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15ES/EI51

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Management & Entrepreneurship Development

Time: 3 hrs. Max. Marks: 80

Note: ***Answer FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Classify management into three levels. **(03 Marks)**
b. Summarize briefly three types of managerial skills. **(06 Marks)**
c. Analyse management as science and also as an art. **(07 Marks)**

OR

2 a. Define planning. Explain any six limitations of planning. **(07 Marks)**
b. Illustrate and explain different blocks of decision making process. **(09 Marks)**

Module-2

3 a. Select and describe important steps in the process of organizing. **(05 Marks)**
b. Explain the advantages and disadvantages of committees in an organization. **(05 Marks)**
c. Summarize any six types of recruitment process. **(06 Marks)**

OR

4 a. What is direction in an organization? Explain any five techniques of co-ordination. **(06 Marks)**
b. Explain the three basic steps in a control process. **(06 Marks)**
c. List four important characteristics of leadership. **(04 Marks)**

Module-3

5 a. Why is social audit required? **(02 Marks)**
b. Illustrate the social responsibilities of business towards different groups. **(08 Marks)**
c. List out the advantages of corporate governance. **(06 Marks)**

OR

6 a. Explain any four characteristics of successful entrepreneurship. **(08 Marks)**
b. Summarize capacity building for entrepreneurship. **(08 Marks)**

Module-4

7 a. Explain any four roles or importance of Small Scale Industries (SSI) in economic development. **(08 Marks)**
b. Define Ancillary Industry and Tiny Industry. **(04 Marks)**
c. Outline any four reasons for sickness in SSI sector. **(04 Marks)**

OR

8 Summarize any four state level or central level institutions that support small business enterprises. **(16 Marks)**

Module-5

9 a. List out any four characteristics of project. **(04 Marks)**
b. Classify projects into different types based on various parameters. **(05 Marks)**
c. What is project formulation? Explain the major steps involved in project formulation. **(07 Marks)**

OR

10 a. Mention various steps involved in the PERT analysis. **(10 Marks)**
b. List out the advantages and limitations of CPM. **(04 Marks)**
c. Show the relation between project design and network using block diagram. **(02 Marks)**

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15EC52

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Digital Signal Processing

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Derive the DFT expression from the DTFT. **(04 Marks)**

b. Compute the 'N' point DFT of the sequence
$x(n) = a.n\ 0 \le n \le N-1$. **(06 Marks)**

c. Find the circular convolution between the sequences using DFT and IDFT method
$x_1(n) = (1, 2, 3, 1)$ and $x_2(n) = (4, 3, 2, 1)$ **(06 Marks)**

OR

2 a. State and prove that circular (i) Folding ii) Frequency shift properties of an 'N' point sequence. **(06 Marks)**

b. Consider the finite length sequence $x(n) = \delta(n) + 2\delta(n-j)$ Find :
(i) 10 point DFT of x(n)
(ii) $y(k) = e^{-j\left(\frac{4\pi k}{10}\right)} X(k)$ where X(k) is 10 point DFT of x(n) find y(n)
(iii) Find z(n) that has DFT $z(k) = X(k).w(k)$ where w(k) is the 10 point DFT of $w(n) = u(n) - u(n-7)$ **(07 Marks)**

c. Let x(n) be a finite length sequence with $x(k) = \{1, 4j, 0, -4j\}$, find the DFT's of
(i) $x_1(n) = e^{j\frac{\pi}{2}n} x(n)$ (ii) $x_2(n) = \cos\left(\frac{\pi}{2}n\right) x(n)$ (iii) $x_3(n) = x((n-1)_4)$ **(03 Marks)**

Module-2

3 a. Explain the disadvantages of direct computation of DFT and advantage of FFT. **(04 Marks)**

b. Find the output y(n) of a filter whose impulse response $h(n) = \{3, 2, 1\}$ and input $x(n) = \{2, 1, -1, -2, -3, 5, 6, -1, 2, 0, 2, 1\}$. Using overlap and save method. Use 8 point circular convolution in your approach. **(10 Marks)**

c. State and prove symmetric property of twiddle factor w_N. **(02 Marks)**

OR

4 a. Find the number of complex multiplications and additions required to computer 128 point DFT using (i) Direct method (ii) FFT (iii) what is the speed improvement factor (iv) Number of real registers needed (v) Number of trigonometric functions needed. **(06 Marks)**

b. A long sequence x(n) is filtered with a filter with impulse response h(n) to produce output y(n). If $x(n) = \{1, 4, 3, 0, 7, 4, -7, -7, -1, 3, 4, 3\}$ and $h(n) = \{1, 2\}$. Compute y(n) using overlap and add method. Use only 5 point circular convolution in your approach. **(10 Marks)**

Module-3

5 a. Develop 8 point DIT-FFT radix – 2 algorithm and draw the signal flow graph. **(08 Marks)**

b. Find the 8 point DFT of the sequence $x(n) = \{1, 1, 1, 1, 0, 0, 0, 0\}$ using radix – 2 DIF FFT algorithm. **(08 Marks)**

OR

6 a. Find the 4 point circular convolution of x(n) and h(n) given below using radix – 2 DIT FFT algorithm. x(n) = {1, 1, 1, 1} h(n) = {1, 0, 1, 0}. **(06 Marks)**

b. First five points of 8-point DFT's of a real valued sequence is given by x(0) = 0 x(1) = 2 + 2j, x(2) = -4j, x(3) = 2 – 2j, x(4) = 0. Determine the remaining points. Hence find the sequence x(n) using radix – 2 DIT FFT algorithm. **(10 Marks)**

Module-4

7 a. Compare Butterworth and Chebyshev filters. **(04 Marks)**

b. Design an analog lowpass Butterworth filter for the following specifications
$0.8 \le |H_a(s)| \le 1, 0 \le \Omega \le 0.2\pi,\ |H_a(s)| \le 0.2, 0.6\pi \le \Omega \le \pi$. **(08 Marks)**

c. Explain Analog to Analog transformation. **(04 Marks)**

OR

8 a. Design a digital lowpass filter using BLT to satisfy the following chart.
i) Monotonic pass and stop band
ii) -3dB cut –off of 0.5π rad
iii) Magnitude down atleast 15dB at 0.75π rad **(08 Marks)**

b. Find H(z) for the given T.F $H(s) = \dfrac{s+a}{(s+a)^2 + b^2}$ using Impulse Invariant Transformation (IIT) technique. **(08 Marks)**

Module-5

9 a. Obtain direct form – I, Form – II, Cascade and parallel form of realization for the following system. y(n) = 0.75 y(n – 1) – 0.125 y(n – 2) + 6x(n) + 7x (n – 1) + x(n – 2). **(12 Marks)**

b. Realize an FIR filter given by $h(n) = \left(\frac{1}{2}\right)^n [u(n) - u(n-4)]$ using direct form – I. **(04 Marks)**

OR

10 a. Write equations of any four different windows used in design of FIR filters. **(10 Marks)**

b. Design the symmetric FIR, lowpass filter whose desired frequency response is given as

$$H_d(w) = \begin{cases} e^{-jw\tau} & \text{for } |w| \le w_c \\ 0 & \text{otherwise} \end{cases}$$

The length of the filter should be 7 and $w_c = 1$ radian/sample use rectangular window. **(06 Marks)**

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15EC53

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Verilog HDL

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain top-down design methodology with an example. **(06 Marks)**

b. Explain the typical design flow for designing VLSI IC circuits, with a neat flow chart. **(10 Marks)**

OR

2 a. Explain Bottom-up design methodology with an example. **(06 Marks)**

b. Explain the different levels of abstraction used for programming in verilog. **(10 Marks)**

Module-2

3 a. Explain system tasks and compiler directives in verilog. **(06 Marks)**

b. What are the basic components of a module? Explain all the components of a verilog module with a neat block diagram. **(06 Marks)**

c. Write verilog description of SR Latch. Also write stimulus code. **(04 Marks)**

OR

4 a. Write a note on: i) Registers ii) Nets iii) Arrays iv) Parameters v) Vectors vi) Memories. **(12 Marks)**

b. Declare a top-level module "Stimulus". Define Reg_in (4 bit) and Clk (1 bit) as register variables and Reg_out (4 bits) as wire. Instantiate the module "shift-reg" in "stimulus" block and connect the ports by ordered list. Declare A (4 bit) and clock (1 bit) as inputs and B (4 bit) as output in "shift-reg" module. (No need to show internals). Write a verilog code for the above. **(04 Marks)**

Module-3

5 a. Write the verilog description of 4 bit ripple carry adder at gate level abstraction, with a neat block diagram. Also, write stimulus block. **(08 Marks)**

b. What would be the output of the following:

a = 4'b1010, b = 4'b1111

i) a & b ii) a && b iii) & a iv) a >> 1 v) a >>> 1 vi) y = {2{a}}

vii) a ∧ b viii) z = {a, b}. **(08 Marks)**

OR

6 a. A full subtractor has three 1-bit inputs x, y and z (previous borrow) and two 1-bit outputs D(Difference) and B(Borrow). The logic equations are

$D = \bar{x}\bar{y}z + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xyz$

$B = \bar{x}y + \bar{x}z + yz$

Write verilog description using dataflow modeling. Instantiate the subtractor module inside a stimulus block and test all possible combinations of inputs x, y and z. **(08 Marks)**

b. Design 4:1 multiplexer using gate level modeling or structural description. Write stimulus block. **(08 Marks)**

Module-4

7 a. Explain structured procedure statements in verilog. **(06 Marks)**
b. Write a verilog behavioral 8:1 multiplexer program using case statement. **(06 Marks)**
c. Explain casex and casez statements in verilog. **(04 Marks)**

OR

8 a. Explain procedural assignment statements in verilog. **(06 Marks)**
b. Explain sequential and parallel blocks with examples. **(06 Marks)**
c. Write a verilog code to find the first bit with a value 1 in Flag = 16'b 0010_0000_0000_0000. **(04 Marks)**

Module-5

9 a. Explain the design tool flow followed in VLSI design with a neat flow diagram. **(10 Marks)**
b. Write VHDL Data flow description of 1 Bit full Adder. **(06 Marks)**

OR

10 a. Explain the relationship between a design entity and its entity declaration and architecture body in VHDL. **(10 Marks)**
b. Write VHDL structural description of 1 Bit Full Adder. **(06 Marks)**

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15EC54

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Information Theory and Coding

