Total Printed Pages: 03

Roll No. :.....

CSA-102
Examination –Dec- 2022
B.Tech. I Sem : CSE, IT, AIADS, CSE(BC), IoT
Digital Electronics

Max. Marks : 60
Min. Marks : 19

Time : 2 Hrs

Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a & b are compulsory while Part c & d has internal Choice. Assume missing data, if any.
Word limit be observed as follows:
Part a – Max 50 words, Part b – Max 50 words,
Part c – Max 100 words and Part d – Max 400 words.
Word limit NOT to be followed for diagram, numerical, derivation.

Q.1 (a) Add $(756)_8 + (ACC)_{16}$ 02

(b) Representation of 7 in 8 4 -2 -1 code 02

(c) Perform the BCD addition $(175)_{10} + (259)_{10}$ 03

OR

Convert $(135)_{10}$ to Gray code 03

(d) A 7-bit Hamming code 1010110 is received in which almost a single error has occurred. Locate the position of the error bit using parity checks assuming code was created using an even parity 05

OR

Solve the following : 05

(a) Convert $(01FA.3A)_{16}$ to $(N)_2$

(b) $(255)_{10}$ to $(N)_8$

(c) Subtract $(011011)_2 - (110011)_2$

(d) $(1721.54)_8$ to $(N)_{10}$

(e) 2's complement of $(1011010)_2$

Q.2 (a) Obtain the simplified expressions in sum of products for the following Boolean functions: $F(x,y,z)= \sum(2,3,12,13,14,15)$ 02

(b) $F= \pi (0,1,2,3,4,10,11)$, find POS. 02

(c) Simplify the Boolean functions F using the don't-care conditions in Sum of product form 03

F= A'B'D'+ A'CD+ A'BC

d= A'BC'D +ACD +AB'D'

OR

Find POS 03

F = (A+B'+D) (A'+B+D) (C+D) (C'+D')

(d) Implement the function using NAND gate in SOP form 05

$F = B'D + B'C + ABCD$

$d = A'BD + AB'C'D'$

OR

Design a combinational circuit whose input is 3-bit number and whose output is the 2's complement of the input number. 05

Q.3 (a) Implement the Boolean expression $F(A,B,C) = \sum m\,(0,3,5,6)$ using 4:1 multiplexer. 02

(b) Explain the working of Encoder. 02

(c) Explain full substractor. 03

OR

Construct a 5□32 decoder using four 3□8 decoder and one 2□4 decoder 03

(d) Implement full adder with two half adder and one OR gate with its truth table 05

OR

Design a Binary to Gray code converter. 05

Q.4 (a) What is the difference between Sequential Circuit and combinational circuit? 02

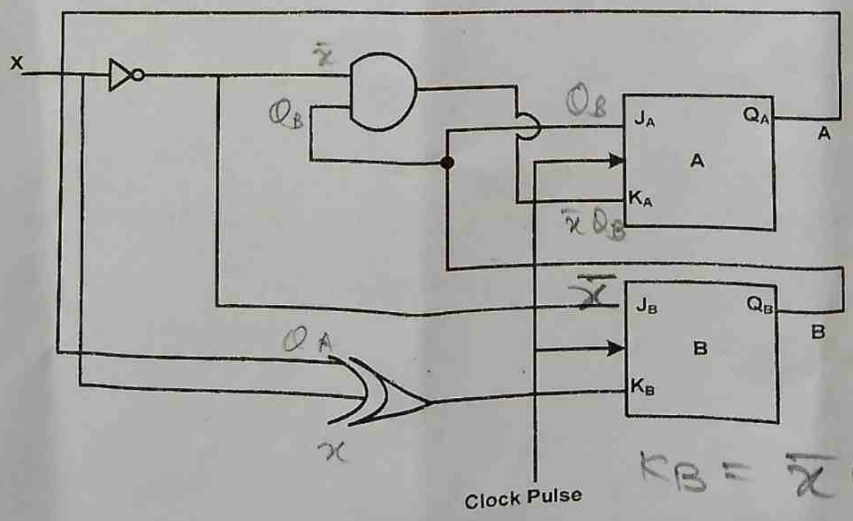
(b) Explain SR Latch flip-flop using NAND Gate. 02

