Enrollment No…….

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Digital Circuit & Design [CS222T]
Branch-CS

Time: 3:00 Hrs **Max Marks 70**

Note : Attempt any five questions. All question carry equal Marks.

Q.1 (a) Write down AND gate, NAND gate and exclusive-OR gate with suitable diagram and truth table.
(b) Explain De-Morgan's theorem with example.

Q.2 (a) Explain C-mos inverter and C-mos gates.
(b) Write short note on : (i) PROM (ii) EPROM (iii) static RAM.

Q.3 (a) Explain PLA and PAL.
(b) Describe the following: (i) RTL (ii) DTL (iii) TTL

Q.4 (a) Explain ring counter and shift counter?
(b) What is universal shift register? Explain it.

Q.5 (a) Design of synchronous counter?
(b) Write down the Asynchronous counter?

Q.6 (a) What is difference between level triggering and edge triggered?
(b) Write down the master-slave flip-flop.

Q.7 (a) Explain SR flip-flop and JK flip-flop?
(b) What is a decoder and explain how 3*8 decoder is constructed?

Q.8 (a) Write down half adder substractot with truth table?
(b) Simplify the logic function using K-map
F (A, B, C) = A'C+A'B+AB'C+BC

Enrollment No…….

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Electronic Devices & Circuits [CS-221]
Branch-CS

Time: 3:00 Hrs **Max Marks 70**

Note : (i) Attempt any five questions.
(ii) Answer should be precise & to be point only.
(iii) Assume suitable data if necessary & state them clearly

Q.1 (a) Explain the V.I characteristics of a PN junction diode and show that PN diode works as a rectifier.
(b) Differentiate BJT and FET.

Q.2 (a) With the help of characteristics curves and neat sketches explain the operation of the junction FET.
(b) What is Zener diode? Explain.

Q.3 (a) What do you understand by feedback in amplifier? Explain it's types. Write two advantages and disadvantages of negative feedback.
(b) Draw wien bridge oscillator and explain it's working.

Q.4 (a) Explain working of L-C (Hartley Colpitts) oscillator.
(b) Explain power amplifier.

Q.5 (a) Explain how transistor can be used as a switch. Also discuss it's switching characteristics.
(b) Write short note on bistable multivibrator.

Q6. (a) Explain the transfer characteristics of differential amplifier.
(b) Draw and explain free running multivibrator.

Q.7 (a) Describe Schmitt trigger.
(b) Write short note instrumentation amplifier

Q.8 Write a short notes:
(i) Slew rate (ii) Operational amplifier
(iii) Log and Antilog amplifier (iv) Off-set voltage

Enrollment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Data Structure-II [CS-223]
Branch- CS

Time: 3:00 Hrs **Max Marks 70**

Note : (i) Attempt any five questions.
(ii) All question carry equal marks.

Q.1 (a) What do you understand by Asymptotic notation? Explain each notation with example and diagram.
(b) Explain different non primitive data structure and the operation associated with them.

Q.2 (a) Explain various algorithm used in data structure.
(b) Provide the solution for the following recurrences:
T(n) 2T(n/2) + n log n

Q.3 Explain the AVL tree insert method and explain. Why its insertion time complexity is still of the same order as binary tree?

Q.4 (a) Construct an AVL search tree by inserting the following element in order of their occurrence 64, 1, 44, 26, 13, 110, 98, 85
(b) Explain analysis of Heap operation with example.

Q.5 (a) What is a stable sorting algorithm? Also prove counting sort is stable.
(b) Explain outline and offline algorithm.

Q6. (a) What do you understand by data structure maintenance? Explain.
(b) Explain Augmentation strategy with example.

Q.7 (a) Write short note on Internal trees. Explain with example.
(b) Explain retrieving an element with a given rank.

Q.8 (a) Explain Quick sort? Sort the following elements using Quick sort:
32, 23, 56, 78, 12, 66, 37, 93, 29, 80
(b) Write a short notes:
(i) Comparison of indexing and hashing
(ii) Radix sort
(iii) Insertion sort

Enrollment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Discrete Structures [CS-224]
Branch-CSE

Time: 3:00 Hrs **Max Marks 70**

Note : Attempt any five questions. All questions carry equal marks.

Q.1 (a) Describe Graph and its types?
(b) State and prove binomial theorem?