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

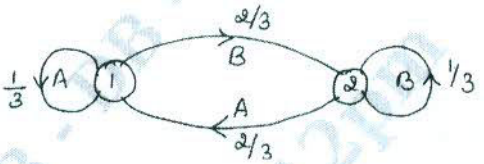
Module-1

1 a. The output of an information source contains 160 symbols, 128 of which occur with a probability of $\frac{1}{256}$ and remaining with a probability of $\frac{1}{64}$ each. Find the average information rate of the source if the source emits 10,000 sym/s. **(02 Marks)**

b. In a facsimile transmission of a picture, there are 4×10^6 pixels/frame. For a good reconstruction of the image atleast eight brightness levels are necessary. Assuming all these levels are equally likely to occur. Find the average information rate if one picture is transmitted every 4s. **(04 Marks)**

c. Consider the following Markov source shown in fig. Q1(c). Find i) State probabilities ii) State entropies iii) Source entropy iv) G_1, G_2 v) Show that $G_1 > G_2 > H$. **(10 Marks)**

Fig.Q1(c)



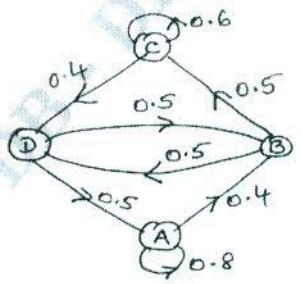
OR

2 a. The international Morse code uses a sequence of symbols of dots and dashes to transmit letters of English alphabet. The dash is represented by a current pulse of duration 2ms and dot of 1ms. The probability of dash is half as that of dot. Consider 1ms duration of gap is given in between the symbols. Calculate i) Self – information of a dot and a dash ii) Average information content of a dot – dash code iii) Average rate of information. **(06 Marks)**

b. State the properties of Entropy. **(04 Marks)**

c. Consider the Markov source shown in fig. Q2(c). find i) State probabilities ii) State entropies iii) Source entropy. **(06 Marks)**

Fig.Q2(c)



Module-2

3 a. With an example, explain Prefix codes. **(04 Marks)**

b. Consider the following source S = {A, B, C, D, E} with probabilities P = {0.5, 0.25, 0.125, 0.0625, 0.0625}. Find the code words for the symbols using Shannon's encoding algorithm. Also, find the source efficiency and redundancy. **(06 Marks)**

c. An information source produces a sequence of independent symbols having the following probabilities. Construct binary code using Huffman encoding and find its efficiency. **(06 Marks)**

A	B	C	D	E	F	G
1/3	1/27	1/3	1/9	1/9	1/27	1/27

OR

4 a. State Kraft McMillan Inequality property. **(04 Marks)**

b. Consider a discrete memory less source with S = (X, Y, Z) with the corresponding probabilities P = (0.5, 0.3, 0.2). Find the code words for the symbols using Shannon's algorithm. Also, find the source efficiency and redundancy. **(06 Marks)**

c. Consider a discrete memory less source with S = (X, Y, Z) with respective probabilities P = (0.6, 0.2, 0.2). Find the codeword for the message 'YXZXY' using arithmetic coding. **(06 Marks)**

Module-3

5 a. A binary channel has the following characteristics

$$P(Y/X) = \begin{bmatrix} 2/3 & 1/3 \\ 1/3 & 2/3 \end{bmatrix}$$

. If input symbols are transmitted with probabilities ¾ and ¼ respectively. Find entropies, H(X) , H(X, Y) and H(Y/X). **(03 Marks)**

b. Prove that the mutual information is always a non - negative entity $I(X ; Y) \geq 0$. **(06 Marks)**

c. The noise characteristics of a channel are as shown in fig.Q5(c). Find the capacity of the channel using Muroga's method. **(07 Marks)**

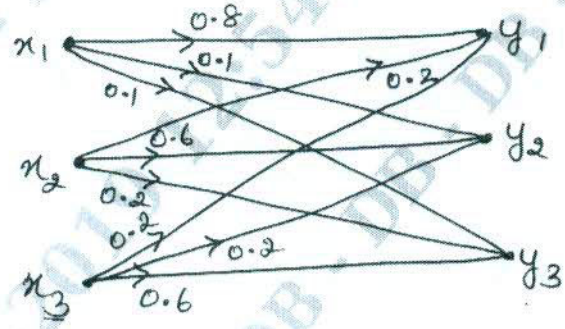


Fig.Q5(c)

OR

6 a. State the properties of Joint Probability Matrix. **(04 Marks)**

b. Find the mutual information for the channel shown in fig.6(b). Let $P(x_1) = 0.6$ and $P(x_2) = 0.4$. **(06 Marks)**

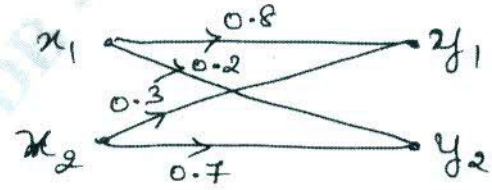


Fig.Q6(b)

c. Derive the expression for the channel capacity of a Binary Symmetric Channel. **(06 Marks)**

Module-4

7 a. For a (6, 3) code find all the code vectors if the co-efficient matrix P is given by

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

i) Find code vector ii) Implement the encoder iii) Find the syndrome vector (S).
iv) Implement the syndrome circuit. **(08 Marks)**

b. Obtain the generator and parity check matrices for an (n, k) cyclic code with $g(x) = 1+x+x^3$. **(08 Marks)**

OR

8 a. In an LBC, the syndrome is given by

$S_1 = r_1 + r_2 + r_3 + r_5$; $S_2 = r_1 + r_2 + r_4 + r_6$; $S_3 = r_1 + r_3 + r_4 + r_7$.

i) Find the parity check matrix (H) ii) Draw the encoder circuit
iii) Find the code word for all input sequences.
iv) What is the syndrome for the received data 1011011? **(08 Marks)**

b. In a (15,5) cyclic code, the generator polynomial is given by $g(x) = 1+x+ x^2+x^4+x^5+ x^8+ x^{10}$. Draw the block diagram of an encoder and syndrome calculator for this code. Find whether $r(x) = 1+ x^4 + x^6 + x^8 + x^{14}$ a valid code word. **(08 Marks)**

Module-5

9 a. Design a (15,7) binary BCH code with r = 2. **(06 Marks)**

b. Consider the (3, 1, 2) convolution code with $g^{(1)} = (1\ 1\ 0)$, $g^{(2)} = (1\ 0\ 1)$, $g^{(3)} = (1\ 1\ 1)$.
i) Find the constraint length ii) Find the rate iii) Draw the encoder block diagram
iv) Find the generator matrix v) Find the code word for the message sequence (1 1 1 0 1) using time – domain and transfer – domain approach. **(10 Marks)**

OR

10 a. Explain why (23, 12) Golay code is called as perfect code. **(04 Marks)**

b. Consider the convolution encoder shown in fig. Q10(b).
i) Write the impulse response of the encoder.
ii) Find the output for the message (1 0 0 1 1) using time – domain approach.
iii) Find the output for the message (1 0 0 1 1) using transfer – domain approach. **(12 Marks)**

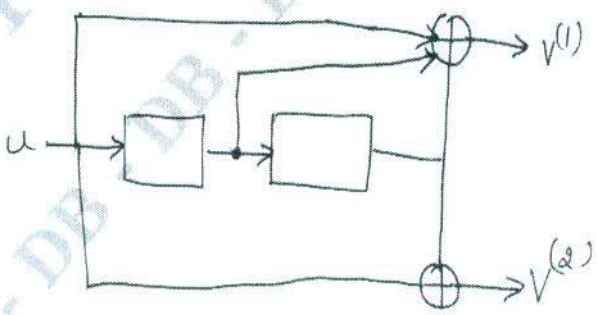


Fig.Q10(b)

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15EC562

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Object Oriented Programming using C++

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is C++? List the applications of C++. **(04 Marks)**

b. Describe the structure of a C++ program with an example. **(08 Marks)**

c. When do we use cascading of input/output operators? Give example. **(04 Marks)**

OR

2 a. Write a C++ program to find the sum of digits of a given number.
e.g If input number = 16738
output is 25 i.e. 1 + 6 + 7 + 3 + 8. **(04 Marks)**

b. Explain the different types of expressions in C++. Give examples for each type. (any four) **(08 Marks)**

c. With an example, describe the purpose of new and delete operators in C++. **(04 Marks)**

Module-2

3 a. Mention the restrictions posed by the complier on inline functions. **(04 Marks)**

b. Design a class 'triangle' containing data items 'base' 'height' and four member functions setdata( ), getdata( ), displaydata( ) and findarea( ), to set values to 'base' and 'height', to get the user input, to display and find area of triangle (i.e. $\frac{1}{2}$ * base*height) respectively. Write the main function which creates the object and uses the members of the class. **(08 Marks)**

c. Discuss the different types of function overloading in C++. **(04 Marks)**

OR

4 a. When do we use default arguments? State the rules that need to be followed while using default arguments. **(04 Marks)**

b. Draw a neat diagram and explain the process of memory allocation to objects in C++. **(06 Marks)**

c. Develop a C++ program to define two classes namely husband and wife that hold a private member 'salary' respectively. Calculate and display the total income of the family using friend function. **(06 Marks)**

Module-3

5 a. How are constructors differ from member functions of a class? **(04 Marks)**

b. What is operator overloading? Give syntax and example. List the operators that cannot be overloaded. **(06 Marks)**

c. Explain the significance of friend functions to overload operators. **(06 Marks)**

OR

6 a. Discuss the importance of dynamic constructors and destructor in a C++ class. **(08 Marks)**

b. Write a C++ program to add two complex numbers by overloading the + operator. Also overload << and >> operators for reading and displaying the complex numbers. **(08 Marks)**

Module-4

7	a.	What is inheritance? List its advantages.	(04 Marks)
	b.	Explain the visibility inheritance modes. Give an example.	(08 Marks)
	c.	Compare multiple inheritances with multilevel inheritance.	(04 Marks)

OR

8	a.	What is abstract class? Give an example.	(04 Marks)
	b.	Demonstrate the working of pointers as objects with a relevant example.	(08 Marks)
	c.	State the differences between virtual and pure virtual functions.	(04 Marks)

Module-5

9	a.	What is a data stream? Describe the hierarchy of file stream classes in C++.	(08 Marks)
	b.	Explain the following unformatted I/O functions : i) getline( ) ii) write( ).	(04 Marks)
	c.	Compare and contrast width( ) and setw( ).	(04 Marks)

OR

10	a.	How file opening and closing is done? What are the functions required for reading and writing data in a file. Explain with an example.	(08 Marks)
	b.	Create a C++ program to read a text file and find number of characters, words and lines in a file.	(08 Marks)

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15EC553

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Operating Systems

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define operating system. Explain the key concerns of an operating system. **(10 Marks)**
b. Explain the different computational structures of operating system. **(06 Marks)**

