroller. **(04 Marks)**
c. Explain the working of port 0 and port 1 with the help of necessary diagram. **(06 Marks)**

2 a. Show the internal memory organization of 8051. **(06 Marks)**
b. Explain the interfacing of external ROM and RAM to 8031 microcontroller with the help of a neat diagram. **(10 Marks)**
c. Explain the addressability and byte addressability with examples. **(04 Marks)**

3 a. Explain the different addressing modes with examples. **(08 Marks)**
b. Explain the following instructions with examples.
i) DJNZ R2, again ii) MOV A, 50h iii) INC R1 iv) DA A **(08 Marks)**
c. Write an ALP to add two 16-bit numbers. **(04 Marks)**

4 a. Write an ALP to transfer the data bytes 10h, 20h, 30h, 40h, 50h to memory locations 60h, 61h, 62h, 63h, 64h without using loops. **(08 Marks)**
b. Explain different rotate instructions with examples. **(08 Marks)**
c. Mention the flags of PSW and its applications in instructions. **(04 Marks)**

5 a. Explain the sequence of events when a call opcode occurs in the program and use of stack with necessary diagram. **(08 Marks)**
b. Write an ALP to find factional of an 8-bit number. The result should be maximum of 8-bit. **(06 Marks)**
c. Write an ALP to add first 10 natural numbers. **(06 Marks)**

6 a. Write an ALP to find smallest number in an array of 10 bytes from location 60h. **(10 Marks)**
b. Show different jump instructions in 8051 with diagram based on range. **(06 Marks)**
c. In the Fig Q6(c), write an ALP to turn on LED when switch is pressed and turn off, LED when switch is not pressed.

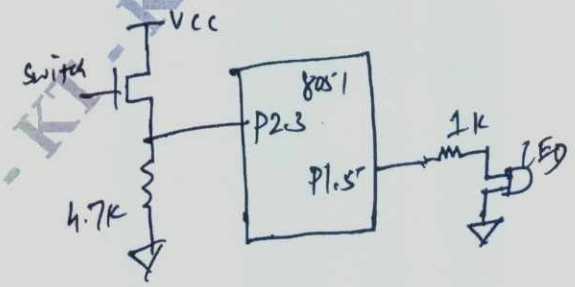

Fig Q6(c) **(04 Marks)**

7 a. Explain the brief the operation of timer in mode 1 and mode 2. Also calculate the maximum delay for both modes if XTAL is 11.0592MHz. **(10 Marks)**

b. Generate a waveform given in Fig Q7(b), if XTAL = 11.0592MHz P1.3 use timer 0 in mode 1.

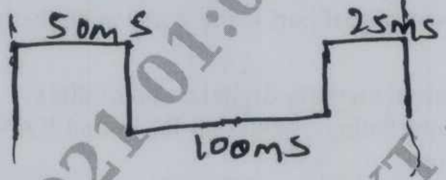

Fig Q7(b) **(10 Marks)**

8 a. Generate a square wave of frequency of 1KHz and 2KHz using timer 1 in mode 2 Assume XTAL = 22MHz. **(10 Marks)**

b. Write an 8051 C program to send two different strings to the serial port. Assuming that SW is connected to pin P2.0, monitor its status and make a decision follows :
SW = 0 : Send your data as BE
SW = 1 : Send your data as VTU
Assume XTAL = 11.0592MHz, baud rate of 9600, 8-bit data, 1 stop bit. **(10 Marks)**

9 a. Two switches are connected to pins P3.2 and P3.3. When a switch is pressed, the correspond lines goes low. Write an assemble language program to
i) Light an LED's connected to port 0 , if first switch is pressed
ii) Light all LED's connected to port 2 , if the second switch is pressed **(10 Marks)**

b. Write a C program to create a square wave of 200ms period on pin 2.5. Use timer 0 in mode 2. Assume XTAL = 11.0592MHz. Simultaneously get data from P1.7 and send it to P1.0. **(10 Marks)**

10 a. With a neat diagram, explain interfacing of LCD to 8051. **(06 Marks)**

b. A switch is connected to pin P2.7. Write a assembly language program to monitor the status of SW and perform the following :
i) If SW = 0, the stepper motor moves clockwise
ii) If SW = 1, the stepper motor moves counter clockwise. **(08 Marks)**

c. With the neat diagram, explain the interfacing of ADC 0804 to 8051 Microcontroller **(06 Marks)**

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