(c) Explain JK flip-flop with characteristics and Excitation table. 03

OR

Convert JK Flip Flop to T Flip Flop. 03

(d) Find the state diagram 05



OR

Explain different type of shift register explain them with neat diagram. 05

Q.5 (a) Write a difference between Asynchronous and Synchronous counter. 02

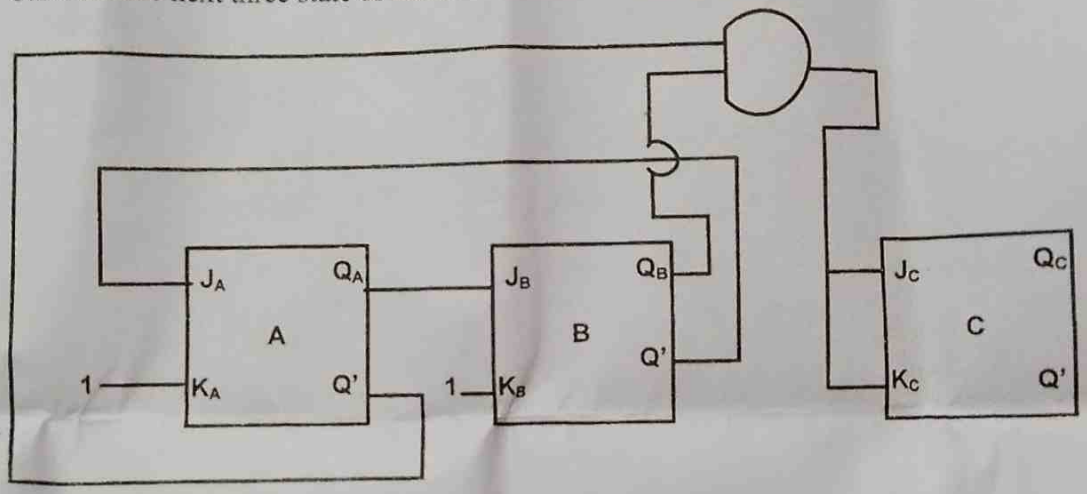
(b) Design 2-bit asynchronous up counter using J-K flip-flop. 02

(c) Design a 3-bit Synchronous up counter using T flip-flop. 03

OR

Design a synchronous counter that will count 0 , 3, 5, 7. 03

(d) Calculate the next three state of counter if the initial state is '0 0 0'. 05



OR

Design a mode 6 down asynchronous counter for active low pre-set. 05

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Total Printed Pages: 03

Roll No. : 0108TT22039

MAB-101
Examination –Dec- 2022
B.Tech. I Sem : Common for all Branches
Linear Algebra and Calculus

Time : 2 Hrs

Max. Marks : 60
Min. Marks : 19

Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a & b are compulsory while Part c & d has internal Choice. Assume missing data, if any.

Word limit be observed as follows:
Part a – Max 50 words, Part b – Max 50 words,
Part c – Max 100 words and Part d – Max 400 words.
Word limit NOT to be followed for diagram, numerical, derivation.

Q.1 (a) Write the statement of Maclaurin's theorem Theorem. 02

(b) Expand **logx** in power of **(x – 1)** by taylor's theorem. 02

(c) Find the first four terms in the expansion of **log(1 + sin x)** by Maclaurin`s theorem 03

OR

Find the radius of curvature of the following curves at the points indicated against them 03
$\sqrt{x} + \sqrt{y} = \sqrt{a}$, (1/4, 1/4).

(d) Discuss the maxima and minima of the function **U = Sinx Siny Sin (x+y).** 05

OR

Find the radius of curuature at the Pamt **"t"** of the curve. 05
x = 3a cost – a cos3t, y = 3a sint- a sin3t

Q.2 (a) If $u = \sin^{-1}(x/y) + \tan^{-1}(y/x)$ Show that $x\,\partial u/\partial x + y\,\partial u/\partial y = 0$ 02

(b) State and prove Euler's theorem 02

(c) if $u = (x^2 + y^2 + z^2)^{-1/2}$ Show that $\partial u/\partial x + \partial u/\partial y + \partial u/\partial z = -u$ 03

OR

If $x^x y^y z^z = c$ then show that $\delta^2 z/\delta x \delta y = -(x \log ex)^{-1}$. 03