OR

2 a. Explain different classes of operating system. **(10 Marks)**
b. Explain various resource allocation strategies. **(06 Marks)**

Module-2

3 a. Define process, process states and transition with suitable algorithm. **(08 Marks)**
b. Explain Process Control Block. **(08 Marks)**

OR

4 a. For a given set of process FCFS and SRN scheduling compare their performance in terms of mean turnaround time and weighted turnaround time. **(10 Marks)**

Process	P_1	P_2	P_3	P_4	P_5
Admission time	0	2	3	5	9
Service time	3	3	2	5	3

b. Explain long-term and short term scheduling. **(06 Marks)**

Module-3

5 a. Compare contiguous and non-contiguous memory allocation techniques. **(08 Marks)**
b. Write a short note on : i) paging ii) segmentation. **(08 Marks)**

OR

6 a. Explain demand paging preliminaries. **(10 Marks)**
b. Write short note on :
i) First–In–First–Out (FIFO) page replacement policy. **(03 Marks)**
ii) Least Recently Used (LRU) page replacement policy. **(03 Marks)**

Module-4

7 a. Explain file system and IOCS. **(08 Marks)**
b. Explain fundamental file organizations. **(08 Marks)**

OR

8 a. Explain directory structures. **(08 Marks)**
b. Explain file system action at a file operation. **(08 Marks)**

Module-5

9 a. Define message passing. Explain how to implement the message passing. **(08 Marks)**
b. Explain mail boxes and message passing in unix. **(08 Marks)**

OR

10 a. Define deadlock. Explain deadlock in resource allocation. **(08 Marks)**
b. Explain deadlock detection algorithm. **(08 Marks)**

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15EC563

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
8051 Microcontroller

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is a micro controller? Mention its applications. **(04 Marks)**

b. With a neat block diagram explain the features of 8051 microcontroller. **(06 Marks)**

c. Mention the internal RAM organization in 8051 microcontroller. **(06 Marks)**

OR

2 a. With a neat functional block diagram explain the architecture of 8051. **(08 Marks)**

b. Design a micro controller system using 8051 microcontroller, 4 kbytes of ROM and 8k bytes of RAM interface the external memory such that the starting address of ROM is 1000 H and RAM is C000H. **(08 Marks)**

Module-2

3 a. Explain any 4 different addressing modes used in 8051 microcontroller with suitable illustrations. **(08 Marks)**

b. Explain the following instructions with examples.

i) DJNZ Rn, rel
ii) JNC rel
iii) ANL A, R_n
iv) DA A. **(08 Marks)**

OR

4 a. Write 8051 instructions to rotate the contents of A left by two positions. **(08 Marks)**

b. Write 8051 instructions to add two BCD numbers and store the result in BCD in register R_1. **(08 Marks)**

Module-3

5 a. Write a program to find the smallest number of an array of N-8 bit unsigned numbers. The starting address is at 2000h and store the result in 2500H. **(08 Marks)**

b. Write a program to count the numbers of 1's and 0's in 8 bit data stored. **(08 Marks)**

OR

6 a. Write a program to arrange the numbers in ascending order. **(08 Marks)**

b. Write a program to create a delay of 1sec. Assume that the oscillator frequency is 1.2 MHz. **(08 Marks)**

Module-4

7 a. Explain the jump and CALL program range with reference to 8051 microcontroller. **(06 Marks)**

b. Write a program to find the factorial of a number. **(06 Marks)**

c. Write a program to move a block of data stored in external memory location 9000h to a location starting from F000h (without overlapping). **(04 Marks)**

OR

8 a. Explain the role of CALL and subroutines in 8051 microcontroller programming. **(04 Marks)**

b. What are timers and counters? Explain its operations. **(06 Marks)**

c. Explain timer control register and timer mode control register. **(06 Marks)**

Module-5

9 a. Explain the 8051 S-CON register. **(08 Marks)**

b. Write a 8051 subroutine program to initialize 8051 serial port to operate in mode 0 for transmission. **(04 Marks)**

c. Explain RS – 232 standards. **(04 Marks)**

OR

10 a. Bring out the difference between interrupts and polling. **(04 Marks)**

b. Explain interrupt priority register of 8051 microcontroller. **(04 Marks)**

c. Write an 8051 C program to send letters 'M', 'D' and E to the LCD using delays. **(08 Marks)**

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15EC52

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

Time: 3 hrs. Max. Marks: 80

Note: *Answer any FIVE full questions.*

1 a. Compute the N-point DFT of the sequence, $x(n) = a.n \quad 0 \le n \le N-1$. **(08 Marks)**

b. Obtain the relationship between DFT and Z-transform. **(04 Marks)**

c. Find the Inverse DFT of the sequence $X(K) = (2, 1+j, 0, 1-j)$. **(04 Marks)**

2 a. Compute the 8-point DFT of the sequence x(n) given below:
$x(n) = (1, 1, 1, 1, 0, 0, 0, 0)$. **(06 Marks)**

b. Compute the N-point DFT of the sequence,
$x(n) = a^n, \quad 0 \le n \le N-1$. **(04 Marks)**

c. Find the IDFT of 4-point sequence,
$X(K) = (4, -j2, 0, j2)$ using the DFT. **(06 Marks)**

3 a. In many signal processing applications, we often multifly an infinite length sequence by a window of length N. The time-domain expression for this window is,

$$w(n) = \frac{1}{2} + \frac{1}{2}\cos\left[\frac{2\pi}{N}\left(n - \frac{N}{2}\right)\right]$$

What is the DFT of the windowed sequence, $y(n) = x(n)w(n)$? Keep the answer in terms of X(n). **(07 Marks)**

b. Let x(n) be a real sequence of length N and its N-point DFT is given by X(K) . Show that :

(i) $X(N-K) = X^*(K)$. (ii) X(0) is real, and

(iii) If N is Even, $X\left(\frac{N}{2}\right)$ is real. **(09 Marks)**

4 a. Let x(n) = (1, 2, 0, 3, -2, 4, 7, 5). Evaluate the following :

(i) X(0) (ii) X(4) (iii) $\sum_{K=0}^{7} X(K)$ (iv) $\sum_{K=0}^{7} |X(K)|^2$ **(08 Marks)**

b. Perform x(n)*h(n), $0 \le n \le 11$ for the sequence x(n) and h(n) given below using overlap-add based fast convolution technique. Choose appropriately number of points of circular convolution.
h(n) = (1, 1, 1)
and x(n) = (1, 2, 0, -3, 4, 2, -1, 1, -2, 3, 2, 1, -3) **(08 Marks)**

5 a. Find the 4 point circular convolution of x(n) and h(n) given in Fig. Q5 (a) using radix-2 DIF-FFT algorithm. **(08 Marks)**

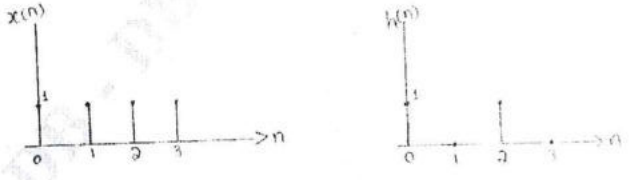

Fig. Q5 (a)

b. Find the 8-point DFT of sequence x(n), x(n) = (1, 1, 1, 1, 0, 0, 0, 0) using DIT-FFT radix-2 algorithm. Use the butterfly diagram. **(08 Marks)**

6 a. Derive the DIT-FFT algorithm. **(08 Marks)**

b. Find number of complex multiplications and complex additions in finding 512 point DFT. **(02 Marks)**

c. Find the 4-point real sequence x(n) if its 4-point DFT samples are X(0) = 6, X(1) = −2+j2, X(2) = −2. Use DIF–FFT algorithm. **(06 Marks)**

7 a. Draw the block diagrams of direct form-I and direct form-II realization for a digital IIR filter described by the system function.

$$H(z)=\frac{8z^3-4z^2+11z-2}{\left(z-\frac{1}{4}\right)\left(z^2-z+\frac{1}{2}\right)}.$$ **(08 Marks)**

b. Obtain a parallel realization for the system described by,

$$H(z)=\frac{\left(1+z^{-1}\right)\left(1+2z^{-1}\right)}{\left(1+\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{4}z^{-1}\right)\left(1+\frac{1}{8}z^{-1}\right)}.$$ **(08 Marks)**

8 a. Design an analog bandpass filter to meet the following frequency domain specifications:

(i) a −3.0103 dB upper and lower cut-off frequency of 50 Hz and 20 kHz.

(ii) a stopband attenuation of atleast 20 dB at 20 Hz and 45 kHz and

(iii) a monotonic frequency response. **(08 Marks)**

b. Let $H_a(s)=\frac{s+a}{(s+a)^2+b^2}$ be a casual second order transfer function. Show that the casual second order digital function H(z) is obtained from $H_a(s)$ through impulse invariance method is given by,

$$H(z)=\frac{1-e^{-aT}\cos bTz^{-1}}{1-2\cos bTe^{-aT}z^{-1}+e^{-2aT}z^{-2}}.$$ **(08 Marks)**

9 a. The desired frequency response of a low pass filter is given by,

$$H_d(e^{jw})=H_d(w)=\begin{cases}e^{-j3w}, & |w|<\frac{3\pi}{4}\\ 0, & \frac{3\pi}{4}<|w|<\pi\end{cases}.$$

Determine the frequency response of the FIR filter if Hamming window is used with N = 7. **(08 Marks)**

b. Determine the co-efficients K_m of the lattice filter corresponding to FIR filter described by the system function,

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

Also, draw the corresponding second order lattice structure. **(08 Marks)**

10 a. A low pass filter is to be designed with the following desired frequency response:

$$H_d(e^{jw}) = H_d(w) = \begin{cases} e^{-j2w}, & |w| < \frac{\pi}{4} \\ 0, & \frac{\pi}{4} < |w| < \pi \end{cases}.$$

Determine the filter co-efficients $h_d(n)$ and $h(n)$ if $w(n)$ is a rectangular window defined as follows:

$$w_R(n) = \begin{cases} 1, & 0 \le n \le 4 \\ 0, & \text{otherwise} \end{cases}$$

Also find the frequency response, $H(w)$ of the resulting FIR filter. **(06 Marks)**

b. Realize the linear-phase FIR filter having the following impulse response.

