IT-2210

Rimpa

Interpolating a table of data by Newton's forward and backward difference interpolation formula, Lagrange's Interpolation formula and Inverse Lagrange's Interpolation formula.

1. Write a program to find out y(10) and y(1) for the following tabular data

x	$x_0=3$	$x_1=4$	$x_2=5$	$x_3=6$	$x_4=7$	$x_5=8$	$x_6=9$
y	$y_0=2.7$	$y_1=6.4$	$y_2=12.5$	$y_3=21.6$	$y_4=34.3$	$y_5=51.2$	$y_6=72.9$

2. Write a program to find out y(3) for the following tabular data

x	$x_0=0$	$x_1=1$	$x_2=2$	$x_3=4$
y	$y_0=2$	$y_1=5$	$y_2=9$	$y_3=12$

3. If $y_1=4$, $y_3=12$, $y_4=19$ and $y_x=7$, then write and program to find x.

1. Derive Simpson's 3/8 rule from Newton's Cotes Method. 8
2. Evaluate the following integral using Simpson's 1/3 method for n=6: 12
   - $I = \int_0^{\frac{\pi}{2}} \sqrt{(1 - 0.25 sin^2 x)}\, dx$
   - $I = \int_1^2 \frac{e^x}{x} dx$

Tutorial-3

Course No# IIT-2207

Date : 19.02.2020 Marks : 20

1. a) Define Laplace Transform with properties.
   Find $L(t^5)$, and $L(t^2e^{at})$

   b) Calculate $L^{-1}\left(\frac{s^3-2s^2+1}{s^2(s^2-1)}\right)$

   c) Solve : $Y'' - Y' = t$; $Y(0) = 2$ $Y'(0) = 3$

   d) Define Fouier series and find the F.S. expansion for (2x)

Set up truth table, write SOP format simplify and implement on breadboard:

In a simple copy machine, a stop signal, S, is to be generated to stop the machine operation and energize an indicator light whenever either of the following conditions exists: (1) there is no paper in the paper feeder tray; or (2) the two microswitches in the paper path are activated, indicating a jam in the paper path.The presence of paper in the feeder tray is indicated by a HIGH at logic signal P. Each of the microswitches produces a logic signal (Q and R) that goes HIGH whenever paper is passing over the switch to activate it. Design the logic circuit to produce a HIGH at output signal S for the stated conditions, and implement it using the 74HC00 quad two-input NAND chip.

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y	$y_0=2$

3. If $y_1=4$, $y_3=12$, $y_4=19$ and $y_x=7$, then write and prog

The following table contains the temperature of a particular city on November month.

Date (d)	5	8	11	14	17	20	23
Temperature t(d)	20.5	17.6	16.06	15.75	15.05	14.5	14.25

Find the temperature of November 21 using the proper interpolating technique. Validate your point towards selecting the technique.

3. If $y_1=4$, $y_3=12$,

Institute of Information Technology, JU

Quiz# 1, DLD, 2nd Year 2nd Semester 2019

Full marks: 15 Time: 40 Minutes.

1. What is number system? List its example. Write an algorithm and draw a flow chat to convert number from one system to another. 5
2. Explain the Consensus theorem and Shannon's Expansion with examples. 5
3. Simplify the following expression using K-Map:

$$Y= \overline{(C+D)} + \bar{A}\,C\,\bar{D} + A\bar{B}\bar{C} + \bar{A}\bar{B}\,CD + AC\bar{D}$$ 5

4. Briefly discuss the operating [illegible]
5. Construct a 3 bits binary count sequence using flip-flop and explain it operation.

Institute of Information Technology
Jahangirnagar University, Savar, Dhaka
2nd Year 2nd Semester B.Sc. (Hons.) Quiz--2 Examination 2019

Course Code: IT-2203 Course Title: Digital Logic Design
Total Marks: 15 Times: 40 Hours

1. Define different types of clock signal with figures. 2
2. Draw and discuss the functional diagram of a 555-timer circuit. 3
3. Calculate the frequency and the duty cycle of the 555 astable multivibrator output for $C=0.001\mu F$, $R_A= 2.2\ k\Omega$, and $R_B= 100\ k\Omega$. 3
4. Briefly discuss the operating characteristics of a flip-flop. 4
5. Construct a 3 bits binary count sequence using flip-flop and explain it operation. 3

x	$x_0=0$	$x_1=1$	$x_2=2$	$x_3=12$
y	$y_0=2$	$y_1=5$	$y_2=9$	

3. If $y_1=4$, $y_3=12$, $y_4=19$ and $y_x=7$, then write and program to find x.

Tutorial-3(DLD, 2nd Year 2nd Semester 2019) ; Full Marks: 15 ; Time- 45 Min.

1. What synchronous counter? Construct and explain the working of a synchronous Up/down counter. 5
2. What is Mod number? Describe the steps of designing of a synchronous counter of Mod-number 25. 5
3. Draw a block diagram to explain the working of a successive approximation ADC. Also briefly explain its working. 5

1. Determine the real root of $f(x) = 4x^3 - 6x^2 + 7x - 2.3$ using bisection to locate the root. Iterate until the estimated error falls below a level of 10%.
2. For $f(x) = x^5 - x^3 + 2x^2 - 1$, apply Newton-Raphson method to find the root up to 4^{th} iteration.