(d) (d) If $u = f(r)$, Where $r^2 = x^2 + y^2$ Show that $\partial^2 u/\partial x^2 + \partial^2 u/\partial y^2 = f''(r) + 1/r\, f'(r)$. 05

OR

05

If $u = \sin^{-1}\left(\dfrac{x^{1/3} + y^{1/3}}{x^{1/2} + y^{1/2}}\right)^{1/2}$ then show that

$$x^2 \frac{\partial^2 u}{\partial x^2} + y^2 \frac{\partial^2 u}{\partial y^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} = \frac{\tan u}{144}(13 + \tan^2 u)$$

Q.3 (a) Evaluate 02

$$\int_0^2 \int_0^1 (x^2+y^2)\, dx\, dy$$

(b) Find the limit as n→∞ of the series 02

$$\frac{1}{n}+\frac{n^2}{(n+1)^3}+\frac{n^2}{(n+2)^3}\cdots\cdots+\frac{1}{8n}$$

(c) Find the area include between the parabola $y^2 = 4ax$ and $x^2 = 4ay$ 03

OR

Find the limit as **n**→∞ of the series 03

$$\left[\left(1+\frac{1}{n^2}\right)\left(1+\frac{2^2}{n^2}\right)\left(1+\frac{3^2}{n^2}\right)\cdots\cdots\left(1+\frac{n^2}{n^2}\right)\right]^{\frac{1}{n}}$$

(d) Evaluate $\int_0^4 \int_0^x \int_0^{x+y} z\,dz\,dy\,dx$ 05

OR

Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xy\,dx\,dy$ and hence evaluate it. 05

Q.4 (a) Find the characteristic root's of the matrix $\mathbf{A}=\begin{bmatrix}5 & 4\\ 1 & 2\end{bmatrix}$ 02

(b) Define Echelon form of a matrix with example 02

(c) Reduce the Matrix to normal form and find it`s rank. 03

$$\mathbf{A}=\begin{bmatrix}8 & 1 & 3 & 6\\ 0 & 3 & 2 & 2\\ -8 & 1 & -3 & 4\end{bmatrix}$$

OR

Verify Calley – Hamilton theorem for matrix. 03

$$A=\begin{bmatrix}1 & 2 & 3\\ 2 & 4 & 5\\ 3 & 5 & 6\end{bmatrix}$$

(d) Check the consistency of the following system of equations. 05

$$7x_1+2x_2+3x_3 = 16$$
$$2x_1+11x_2+5x_3 = 25$$
$$x_1+3x_2+4x_3 = 13$$

OR

Determine the eigen values and eigen vectors of the matrix 05

$$A=\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

Q.5 (a) Define Equivalent, Contradiction. 02

(b) If p and q are two statements prove that $(p \wedge q) \Rightarrow p$ is a tautology. 02

(c) State and prove Demorgan;s law. 03

OR

(1) Degree of vertex (2) Walk (3) Isomorphic graph. 03

(d) Express the following function into disjunctive normal form: 05

$F(x, y, z) = (x + y)(x+z')+(y+z')$

OR

Simplify the following $(a+b).(a'+b).).(a'+b').=a'b'$ 05

$pqr+ pqr'+ pq'r+ p'qr = pq + qr+ rp$

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Total Printed Pages: 02

Roll No. : 9108FT221039

CSA-101
Examination –Dec- 2022
B.Tech. I Sem : CSE, IT, AIADS, CSE(BC), IoT
Introduction to Computer Science Engineering

Time : 2 Hrs

Max. Marks : 60
Min. Marks : 19

Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a & b are compulsory while Part c & d has internal Choice. Assume missing data, if any.
Word limit be observed as follows:
Part a – Max 50 words, Part b – Max 50 words,
Part c – Max 100 words and Part d – Max 400 words.
Word limit NOT to be followed for diagram, numerical, derivation.

Q.1 (a) What are the four basic operations performed by the computer? 02

(b) Define computer. What are the applications of a computer? 02

(c) What are the differences between RAM and ROM? 03

OR

What is a bus? Describe the functions of a control bus? 03

(d) What are different registers in CPU? What are their functions? 05

OR

What is software? What are its different types? Explain each in detail. 05

Q.2 (a) What are flowcharts? 02

(b) What are the rules to be followed in naming variables? 02

(c) Explain the structure of C program. 03

OR

What are logical operators? 03

(d) What are data types? Explain its types and its type modifiers. 05

OR

Explain the following control constructs- 05
If-else, for, while and do-while.