$$h(n) = \delta(n) + \frac{1}{4}\delta(n-1) - \frac{1}{8}\delta(n-2) + \frac{1}{4}\delta(n-3) + \delta(n-4).$$ **(06 Marks)**

c. Realize an FIR filter with impulse response $h(n)$ given by,

$$h(n) = \left(\frac{1}{2}\right)^n [u(n) - u(n-4)]$$

Using direct form – I. **(04 Marks)**

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15EC53

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

Time: 3 hrs. Max. Marks:80

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

1 a. Explain a typical design flow for designing VLSI IC circuit using block diagram. **(06 Marks)**

b. Develop virolog code for 4-bit ripple carry counter and with neat block diagram explain design hierarchy for the same. **(10 Marks)**

2 a. Explain to-down design methodology and bottom up design methodology. **(10 Marks)**

b. Explain the importance of HDL and also mention useful features of verilog HDL. **(06 Marks)**

3 a. Explain the following data-types with an example in verilog :
i) Nets ii) Registers iii) Vectors iv) Arrays. **(08 Marks)**

b. Explain the below mentioned system tasks NAND complier directives with examples :
i) $display ii) $monitor iii) 'Define iv) 'Include. **(08 Marks)**

4 a. With a neat block diagram explain components of verilog module. **(06 Marks)**

b. Explain part connection rules. **(06 Marks)**

c. Write a verilog code for SR latch using and gates as elements. **(04 Marks)**

5 a. What are rise, fall and turnoff delays? How they are specified in verilog. **(06 Marks)**

b. Design and develop verilog code for an 4-bit ripple carry adder using 1-bit fulladder as a component. Also write stimulus for 4-bit ripple carry fulladder. **(10 Marks)**

6 a. For the schematic network shown below. Write a verilog code for gate level implementation with delay s mentioned :

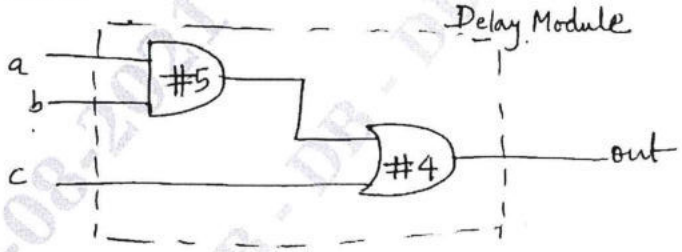

Fig.Q6(a)

Also write stimulus for the above example. **(06 Marks)**

b. Write a verilog code for :
i) 2 : 1 mux with conditional operator
ii) 4 : 1 mux with conditional operators
iii) 4 : 1 mux using logic equation
iv) 2 : 1 mux using logic equation. **(10 Marks)**

7 a. Explain with examples always and initial statements. **(08 Marks)**

b. Explain blocking assignment statements and non-blocking assignment statements with relevant examples. **(08 Marks)**

8 a. Explain sequential and parallel blocks with examples. **(08 Marks)**

b. Write a verilog code for :

i) 4 : 1 multiplexer using case statement

ii) 4 – bit counter with behavioral description. **(08 Marks)**

9 a. Explain design tool flow diagram with block diagram. **(08 Marks)**

b. i) Write VHDL dataflow description for – 4 – bit equality comparator using logic equations and block diagrams. **(04 Marks)**

ii) Write VHDL structural description for 4-bit comparator with necessary block diagrams. **(04 Marks)**

10 a. Explain the declaration of constant, variable and signal in VHDL, with example. **(08 Marks)**

b. Explain attributes in VHDL. **(04 Marks)**

c. Write a VHDL code for half adder using behavioral description. **(04 Marks)**

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15EC54

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

Time: 3 hrs. Max. Marks: 80

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

1 a. Define Self Information , Energy , Rate of Information. **(03 Marks)**

b. A single TV picture is viewed as an array of black, white and grey dots with roughly 500 rows and 600 columns. It is assumed that these dots take one of the 10 brightness levels. Find the information conveyed by one picture. **(04 Marks)**

c. Prove Extremal property of Entropy using Total derivative formula. **(09 Marks)**

2 a. Prove that $H.(S^m) = m.H(s)$ bits/sym. **(06 Marks)**

b. Students graduating from an Engineering department this year shows the following tendency
i) Some go abroad ii) Some join MNCs in India iii) Remaining join PG course.
The tendency in the next year is given below.
i) 50% of those who went abroad will return back to India, out of which 80% would join MNCs in India and remaining take PG course.
ii) Among those who remain in India 80% go abroad.
iii) Those who had remained in India have not swapped their fields.
Based on the information given above write the suitable model and determine entropy of the source. **(10 Marks)**

3 a. What do you mean by Source Encoding? List its properties. **(04 Marks)**

b. A DMS produces six symbols with probabilities of occurances $\frac{1}{3}, \frac{1}{6}, \frac{1}{12}, \frac{1}{24}, \frac{1}{3}, \frac{1}{24}$.
Encode the symbols using Shannon Fano algorithms. Compute Average code work length and efficiency. **(05 Marks)**

c. Consider a statistically independent value whose source alphabet $S = \{S_0, S_1, S_2, S_3, S_4, S_5\}$ with $P = \{0.5, 0.25, 0.125, 0.0625, 0.03125, 0.03125\}$. Using Shannon Encoding Algorithm , find Code words and compute Minimum average length, Efficiency and Variance. **(07 Marks)**

4 a. Prove Source Coding theorem. **(07 Marks)**

b. A DMS has an alphabet $S = \{S_1, S_2, S_3, S_4, S_5, S_6\}$ with $P = \left\{\frac{1}{3}, \frac{1}{4}, \frac{1}{8}, \frac{1}{8}, \frac{1}{12}, \frac{1}{12}\right\}$. Construct Huffman code by taking the code alphabet $X = \{0, 1, 2\}$. Find code efficiency and write decision tree. **(05 Marks)**

c. Write an explanatory note on Lempel Ziv algorithm. **(04 Marks)**

5 a. Compute all entropy functions and write the graphical model for channel given below :

$$P(xy) = \begin{bmatrix} 0.25 & 0 & 0 & 0 \\ 0.1 & 0.3 & 0 & 0 \\ 0 & 0.05 & 0.1 & 0 \\ 0 & 0 & 0.05 & 0.1 \\ 0 & 0 & 0.05 & 0 \end{bmatrix}$$

(07 Marks)

b. Show that I(X ; Y) = H(X) – H(X|Y) bits/sym. **(04 Marks)**

c. Compute channel capacity for the channel given below : $P(Y/X) = \begin{bmatrix} 0.7 & 0.3 \\ 0.4 & 0.6 \end{bmatrix}$. **(05 Marks)**

6 a. For the JPM given below , compute Data transmission rate, Channel capacity, Efficiency and Redundancy. $r_s = 1000$ sym/sec

$$P(xy) = \begin{bmatrix} 0.05 & 0 & 0.2 & 0.05 \\ 0 & 0.1 & 0.1 & 0 \\ 0 & 0 & 0.2 & 0.1 \\ 0.05 & 0.05 & 0 & 0.1 \end{bmatrix}.$$ **(07 Marks)**

b. Derive an expression for Differential Entropy. **(04 Marks)**

c. A black and white TV picture may be viewed as 3×10^5 pixel per frame with 10 distinct equi probable brightness levels. Assume that rate of transmission is 30 picture frames/second and SNR = 30db. Using Channel Capacity theorem, compute minimum bandwidth to support for error free transmission of Video signal. **(05 Marks)**

7 a. Consider the (T, 4) Linear Block Code, whose generator matrix is

$$G = \left[\begin{array}{cccc:ccc} 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{array}\right]$$

i) Find all code words ii) Find Parity check matrix 4

iii) Find minimum Hamming weight and distance. **(04 Marks)**

b. Obtain the code word for the message (1 0 1 0) for a (7, 4) cyclic code with $g(x) = 1 + x + x^3$. Use a four stage shift register for encoding. **(07 Marks)**

c. Write the decoding circuit for an (n , k) Linear Block Code and Decoding steps. **(05 Marks)**

8 a. Design a Single error correcting Hamming code for a message of length 4. **(04 Marks)**

b. In a Linear Block Codes the syndrome is given by $S_1 = r_1 + r_2 + r_3 + r_5$, $S_2 = r_1 + r_2 + r_4 + r_6$ $S_3 = r_1 + r_3 + r_4 + r_7$.

i) Find the parity check matrix.

ii) Write the syndrome computation circuit.

iii) What is the syndrome for the received data (1 0 1 1 0 1 1) and correct it. **(06 Marks)**

c. Design a syndrome calculator circuit for a (7,4) cyclic code having $g(x) = 1 + x + x^3$. Verify the circuit for receiving code vector R = [1 1 0 1 0 0 1]. **(06 Marks)**

9 a. Consider the (2, 1, 2) convolution encoder with $g^{(1)} = (111)$, $g^{(2)} = (101)$.

i) Find the constraint length ii) Find the rate iii) Draw the encoder block diagram

iv) Find the output of the message (1 0 0 1 1) using Time Domain Approach

v) Find the output of the message (1 0 0 1 1) using Transform Domain Approach. **(12 Marks)**

b. Write short note on Golay codes. **(04 Marks)**

10 a. For (2, 1, 3) Convolution encoder with $g_1 = (1\ 0\ 1\ 1)$, $g_2 = (1\ 1\ 0\ 1)$.

i) Draw State diagram ii) Draw Tree diagram iii) Draw Trellis diagram and Code word for the message (1 1 1 0 1). **(12 Marks)**

b. Write an explanatory note on Viterbi Algorithm. **(04 Marks)**

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15EC553

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

Time: 3 hrs. Max. Marks: 80

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

1 a. Define computational structure. Explain and list computational structures and OS responsibilities. **(08 Marks)**

b. Explain the strategies for resource allocation. Also explain CPU sharing and memory sharing. **(08 Marks)**

2 a. Why I/O bound programs should be given higher priority in a multiprogramming class of OS? Illustrate with timing diagram. **(08 Marks)**

b. Write short notes on real time operating system and distributed class of OS. **(08 Marks)**

3 a. With fundamental state transition diagram, explain the functions of states and causes of fundamental state transitions for a process. **(08 Marks)**

b. Explain scheduling of user level threads. Illustrate with example how thread library manages threads in a process. **(08 Marks)**

4 a. Define the terms:
i) Response ratio
ii) Turn around time
iii) Preemption
iv) Throughput. **(04 Marks)**

b. What are the functions of long, medium and short term scheduling in a time sharing system? **(05 Marks)**

c. Determine mean turnaround time and mean weighted turnaround time using LCN preemptive scheduling policy for the following process. Assume time slice of 1sec.