Q.2 (a) Define - Graph, Degree of a vertex, Even and odd vertex, Degree of Graph, Path.
(b) Define – (A) Ring, (B) Field

Q.3 (a) State and prove binomial theorem.
(b) State and prove recurrence relations.

Q.4 (a) Describe Finite State Machine.
(b)Define Lattice and describe types of lattice.

Q.5 (a) Represent on truth table: $\sim (p \wedge \sim q)$
(b) Let $G = \{1, -1,, -i\}$, which forms a group under multiplication and I be the group of all integers under addition, prove that the mapping $f : I \rightarrow G$ such that $f(x) = i^n \forall n \in I$ is a homomorphism.

Q.6 (a) Show that $\{1, -1, i, -i\}$ be the group with respect to multiplication.
(b) A relation R is defined on the set Z by "$a\ R\ b$ if $a - b$ is divisible by 5" for $a, b \in Z$. Examine if R is an equivalence relation on Z.

Q.7 (a) Expand $(2x - 5y)^7$ with the help of binomial expansion.
(b) Define - (A) Set, (B) Countable Set, (C) Uncountable Set

Q.8 Short note on: (All define with example)
(i) Group
(ii) Semi group

(iii) Monoid
(iv) Abelian group.

Enrollment No…….

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Communication Skills [HU220]
Branch-CE/EX/EC/CSE/IT/ME

Time: 3:00 Hrs **Max Marks 70**

Note : Attempt any five questions. All questions carry equal marks.

Q.1 What do you mean by Communication? Describe it.

Q.2 Explain process of communication with diagram.

Q.3 What are upward and downward communication?

Q.4 Differentiate one way and two way communication.

Q.5 List out challenges in communication.

Q.6 Explain barriers to communication.

Q.7 Write a short note on Articles.

Q.8 What are parts of speech? Explain with suitable examples.

Enrollment No…….

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Mathematics-III [MA-220]
Branch-EE/EC/CS/IT

Time: 3:00 Hrs **Max Marks 70**

Note : Attempt any five questions.
All question carry equal marks.

Q.1 (a) State and prove Cauchy's theorem.
(b) Show that the function $e^x(cosy + isiny)$ is analytic and find its derivative.

Q.2 (a) Using Cauchy's integral formula prove that : $\int_c^3 \frac{e^{2z}}{(z+1)^4} dz = \frac{8\pi e^{-2}}{3} i$, where C is the circle $|z| = 3$.
(b) Find the imaginary part of the analytic function whose real part is $x^3 - 3xy^2 + 3x^2 - 3y^2$.

Q.3 (a) Find the real root of the equations $x^3 - 9x + 1 = 0$ by the method of false position.

(b) Apply Newton Raphson method to solve $3x = cosx + 1$.

Q.4 (a) Using Newton's forward Interpolation formula, find the value of $f(1.6)$,if

x:	1	1.4	1.8	2.2
y:	3.49	4.82	5.96	6.5

(b) Solve the following system by Gauss elimination method

$$6x_1 + 3x_2 + 2x_3 = 6$$
$$6x_1 + 4x_2 + 3x_3 = 0$$
$$20x_1 + 15x_2 + 12x_3 = 0$$

Q.5 (a) Apply Lagrange's formula to find the value of x when f(x) = 0 given that

x:	30	34	38	42
$f(x)$:	−30	−13	3	18

(b) Solve initial value problem $\frac{dy}{dx} = 1 + xy^2$, $y(0)$=1 for $x = 0.4, 0.5$ by using Milne's method when it is given that

x:	0.1	0.2	0.3
y:	1.105	1.223	1.355

Q.6 (a) Solve the equation $\frac{dy}{dx} = x + y$ with initial condition $y(0) = 1$ by Runge kutta rule from $x = 0$ to $x = 0.4$ with $h = 0.1$

(b) Evaluate $\int_{0.5}^{0.7} x^{1/2} e^{-x} dx$ approximately by using a suitable formula.

Q.7 (a) Solve the following by Euler's modified method, the equation $\frac{dy}{dx} + \log(x + y), y(0) = 2$ at $x = 1.2$ and 1.4 with $h = 0.2$

(b) Use picard's method to approximate y when $x = 0.2$ given that $y = 1$ when $x = 0$ and $\frac{dy}{dx} = x - y$

Q.8 (a) Find the z Transform of Sinak, k7,0

(b) Solve the following by Gauss Seidel iteration Method

$$10x + y + z = 12$$
$$2x + 10y + z = 13$$
$$2x + 2y + 10z = 14$$