Q.3 (a) How many types of array are there? 02

(b) What are functions in C programming? 02

(c) What do you mean by scope of a variable? 03

OR

State the difference between call by value and call by reference. 03

(d) What are pointers? Also explain the actual and formal arguments. 05

OR

What is recursion? Write a simple C program to show the application of recursion. 05

Q.4 (a) What are Macros? 02

(b) How the structure elements are accessed? 02

(c) How structure is declared? 03

OR

What are enumerated data types? 03

(d) What are preprocessor directives? Also explain at least two with example. 05

OR

What is the use of structure in C programming language? 05

Q.5 (a) What is web development? 02

(b) What is Block Chain technology? 02

(c) Explain any three functions of an operating system 03

OR

Explain different types of cloud computing. 03

(d) What is Machine Learning? Also discuss its types. 05

OR

Explain the lifecycle of Data Science. 05

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Total Printed Pages: 04

Roll No. : 0108ET221

CHB-101

Examination –Dec- 2022

B.Tech. I Sem: Common to CSE, CSE BC, IT, AIADS branches

Applied Chemistry

Time :2Hrs

Max. Marks : 60
Min. Marks :19

Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a & b are compulsory while Part c &d has internal Choice. Assume missing data, if any.
Word limit be observed as follows:
Part a – Max 50 words, Part b – Max 50 words,
Part c – Max 100 words and Part d – Max 400 words.
Word limit NOT to be followed for diagram, numerical, derivation.

Q.1 (a) Following two questions have four options, out of which only one is correct. Write the correct answer only. 02

(i) Which of the following is *NOT* an Internal Conditioning method?

1. Colloidal Conditioning
2. Calgon conditioning
3. Zeolite conditioning
4. Phosphate conditioning

(ii) Which of the following is a *CORRECT* relationship?

1. 1 ppm = 0.07°Fr
2. 1 °Fr = 1 ppm
3. 1 mg/l = 1 ppm
4. 1 °Cl = 1 ppm

(b) In the Ion exchange resin method of water softening, hard water is first passed through cation exchanger and then through anion exchanger. Why? 02

(c) Name various defects caused by hard water in boiler. Discuss any one of these defects. 03

OR

50 ml of standard hard water containing 1 mg of pure $CaCO_3$ per ml consumed 20 ml of EDTA using Eriochrome Black - T indicator. 03

In another experiment, 100 ml of hard water sample consumed 25 ml of same EDTA solution by same process. Further, 100 ml of same hard water sample after boiling consumed 20 ml of same EDTA solution by same process. Calculate Total, Temporary and Permanent Hardness of water sample.

(d) Discuss Lime soda process of water softening giving only reactions and diagram. 05

OR

What is alkalinity? Write various ions involved in causing alkalinity with reference to Phenolphthalein and Methyl orange indicators. Write significance of alkalinity. 05

Q.2 (a) Following two questions have four options, out of which only one is correct. Write the correct answer only. 02

(i) The electrode potential is the tendency of a metal

1. To gain electrons
2. To lose electrons
3. Either to lose or to gain electrons
4. Neither to lose nor to gain electrons

(ii) Which of the following is a rechargeable cell/battery?

1. Alkaline battery
2. Dry cell
3. Lithium ion battery
4. Mercury battery

(b) Why does a dry cell become dead after a long time, even if it has not been used? 02

(c) What are reversible and Irreversible cells? Give examples. 03

OR

Calculate the emf of a cell at 25°C, when the concentration of $ZnSO_4$ and $CuSO_4$ are *0.001 M and 0.1 M* respectively. Given: $E^{\circ}_{Zn2+} = -0.76$ V and $= E^{\circ}_{Cu2+} + 0.34$ V. 03

(d) Derive Nernst's equation and give its applications. 05

OR

Discuss construction, working and advantages of Li ion battery. 05

Q.3 (a) Following two questions have four options, out of which only one is correct. Write the correct answer only. 02