Process	P1	P2	P3	P4	P5
Arrival time	0	2	3	5	9
Service time	3	3	2	5	3

(07 Marks)

5 a. With neat sketch, explain how to calculate effective memory address in non-contiguous loading of process. **(08 Marks)**

b. Define external fragmentation and internal fragmentation. Compare contiguous and non-contiguous memory allocation techniques. **(08 Marks)**

6 a. Explain the concepts involved in demand loading of a page with example. **(08 Marks)**

b. Consider the following page reference and reference time string for a process:

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}

Calculate the number of page fault generated by using FIFO and LRU page replacement policy for allocation = 4. **(08 Marks)**

7 a. Explain sequential and index sequential file organization in file system. Also write fields in the file control block. **(08 Marks)**

b. Explain the methods involved in the allocation of disk space. **(08 Marks)**

8 a. Explain file types, file attributes and file operations. **(08 Marks)**

b. Explain the file system actions at a file operation with example. **(08 Marks)**

9 a. Write the issues in message passing. Explain delivery of interprocess messages with kernel actions to implement message passing using symmetric naming and blocking sends. **(08 Marks)**

b. Define mailbox and mention its advantages with neat figure, explain message passing using a mailbox. **(08 Marks)**

10 a. Define deadlock Explain deadlock detection algorithm with example. **(08 Marks)**

b. With necessary figure, explain the different deadlock prevention approaches. **(08 Marks)**

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15EC562

Fifth Semester B.E. Degree Examination, July/August 2021
Object Oriented Programming Using C++

Time: 3 hrs. Max. Marks: 80

Note: *Answer any FIVE full questions.*

1 a. Explain the structure of C++ program. Write a C++ program to find area of circle. **(05 Marks)**

b. With neat diagrams explain insertion (<<) and Extraction (>>) operators present in C++. **(05 Marks)**

c. List out various operators present in C++ and explain the below operators with example:
i) Scope Resolution Operator (: :) ii) endl iii) setw. **(06 Marks)**

2 a. List out different datatypes used in C++ and explain user defined datatypes present in C++. **(06 Marks)**

b. Explain conditional branching statements with their syntax and examples. **(05 Marks)**

c. Explain looping statement with their syntax and examples. **(05 Marks)**

3 a. What is inline function? List out the characteristics of inline function and give an example. **(05 Marks)**

b. Define function overloading? Write a program to demonstrate function overloading. **(05 Marks)**

c. What is class? Explain creation of class and objects to find factorial of a given number. **(06 Marks)**

4 a. Write a C++ program to read two marks, Name, roll_no of 'n' students and find average of 2 marks of all 'n' students and display the avg_marks, Name and roll_no of all 'n' students. Using class and object array of objects. **(06 Marks)**

b. Define Friend Function. Write a C++ program to swap 2 numbers. One is present in XYZ class and another number is present in ABC class. Consider a Friend Function to swap the numbers. **(04 Marks)**

c. Explain pointers to members with examples. **(06 Marks)**

5 a. Define constructor. List out characteristics of constructor give an example. **(05 Marks)**

b. Explain copy constructor with example. **(05 Marks)**

c. Define operator overloading. Write a C++ program to overload Binary '+' operator to add two complex numbers. **(06 Marks)**

6 a. What is operator over loading? Explain overloading of unary operator with an example. **(05 Marks)**

b. Define Destructor. Explain the use of Destructor with example. **(05 Marks)**

c. Write a C++ program to illustrate overloading of insertion (<<) and Extraction (>>) operator to perform Read and Write operations. **(06 Marks)**

7 a. What is Inheritance? Explain various types of inheritance. How inheritance is done using multiple base classes? Demonstrate. **(10 Marks)**
b. Explain the use of "this" pointer with example. **(04 Marks)**
c. Define base class and derived class. **(02 Marks)**

8 a. Define Inheritance. Compare and differentiate different types of inheritance. **(06 Marks)**
b. What is Virtual Function? Explain with an example. **(05 Marks)**
c. Explain pure virtual Function with example. **(05 Marks)**

9 a. List and explain the classes used for file stream operations. **(08 Marks)**
b. Explain the working of formatted and unformatted functions used in C++. **(08 Marks)**

10 a. Write a program to copy content of one file into another file until end of file is reached. Display the copied content on the output screen. **(08 Marks)**
b. How file opening and closing is done? What are the functions required for reading and writing data in a file. Explain in brief EOF. **(08 Marks)**

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15EC563

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

Time: 3 hrs. Max. Marks: 80

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

1 a. Compare between microprocessor and microcontroller. **(06 Marks)**

b. Explain internal block diagram of 8051. **(10 Marks)**

2 a. Explain internal RAM organization of 8051. **(08 Marks)**

b. Explain External RAM (8K Bytes) interfacing with block diagram and timing. **(08 Marks)**

3 a. Explain any four addressing modes of 8051 with examples. Write a program to copy value of 65H into RAM location 50 to 53H using direct addressing mode without loop. **(10 Marks)**

b. Explain the following instruction with examples: i) XCHD ii) ADDC iii) XRL. **(06 Marks)**

4 a. Explain the following instructions with examples: i) CJNE ii) SETB iii) SJMP iv) JC. **(08 Marks)**

b. Write the instructions to do following:
i) Setting bit1 of internal RAM location 20H.
ii) Reading the content of external RAM location.
iii) Moving a data byte into location of 40H.
iv) Setting carry flag and clearing parity flag without altering other flags. **(04 Marks)**

c. Analyze the following program and write the result after executing each instruction:

```
ORG 00H
MOV R0, #21h
MOV R7, #78h
MOV A, 07h
MOV 21H, A
SETB 0Ah
MOV A, @21h
XRL A, R7
MOVX @R0, A
END
```

(04 Marks)

5 a. Explain working of PUSH and CALL instructions with examples. **(10 Marks)**

b. Develop an assembly language program to count number of 1's in a given byte which is in internal RAM location 50H. Display the result on port P1. **(06 Marks)**

6 a. Develop an assembly language program to find largest in the given N numbers, which are stored in internal RAM location 40H onwards. Store the result in external RAM location 40H, write algorithm. **(10 Marks)**

b. Interface a simple switch and Led to 8051 system and develop the program to read switch status continuously and switch on/off LED accordingly. Draw the block diagram. **(06 Marks)**

7 a. Explain 8051 timer mode-1 programming with steps. **(06 Marks)**

b. Develop an assembly language program to generate square wave of 2000Hz a P1-1 using timer mode-2. Assume crystal frequency of 11.0592MHz. Show the calculations. **(10 Marks)**

8 a. Briefly explain serial communication basics. **(04 Marks)**

b. Draw the Bit pattern of SCON register and explain each bit in it. **(06 Marks)**

c. Develop a program in C/assembly to transmit "VES" serially at 9600 baudrate 1 start and 1 stop bit. Assume crystal frequency of 11.0592MHz. **(06 Marks)**

9 a. Explain 8051 interrupts with their vector address and priority. **(08 Marks)**

b. Develop a 'C' program to generate a square wave of 1kHz using timer interrupt on P1.2. Assume crystal frequency of 12MHz. **(08 Marks)**

10 a. With a block diagram, explain LCD interfacing to 8051. Develop a program in assembly language to display "MC1" on LCD panel. **(10 Marks)**

b. Explain stepper motor interfacing to 8051 with a block diagram and explain how to rotate it 180° clockwise. **(06 Marks)**

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15ES/EC/TE/EI/BM/ML51

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

Time: 3 hrs. Max. Marks: 80

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

1	a.	Define Management with definition.	(03 Marks)
	b.	Explain in detail the "Nature of Management".	(05 Marks)
	c.	Explain different roles of manager in an organization.	(08 Marks)
2	a.	What is Planning?	(03 Marks)
	b.	Explain in detail "Different types of Plans".	(05 Marks)
	c.	Discuss in detail "Steps in Planning".	(08 Marks)
3	a.	What is span of management?	(03 Marks)
	b.	Discuss departmentalization with its various types.	(05 Marks)
	c.	Explain complete process of recruitment and selection.	(08 Marks)
4	a.	Define leadership.	(03 Marks)
	b.	What are the different types of co-ordination techniques?	(05 Marks)
	c.	Explain "Maslows Need Hierarchy theory".	(08 Marks)
5	a.	What is Social Audit?	(03 Marks)
	b.	Write a brief note on Business Ethics and Corporate Governance.	(05 Marks)
	c.	Explain corporate social responsibility towards different business group.	(08 Marks)
6	a.	Who is an Entrepreneur?	(03 Marks)
	b.	What are the characteristics of successful Entrepreneur?	(05 Marks)
	c.	What are the classifications of the Entrepreneur?	(08 Marks)
7	a.	What is the concept of Small Scale Industries?	(03 Marks)
	b.	What impact Globalization and WTO has on SSI?	(05 Marks)
	c.	Discuss in detail various Government policies to help in development of SSI in India.	(08 Marks)
8	a.	What is an Ancillary Industry?	(03 Marks)
	b.	Discuss problems faced by small scale Industries.	(05 Marks)
	c.	What are the roles of SSI?	(08 Marks)
9	a.	Define project.	(03 Marks)
	b.	Write down various characteristics of a project.	(05 Marks)
	c.	Explain "product planning and development strategy".	(08 Marks)
10	a.	What is Network Analysis?	(03 Marks)
	b.	Explain different steps in project formulation.	(05 Marks)
	c.	How do you evaluate the project?	(08 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:

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

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 $G_1 > G_2 > G_3 > H$

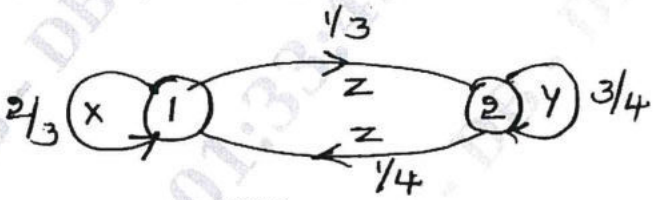

Fig.Q2(a) **(12 Marks)**

b. Suppose that s_1 and s_2 are two zero memory sources with probabilities $p_1, p_2 \ldots p_n$ for source s_1 and $q_1, q_2 \ldots q_n$ 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.

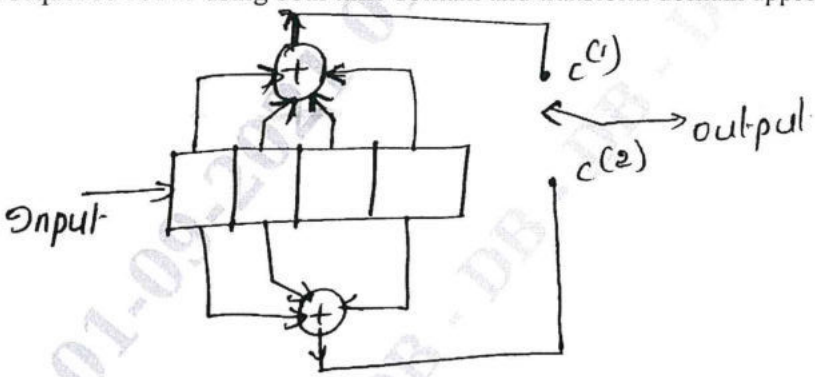

Fig.Q10(b) **(06 Marks)**

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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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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.