Institute of Information Technology
Jahangirnagar University
2nd Part 2nd Semester Final Examination 2019
Course Code; 2203 Title: Digital Logic Design
Total Marks 60; Time 3 hours

There are 7 sets of questions answer any five sets

1 (a) Why NAND and NOR gates are called universal gates 2

(b) A jet aircraft employs a system for monitoring the rpm, pressure, and temperature values of its engines using sensors that operate as follows: 5

Figure 1 shows the logic circuit that controls a cockpit warning light for certain combinations of engine conditions. Assume that a HIGH at output W activates the warning light.

i. Determine what engine conditions will give a warning to the pilot.
ii. Change this circuit to one using all NAND gates.

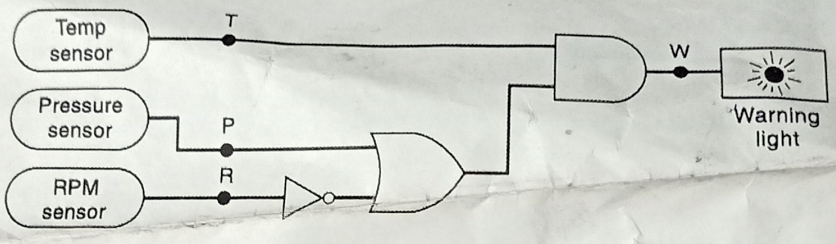

Figure 1: Question # 1 (b)

c) State and Prove De Morgan's theorems by trying all possible cases 5

2 a) Define maxterm and minterm 2

b) Simplify the logic circuit shown in Figure 2 3

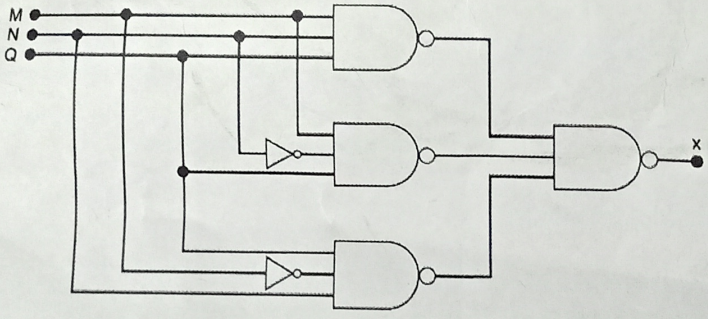

Figure 2: Question # 2 (b)

c) For the combinational logic circuit shown below: 5

i. Obtain the Logic Equation directly from the schematic
ii. Obtain SOP using Boolean theorems & postulates
iii. obtain the Truth Table
iv. obtain the Canonical form SOP
v. obtain the Minterm representation

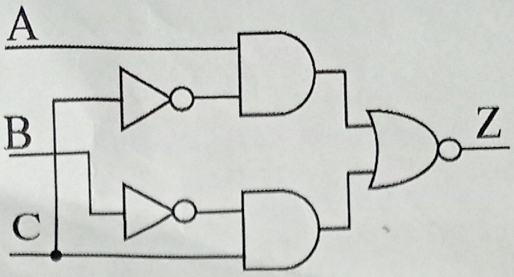

Figure 3: Question # 2 (c)

d) Use a K map to simplify $y = \underline{C}(\underline{ABD} + D) + A\underline{B}C + \underline{D}$

3 a) What is latch? Classify the latches.

b) Define flip-flop. Classify the flip-flops and write the truth table for each class.

c) Draw and briefly explain the operation of a master-slave J-K flip-flop. 4

d) Write the operating characteristics of a flip-flop. 2

4 a) What is parity bit? Draw circuits to build parity bit generator and checker using universal gate. Also briefly discuss their operation. 4

b) Write the basic characteristics of a digital IC. 3

c) State and explain the basic steps in fixing a digital IC which has a fault. 3

d) Write the difference between TTL and CMOS digital ICs. 2

5 a) What is counter? Write the applications of counter. 2

b) Using a J-K flip-flops and logic fates draw a 4-bit presentable counter which starts it counting form 1001. Explain its operation briefly. Also calculate the mod-numbers of the counter. 6

c) Define the synchronous and asynchronous counter. Also write the pros and cons of both of counters. 4

6 a) Write precision reference voltage is required for digital-to-analog conversion (DAC) circuit? Draw and discuss the working of a four-bit DAC including precision reference supply. Also write the drawback of this circuit. 7

b) Proof that $V_{out} = V_{ref} \times \frac{1}{2^n} B$, for n-bit R/2R ladder DAC circuit. Where V_{ref} is the reference supply voltage. 5

7 a) Explain BCD to 7 segment decoder/drivers 4

b) Draw and explain a Digital-ramp ADC 4

c) Describe the Logic diagram for the 74ALS151 multiplexer; also write the truth table and logic symbol of it.