(i) The rusting of iron is catalysed by

1. Zinc
2. Acidic environment
3. Vacuum
4. Silver

(ii) In Galvanisation, the layer of following metal is coated over iron

1.Gold
2. Silver
3. Copper
4. Zinc

(b) Rusting of iron is faster in sea water as compared to river water. Why? 02

(c) State and explain Pilling Bedworth rule. 03

OR

Discuss electrochemical or wet corrosion. 03

(d) Discuss various factors influencing corrosion. 05

OR

Discuss the methods for controlling or preventing corrosion. 05

Q.4 (a) Following two questions have four options, out of which only one is correct. Write the correct answer only. 02

(i) Structural units of polymers are called

1. Thermoplastics
2. Fibers
3. Monomers
4. Resins

(ii) 1 nanometer is equal to

1. 10^{9} cm
2. 10^{-9} cm
3. 10^{9} m
4. 10^{-9} m

(b) LDPE and HDPE differ in density. Why? 02

(c) Give classification of polymers with examples. 03

OR

What is dye sensitized solar cell? Give their applications. 03

(d) What are conducting polymers? Give preparation and applications of any two of following: 05

1.Polyaniline

2.Polypyrrole

3.Polythiophene

OR

Write brief notes on any one of the following: 05

1.Nanomaterials

2.Optical fibers

Q.5 (a) Following two questions have four options, out of which only one is correct. Write the correct answer only. 02

(i) Which is NOT a part of visible region of electromagnetic spectrum

1. Violet light 2. Ultra violet light 3. Yellow light 4. Orange light

(ii) Which is an electroanalytical technique of chemical analysis

1. Conductometry 2. Colorimetry 3. IR spectroscopy 4. UV spectroscopy

(b) IR spectroscopy is regarded as Finger Print technique in chemical analysis of organic compounds. Why? 02

(c) What are electrolytes and non electrolytes? Give examples. 03

OR

Write in brief how pH is determined using pH meter? 03

(d) Discuss principle and instrumentation of Gas Chromatography. 05

OR

Discuss principle and instrumentation of IR spectroscopy. 05

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Total Printed Pages: 02

Roll No. : 0108221039

HUB-102
Examination –Dec- 2022
B.Tech. I Sem :CSE, IT, AIADS, CSE(BC), EE
Communication and Report Writing

Time : 2 Hrs

Max. Marks : 60
Min. Marks : 19

Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a & b are compulsory while Part c & d has internal Choice. Assume missing data, if any.
Word limit be observed as follows:
Part a – Max 50 words, Part b – Max 50 words,
Part c – Max 100 words and Part d – Max 400 words.
Word limit NOT to be followed for diagram, numerical, derivation.

Q.1	(a)	Define non verbal communication. Give examples.	02
	(b)	Define interpersonal communication giving an example.	02
	(c)	What do you understand by physical barriers in communication?	03
		OR	
		What is upward communication?	03
	(d)	What is the process of communication? Explain	05
		OR	
		Discuss the importance of effective communication in business.	05
Q.2	(a)	What are employability skills?	02
	(b)	Is communication an important employability trait?	02
	(c)	Discuss briefly the do's and don'ts of Group Discussion.	03
		OR	
		What is the role of body language in an interview?	03
	(d)	What are the different types of interviews? Discuss.	05
		OR	
		Elucidate the different types of interview skills needed for an interviewee.	05
Q.3	(a)	Define soft skills giving examples.	02
	(b)	Why is problem solving important?	02
	(c)	Briefly explain the qualities of a good leader.	03

OR

How does goal setting help you in your life? 03

(d) What are time wasters? Discuss 05

OR

How can one effectively manage time at work? 05

Q.4 (a) Define a report. 02

(b) Report is the only tangible product of an engineer. Comment. 02

(c) What is the difference between an abstract and summary in report writing? 03

OR

What are the different types of reports? 03

(d) Write the technical description of a laptop. 05

OR

What are the tips to write a five paragraph essay? 05

Q.5 (a) How is a comma different from a full stop? 02

(b) What is a question tag? 02

(c) Give three different uses of subject verb agreement. 03

OR

Define the two types of narration. 03

(d) 05

i. We go to ____ town sometimes to buy clothes. (Insert suitable article)
ii. hurrah we won the match (Punctuate the sentence)
iii. You don't get up early in the morning. (Add question tag
iv. He went ___ the room. (in/into)
v. He said to his friends, "I don't want to take your notes". (Change into Indirect Narration)

OR

Why are articles important in English grammar? Explain with the help of some examples. 05

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