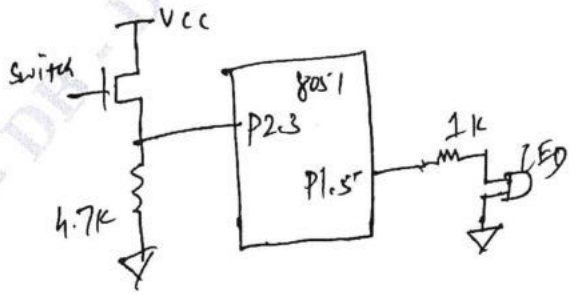

Fig Q6(c) **(04 Marks)**

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.

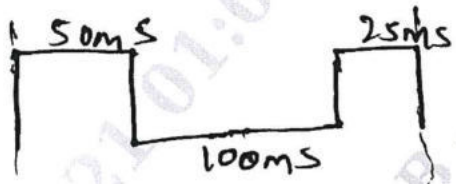

Fig Q7(b) **(10 Marks)**

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

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

Time: 3 hrs. Max. Marks: 100

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

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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18EC52

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. Describe the process of frequency domain sampling and reconstruction of discrete time signal. **(08 Marks)**

b. Find the 4-point DFT of the sequence $x(n) = \{1, 2, 0, 1\}$ using matrix method. **(04 Marks)**

c. Using graphical method (concentric method) obtain 5 point circular convolution of two DFT signal defined as,

$x(n) = (1.5)^n ; \ 0 \le n \le 2$

$y(n) = (2n-3) ; \ 0 \le n \le 3$ **(08 Marks)**

2 a. Compute the 4-point DFT of the given sequence $x(n) = \{0, 1, 2, 3\}$ and verify the result with IDFT method using formula method. **(08 Marks)**

b. Compute the N-point DF of the sequence $x(n) = a^n ; \ 0 \le n \le N-1$. **(04 Marks)**

c. State and prove the following properties :

(i) Circular time shift of a sequence.

(ii) Parseval's theorem. **(08 Marks)**

3 a. Consider a FIR filter with impulse response $h(n) = \{3, 2, 1, 1\}$, if the I/P $x(n) = \{1, 2, 3, 3, 2, 1, -1, -2, -3, 5, 6, -1, 2, 0, 2, 1\}$ find the output. Use overlap save method assuming the length of the block is 9. **(10 Marks)**

b. Find the 8 point DFT of the sequence $x(n) = \{1, 1, 1, 1, 0, 0, 0, 0\}$ using DIT – FFT radix – 2 algorithm and draw the signal flow graph. **(10 Marks)**

4 a. Consider a FIR filter with impulse response $h(n) = \{1, 2\}$ and input sequence $x(n) = \{1, 4, 3, 0, 7, 4, -7, -7, -1, 3, 4, 3\}$. Compute y(n) using overlap add technique assuming the length of the block is 5. **(10 Marks)**

b. Derive the computational arrangement of 8-point DFT using Radix-2 DIF-FFT algorithm and draw the signal flow diagram. **(10 Marks)**

5 a. Design a symmetric FIR low pass filter whose designed frequency is given by,

$$H_d(\omega) = \begin{cases} e^{-j\omega\tau} & ; |\omega| \le \omega_c \\ 0 & ; \text{otherwise} \end{cases}.$$

The length of the filter should be 7 and cut off frequency is 1 rad/sec use rectangular window. **(08 Marks)**

b. Determine the direct form realization of the following system function:

$H(z) = 1 + 2z^{-1} - 3z^{-2} + 5z^{-4} - 4z^{-3}$. **(06 Marks)**

c. List the advantages and disadvantages of FIR filters. **(06 Marks)**

6 a. Draw the magnitude response and show the biggest side lobe values for the following windows:
(i) Rectangular window. (ii) Hanning window.
(iii) Hamming window. (iv) Bartlett window **(04 Marks)**

b. The desired frequency response of a low pass filter is given by,

$$H_d(e^{j\omega}) = H_d(\omega) = \begin{cases} e^{-j3\omega}; & |\omega| < \frac{3\pi}{4} \\ 0 & ; \frac{3\pi}{4} < |\omega| < \pi \end{cases}$$

. Determine the frequency response of the FIR filter if Hamming window is used with N = 7. **(08 Marks)**

c. Consider an FIR lattice filter with coefficients $K_1 = 0.65$, $K_2 = -0.34$, $K_3 = 0.8$, find its impulse response. Draw the equivalent direct form structure. **(08 Marks)**

7 a. Draw the frequency response curve and write the transformation to convert the analog lowpass prototype into practical analog low pass, high pass, band pass and band stop filters with specified frequency. **(08 Marks)**

b. Realize the following digital filter using a direct form II structure

$$H(z) = \frac{1+0.4z^{-1}}{1-0.5z^{-1}+0.06z^{-2}}.$$ **(04 Marks)**

c. Assuming that T = 2 sec in BLT and given the following points:
(i) $S = -1 + j$, on the left half of the S-plane.
(ii) $S = 1 - j$, on the right half of the S-plane.
(iii) $S = j$, on the positive jw on the S-plane.
(iv) $S = -j$ on the negative jw on the S-plane.
Convert each of these points in the S-plane to the Z-plane and verify the mapping properties. **(08 Marks)**

8 a. Draw and discuss flow chart for IIR filter design using Bilinear transformation. **(04 Marks)**

b. An analog filter is given by,

$$H_a(s) = \frac{3}{(s+3)(s+1)},$$

with T = 1 sec. Obtain H(z) using Bilinear transformation. **(08 Marks)**

c. Draw the Direct form – I and Direct form – II structure for the system given by,

$$H(z) = \frac{z^{-1} - 3z^{-2}}{(10 - z^{-1})(1 + 0.5z^{-1} + 0.5z^{-2})}$$ **(08 Marks)**

9 a. Explain Digital Signal processors using Harvard architecture. **(08 Marks)**

b. Convert the following number in the IEE single precision format to the decimal format:
(i) 110000000.010.....0000
(ii) 010000000000.....0000 **(04 Marks)**

c. Explain Fixed-point digital signal processes using basic architecture of TMS320C54X family. **(08 Marks)**

10 a. Explain the following Digital Signal processor hardware units:
(i) Multiplier and Accumulator
(ii) Shifters
(iii) Address Generators. **(09 Marks)**

b. Discuss IEEE Double Precision format. **(07 Marks)**

c. Convert the following Q-15 signed numbers into the Decimal number :
(i) 1110101110000010
(ii) 0100011110110010 **(04 Marks)**

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18EC53

Fifth Semester B.E. Degree Examination, July/August 2021
Principles of Communication Systems

Time: 3 hrs. Max. Marks:100

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

1 a. Explain in detail, the working of switching modulator with suitable block diagram and necessary derivations. **(08 Marks)**

b. Using the message signal $M(t)=\frac{1}{(1+t^2)}$. Determine and sketch the modulated wave for amplitude modulation with the following values : i) μ = 50% ii) μ = 100%. **(06 Marks)**

c. Explain the concept of VSB transmission for analog and digital transmission. **(06 Marks)**

2 a. Derive an equation for SSB modulated wave for which upper sideband is retained. **(07 Marks)**

b. Explain how Costas receiver is used for demodulating DSB – SL signal. **(07 Marks)**

c. With relevant block diagram, explain the working of FDM transmitter and receiver. **(06 Marks)**

3 a. Derive the equation of frequency modulated wave. Define :
i) Modulation index
ii) Maximum deviation of frequency modulated single. **(06 Marks)**

b. With neat circuit diagram, explain FM demodulation using balanced slope detector. **(07 Marks)**

c. With a neat block diagram, explain the concept of super hetero dyne receiver. **(07 Marks)**

4 a. With relevant diagram, explain direct method generation of FM using Hartley oscillator and how frequency stability is achieved. **(08 Marks)**

b. When a 50.4MHz carrier is frequency modulated by a sinusoidal AF modulating signal. The highest frequency reached is 50.405MHz. Calculate :
i) Frequency deviation produced
ii) Carrier swing of the wave
iii) Lowest frequency reached. **(06 Marks)**

c. Explain the linear model of PLL using relevant diagram and suitable expressions. **(06 Marks)**

5 a. Explain shot noise and thermal noise with relevant diagrams and expressions. **(06 Marks)**

b. Show that the figure of merit for DSBSC system is unity using suitable expressions. **(08 Marks)**

c. Why Preemphasis and Deemphasis are required. Explain how they are implemented. **(06 Marks)**

6 a. What is White Noise? Explain the power spectral density and auto correlation function. **(07 Marks)**

b. The average noise per unit BW measured at the front end of the AM receiver is 10^{-3}W/Hz. The modulated wave is sinusoidal with a carrier power of 80KW and side band power of 10KW per side band. The message band width is 4KHz. Determine the SNR_0 of the system and FOM(Figure of Merit). **(06 Marks)**

c. Explain about FM threshold effect and its reduction method. **(07 Marks)**

7 a. What are the advantages of digital signal over analog signal? **(04 Marks)**
b. State and prove sampling theorem for band limited signals. **(08 Marks)**
c. With neat block diagram, explain the generation of PPM waves. **(08 Marks)**

8 a. With neat block diagram, explain the generation PAM waves. **(08 Marks)**
b. Describe the effect of noise in pulse position modulation. **(06 Marks)**
c. Explain the working of TDM system with necessary block diagram. **(06 Marks)**

9 a. Explain the construction and regeneration of PCM signal. **(10 Marks)**
b. Explain the construction of Delta modulation signal. **(06 Marks)**
c. Write short notes on vocoder. **(04 Marks)**

10 a. What is quantization noise? Derive the output signal to noise ratio of the uniform quantizer. **(07 Marks)**
b. To transmit a bit sequence 10011011. Draw the resulting waveform using :
i) Unipolar NRZ ii) Polar NRZ iii) Unipolar RZ
iv) Bipolar RZ v) Manchestor (split phase). **(06 Marks)**
c. Explain how digitization of video and MPEG is achieved with relevant diagram. **(07 Marks)**

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CBCS SCHEME

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18EC54

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. Define the following with respect to information theory:
(i) Self information (ii) Entropy
(iii) Rate of information (iv) Source efficiency **(04 Marks)**

b. Find the relationship between Hartley's nats and bits. **(06 Marks)**

c. Consider the Markov source shown in Fig.Q1(c). Find:
(i) State probabilities (ii) State entropies (iii) Source entropy

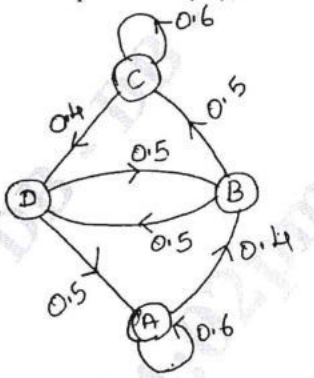

Fig.Q1(c) **(10 Marks)**

2 a. A source emits one of the four probable messages m_1, m_2, m_3, m_4 with probabilities of 7/16, 5/16, 1/8 and 1/8 respectively. Find the entropy of the source. List all the elements for the second extension of this source. Hence show $H(s^2) = 2H(s)$. **(08 Marks)**

b. Prove extremal property of entropy. **(06 Marks)**

c. In a facsimile transmission of picture, there are about 2.25×10^6 pixel frame. For a good reproduction 12 brightness levels are necessary. Assume all these levels are equally likely to occur. Find the rate of information if one picture is to be transmitted every 3 minitus. What is the source efficiency of this facsimile transmitter? **(06 Marks)**

3 a. Define non-singular and uniquely decidable codes with an example. **(04 Marks)**

b. A source emits an independent sequence of symbols from an alphabet consisting of five symbols A, B, C, D and E with probabilities of ¼, 1/8, 1/8, 3/16 and 5/16 respectively. Find the Shannon code for each symbol and efficiency of the coding scheme. **(10 Marks)**

c. State and prove Shannon's first theorem. **(06 Marks)**

4 a. State Prefix and Kraft McMillan inequality property. **(04 Marks)**

b. A source produces nine symbols x_1, x_2.....x_9 with respective probabilities of 0.24, 0.23, 0.19, 0.13, 0.08, 0.06, 0.04, 0.02 and 0.01.
(i) Construct a Shannon-Fano ternary code.
(ii) Determine the code-efficiency and redundancy.
(iii) Draw code-tree.
(iv) Determine the probabilities of 0, 1 and 2 when the encoding alphabet is {0, 1, 2}. **(10 Marks)**

c. Find the minimum number of symbols 'r' in the coding alphabet for devising an instantaneous code such that w = {0, 5, 0, 5, 5}. Device such a code.
(Note: w represents the set of code words of length 1, 2, 3....) **(06 Marks)**

5 a. Show that $H(X,Y) = H\left(\frac{X}{Y}\right) + H(Y)$. **(04 Marks)**

b. A non-symmetric binary channel is given in Fig.Q5(b).

(i) Find H(X), H(Y), $H\left(\frac{X}{Y}\right)$ and $H\left(\frac{Y}{X}\right)$ given $P(X = 0) = \frac{1}{4}$, $P(X = 1) = \frac{3}{4}$, $\alpha = 0.75$, $\beta = 0.9$.

(ii) Find the capacity of the binary symmetric channel if $\alpha = \beta = 0.75$.

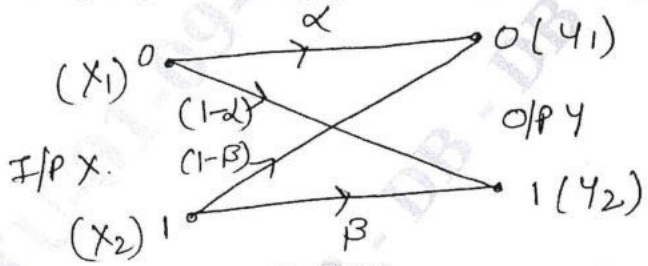

Fig.Q5(b) **(10 Marks)**

c. Show that the mutual information of a discrete channel is symmetric. **(06 Marks)**

6 a. Derive an expression for channel capacity of binary Erasure channel. **(08 Marks)**

b. For the JPM given below, compute individually H(X), H(Y), H(X, Y), $H\left(\frac{X}{Y}\right)$, $H\left(\frac{Y}{X}\right)$ and I(X, Y).

$$P(X,Y) = \begin{bmatrix} 0.05 & 0 & 0.20 & 0.05 \\ 0 & 0.10 & 0.10 & 0 \\ 0 & 0 & 0.20 & 0.10 \\ 0.05 & 0.05 & 0 & 0.10 \end{bmatrix}$$ **(08 Marks)**

c. What is joint probability matrix? State its properties. **(04 Marks)**

7 a. Define Hamming weight, Hamming distance and minimum distance of linear block codes (with example). **(06 Marks)**

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

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

(i) Find G and H.
(ii) Draw the encoding circuit.
(iii) Find all possible valid code vectors.
(iv) A single error has occurred each of these received vectors. Detect and correct those errors. (1) RA = [0111110] (2) RB = [1011100]
(v) Draw the syndrome calculation circuit. **(14 Marks)**

8 a. The generator polynomial of a (15, 7) cyclic code is given by $g(x) = 1 + x^4 + x^6 + x^7 + x^8$.
(i) Draw the syndrome calculation circuit.
(ii) Find the syndrome of the received polynomial $z(x) = 1 + x + x^3 + x^6 + x^8 + x^9 + x^{11} + x^{14}$ by listing the states of the register used in syndrome calculation circuit.
(iii) Verify the syndrome obtained in (ii) by using direct hand calculation. **(10 Marks)**

b. Consider the (15, 11) cyclic code generated by $g(x) = 1 + x + x^4$.
(i) Draw the feedback register encoding circuit for this cyclic code.
(ii) Illustrate the encoding procedure with the message vector 01101001011 by listing the state of the register with each input.
(iii) Verify the code polynomial by using the division method. **(10 Marks)**

9 a. What are convolutional codes? How it is different from block codes. **(05 Marks)**

b. Consider the convolutional encodes shown in Fig.Q9(b).
(i) Find the O/P for the message 10011 using time domain approach.
(ii) Find the O/P for the message 10011 using transform domain approach.

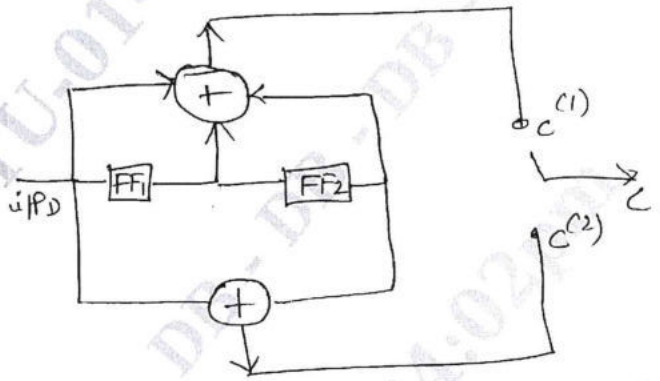

Fig.Q9(b) **(10 Marks)**

c. What do you understand by trellis diagram of a convolutional encodes? Explain clearly. **(05 Marks)**

10 a. For (2, 1, 3) convolution encodes with g(1) = 1011, g(2) = 1101.
(i) Write translation table.
(ii) State diagram.
(iii) Draw the code tree.
(iv) Draw the trellis diagram.
(v) Find the encoded O/P for the message 11101 by traversing the code tree. **(15 Marks)**

b. Explain Viterbi encoding. **(05 Marks)**

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18EC55

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

Time: 3 hrs. Max. Marks:100

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

1 a. Point charges of 50nc each are located at A(1, 0, 0), B(–1, 0, 0), C(0, 1, 0) and D(0, –1, 0). Determine the total force on the charge at A. Also, find $\vec{E}$ at 'A'. **(07 Marks)**

b. Two point charges, 5μC and –3μC are placed along a straight line 10m apart. Determine the location of third charge, 4μC such that it is subjected to no force. **(07 Marks)**

c. Derive an expression for electric field intensity at a point due to an infinite sheet charge, ρ_S c/m^2. Compare the nature of this field with that of infinite line charge. **(06 Marks)**

2 a. Given the two points C(–3, 2, 1) and D(5, 20°, –70°), find the spherical coordinates of 'C' and Cartesian coordinates of 'D'. Also find the distance from 'C' to 'D'. **(07 Marks)**

b. A uniform line charge, infinite in extent, with the density 34nc/m is located at x = –3m and z = 5m in free space. Find $\vec{E}$ at P(1, 12, 4)m. **(07 Marks)**

c. Find the total charge within each of the indicated volume :
i) $0 \le \rho \le 0.1,\ 0 \le \phi \le \pi,\ 2 \le z \le 4$ and $\rho_v = \rho^2 z^2 \sin(0.6\phi)$
ii) Universe : $\rho_v = \dfrac{e^{-2r}}{r^2}$. **(06 Marks)**

3 a. A cube of side 2m is centred at the origin with edges parallel to the coordinate axes of the rectangular coordinate system. If $\vec{D} = 10\dfrac{x^3}{3}\hat{a}_x, c/m^2$, find the volume charge density. Also, find the total charge enclosed by the cube. **(06 Marks)**

b. A vector field is given by $\vec{A} = 30e^{-r}\hat{a}_r - 2z\hat{a}_z$, verify the divergence theorem for the volume enclosed by r = 2, z = 0 and z = 5. **(08 Marks)**

c. Determine the electric field intensity everywhere due to a spherical volume charge of density, ρ_v c/m^3 using Gauss's law. Also, sketch E as a function of distance. **(06 Marks)**

4 a. Calculate the work done in moving a 4C charge from B(1, 0, 0) to A(0, 2, 0) along the path y = 2 – 2x, z = 0 in the field $\vec{E} = 5x\hat{a}_x + 5y\hat{a}_y, V/m$. **(07 Marks)**

b. State and explain the continuity equation of current. Also, mention its physical significance. **(08 Marks)**

c. Given the potential field, V = 2x^{2}y – 5z and a point P(–4, 3, 6), find the numerical values of the following quantities at point, P : i) Electric potential ii) Electric field intensity $\vec{E}$ iii) the direction of $\vec{E}$ iv) electric flux density, $\vec{D}$ v) volume charge density ρ_v. **(05 Marks)**

5 a. Using the Laplace's equation, derive an expression for capacitance per unit length of a coaxial cable using the following boundary conditions :
V = V_0 at r = a, and V = 0 at r = b, b > a. **(08 Marks)**

b. Determine $\vec{H}$ at (0.4, 0.3, 0) in the field of 8A filamentary current directed inward from infinity to the origin on the positive x–axis and then outward to infinity along the y-axis. **(08 Marks)**

c. State and explain the Stoke's theorem. **(04 Marks)**

6 a. Given the potential field $V = (Ar^4 + Br^{-4}) \sin(4\phi)$, show that $\nabla^2 V = 0$. Also find A and B such that V = 100 volts and $|\vec{E}| = 500 V/m$ at p(1, 22.5°, 2). **(07 Marks)**

b. Evaluate both sides of the Stoke's theorem for the field, $\vec{H} = 6xy\hat{a}_x - 3y^2\hat{a}_y, A/m$ and the rectangular path around the region $2 \le x \le 5$, $-1 \le y \le 1$, $z = 0$. Let the positive direction of $d\vec{S}$ be $\hat{a}_z$. **(07 Marks)**

c. State the following and write the corresponding equations :

Biot Savart law, Ampere's law and Curl $\vec{F}$. **(06 Marks)**

7 a. Derive an expression for the force acting between two differential current elements. **(04 Marks)**

b. Find the magnetization in a wire where i) $\mu = 1.8 \times 10^{-5}$H/m, and H = 120A/m
ii) $\mu_r = 22$, there are 8.3×10^{28} atoms/m^3 and each atom has a dipole moment of 4.5×10^{-27}A-m^2 iii) $\beta = 300\mu$T and $\Psi_m = 15$. **(08 Marks)**

c. A conducting filamentary triangle joins points A(3, 1, 1), B(5, 4, 2) and C(1, 2, 4). The segment AB carries a current of 0.2A in $\hat{a}_{AB}$ direction. The magnetic field is

$\vec{B} = 0.2\hat{a}_x - 0.1\hat{a}_y + 0.3\hat{a}_z$ T.

i) Find the force on segment BC
ii) The torque on the loop about an origin at 'A'
iii)The torque on the loop about an origin at 'C'. **(08 Marks)**

8 a. Obtain the torque on a square loop having the corners (–2, –2, 0), (2, –2, 0), (2, 2, 0) and (–2, 2, 0) :

i) About the origin by $\vec{B} = 0.4\hat{a}_x$ T;

ii) About the origin by $\vec{B} = 0.6\hat{a}_x - 0.4\hat{a}_y$ T and

iii) About (4, 6, 8) by $\vec{B} = 0.4\hat{a}_x + 0.6\hat{a}_y - 0.7\hat{a}_z$ T. Take I = 0.8A. **(08 Marks)**

b. Determine the boundary conditions for the magnetic field at the interface between two different magnetic materials. **(06 Marks)**

c. Derive the Maxwell's equation from Faraday's law of electromagnetic induction. **(06 Marks)**

9 a. Let $\mu = 10^{-5}$H/m, $\epsilon = 4 \times 10^{-9}$F/m, $\sigma = 0$ and $\rho_v = 0$. Determine 'K' so that each of the following pair of fields satisfies Maxwell's equation :

i) $\vec{D} = 2x\hat{a}_x - 3y\hat{a}_y + 4z\hat{a}_z$ nC/m^2, $\vec{H} = Kx\hat{a}_x + 10y\hat{a}_y - 25z\hat{a}_z$ A/m

ii) $\vec{E} = (20y - kt)\hat{a}_x$ V/m, $\vec{H} = (y + 2\times10^6 t)\hat{a}_z$ A/m. **(08 Marks)**

b. Explain the wave propagation in good conductors using the skin depth. **(06 Marks)**

c. For a perfect dielectric medium, $\mu_r = 1$ and $\epsilon_r = 81$ at f = 1MHz. Determine attenuation constant, phase constant, propagation constant, wave length, phase velocity and intrinsic impedance for the medium. **(06 Marks)**

10 a. In a certain dielectric medium, $\epsilon_r = 5$, $\sigma = 0$ and displacement current density.

$\vec{J}_d = 20\cos(1.5\times10^8 t - \beta x)\hat{a}_y \mu A/m^2$. Determine the electric flux density and electric field intensity. **(06 Marks)**

b. Explain the propagation of electromagnetic waves in free space. **(08 Marks)**

c. State and prove Poynting theorem. **(06 Marks)**

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18EC56

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 various stages used in VLSI design with a neat flow diagram. **(08 Marks)**

b. Design a 4-bit ripple carry counter using a top-down design methodology. **(08 Marks)**

c. Compare the HDL programming to traditional software programming. **(04 Marks)**

2 a. Give the importance of stimulus block. Explain the different styles of stimulus block used for testing the design. **(08 Marks)**

b. Explain the different levels of abstraction. **(06 Marks)**

c. Write a pseudo verilog code for 4-bit ripple carry adder with following description.

i) Define a module FA with input A, B C in, sum and carry with no internals.

ii) Instantiate 4 full adders of the type FA in the module Ripple-Add and name them as FA0, FA1, FA2 and FA3. **(06 Marks)**

3 a. Illustrate with examples the data types used to define nets, registers, vectors and arrays. **(08 Marks)**

b. Differentiate i) $display and$ monitor ii) $stop and $finish with examples. **(06 Marks)**

c. Declare a top-level module as TOP for stimulus. Define a constant N of size 8, IN_REG (8 bit) LOAD_EN(1-bit), LOAD_VAL (8-bit) and CLK(1bit) as register variables, and OUI_ REG (8-bit) as wire. Instantiate the module shift_reg and call it as SRl. Connect the port by named list. **(06 Marks)**

4 a. Illustrate with example the post connection rule of verilog HDL programming. **(08 Marks)**

b. Draw the logic diagram of SR latch. Develop the verilog code for SR latch. Identify the components and hence write the test bench to verify the functionality. **(08 Marks)**

c. Declare the following variables in verilog.

i) Net 'A is fixed to logic value '0' at declaration

ii) Vector register, Address_bus of 41 bit wide

iii) A memory MEM containing 256 words of 64 bit each

iv) An integer called count. **(04 Marks)**

5 a. Design a 4-bit ripple carry full adder using 1-bit full adder. Develop the verilog code for a 4-bit ripple carry full adder using gate level modeling. Verify the functionality with appropriate test bench. **(08 Marks)**

b. Given A = 5'b10101 ; B = 5'b11101 ; C = 5'b11001 ; D = 5'b10011. Evaluate.

i) Y = A & B ii) Y = ~ (& C) iii) Y = C ^ D

iv) Y = C% A v) Y = A + (D>>>1) vi) Y = {B[3], C[2], A} **(06 Marks)**

c. Discuss the gate delays along with its types of delay specification. **(06 Marks)**

6 a. Design a 4-bit ripple carry counter using TFF. Write the verilog code using data flow modeling. Verify the code with appropriate test bench. **(08 Marks)**

b. Design a 2×1 MUX using bufif0 and bufif1 gates. Write the verilog code using gate level modeling for the given delay specification.

	Min	Max	Typ
Rise	1	3	2
Fall	3	5	4
Turnoff	5	7	6

(06 Marks)

c. Discuss the types of delays used in the continuous assignment statement. **(06 Marks)**

7 a. i) Differentiate blocking and non-blocking statement with appropriate examples.
ii) Design a clock with period 40 and a duty cycle of 25% by using the always and initial statement. The value of clock at time = 0 is initialized to 0. Display the value. **(08 Marks)**

b. Design a 4×1 MUX and develop a verilog code using case statement. **(06 Marks)**

c. Bring out the differences and similarities between task and function. **(06 Marks)**

8 a. Compare sequential and parallel block with appropriate example. **(06 Marks)**

b. Define a task to compute the parity of a 16-bit data. Write a verilog code to call task calc-parity to compute the parity. Display the message as even or odd parity. **(08 Marks)**

c. Discuss the for loop and forever statement with example. **(06 Marks)**

9 a. Illustrate with examples the system tasks related to files. **(06 Marks)**

b. Write a verilog program for a positive edge triggered DFF with asynchronous clear (q = 0) and preset (q = 1) using assign and deassign statements. **(06 Marks)**

c. Give the importance of parameter overriding. Explain the two techniques of parameter overriding with examples. **(08 Marks)**

10 a. List the limitation of manually obtained gate level synthesis of design. How these are analyzed and addressed using automated logic synthesis tools. **(08 Marks)**

b. Discuss in detail the steps involved in the logic synthesis flow from RTL to gates with a neat flow diagram. **(08 Marks)**

c. Interpret the gatelevel netlist diagram for the following when run on a synthesis tool.
i) assign out = (Sel)? I1 : I0 ;
ii) always @ (posedge clk)
q ⇐ d ; **(04 Marks)**

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18ES51

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

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions.*

1	a.	Define Management. List and explain the essential management functions.	(08 Marks)
	b.	Explain the various roles of a Manager.	(07 Marks)
	c.	Compare 'management' with administration.	(05 Marks)
2	a.	With a neat diagram, explain the hierarchy of organizational plans.	(08 Marks)
	b.	Explain the various steps involved in rational decision making with a neat diagram.	(08 Marks)
	c.	Explain any five limitations of planning.	(04 Marks)
3	a.	Explain about the purpose of organization and the process of organizing.	(10 Marks)
	b.	What is recruitment? Explain the steps in the selection process.	(10 Marks)
4	a.	Explain Maslow's need hierarchy theory with a neat diagram.	(10 Marks)
	b.	Define leadership. Explain briefly about any two leadership styles.	(10 Marks)
5	a.	Describe the social responsibilities of business towards different groups in a society.	(10 Marks)
	b.	What is Social Audit? List its benefit and limitations.	(10 Marks)
6	a.	Define Entrepreneurship. Explain the characteristics of an Entrepreneur.	(10 Marks)
	b.	Briefly explain the various classifications of Entrepreneurs.	(10 Marks)
7	a.	Briefly explain the importance of the family business and the different stages of development of a family business.	(10 Marks)
	b.	Discuss the contribution made by Indian family business with examples.	(10 Marks)
8	a.	Explain the various ways to generate business ideas, and briefly describe how to identify a Business opportunity.	(10 Marks)
	b.	Briefly explain about Marketing and financial feasibility analysis.	(10 Marks)
9	a.	List and explain the contents of a Business plans.	(08 Marks)
	b.	Why do some Business plans fails? Explain.	(04 Marks)
	c.	Define Venture Capital. List out the stages of venture capital financing.	(08 Marks)
10	a.	Explain the importance of Network analysis during project execution.	(08 Marks)
	b.	Discuss the steps in CPM network analysis techniques, with its advantages and limitations.	(08 Marks)
	c.	Compare PERT with CPM.	(04 Marks)

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