

Examination – June - 2023
B.Tech. I/II Sem : Common to all Branches

Applied Physics

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 to be observed is: Part a & b – Objective type/Fill. Part iii – Max 100 words

Part iv – Max 400 words. Word limit NOT to be followed for diagram, numerical and derivations.

- Q.1 (i) Which one of the following is not correct for photons:
 (a) They possess energy (b) They possess mass
 (c) They possess momentum (d) They possess intensity
- (ii) Matter waves have mass
 (a) True (b) False $\lambda = \frac{h}{p}$ ~~mc/mv~~
- (iii) Explain Heisenberg's uncertainty principle.

OR

Write the energy and momentum operators.

- 03
 (iv) Write a brief note on phase and group velocities.
OR
 Write a brief note on Schrödinger wave equation.

- 05
 Q.2 (i) Ruby laser belongs to which of the following category:
 (a) Atomic (b) Molecular (c) Ionic (d) Electronic
 (ii) Optical fibers works on the principle of
 (a) Interference (b) Diffraction (c) Dispersion (d) Total internal reflection
 (iii) Explain briefly, how holograms are constructed.

- 03
OR
 Enlist various important properties of a laser radiation.

- 05
 (iv) Deduce the expression for intermodal dispersion in a step index optical fiber.
OR
 Explain construction and working of a He-Ne laser.



Photo

- Q.3 (i) The emitted wavelength λ from a semiconductor of energy band gap E_g is
(a) E_g/hc (b) hc/E_g (c) hv/E_g (d) E_g/hv
02
- (ii) Can solar cell also be classified as a photodiode?
(a) Yes (b) No
02
- (iii) Write a note on energy bands in a semiconductors.
03

OR

Explain working of a LED.

- (iv) Explain the concept of effective mass in solid state physics.
05

OR

Write a note on working of solar cell.

- Q.4 (i) The phenomenon of superconductivity is sensitive to magnetic field
(a) True (b) False
02
- (ii) As we reduce the size, the surface area (per unit mass)
(a) Increases (B) Decreases
02
- (iii) What are Cooper pairs in a superconductor?
03

OR

Give a brief account of some applications of nanotechnology.

- (iv) Differentiate between type I and Type II superconductors.
05

OR

Write a note on Carbon nanotubes.

- Q.5 (i) Dielectric materials are
(a) Conductors (b) Semiconductors (c) Insulators (d) Superconductors
02
- (ii) Piezoelectric effect can be direct or it can be indirect
(a) True (b) False
02
- (iii) Differentiate between polar and non-polar dielectrics.
03

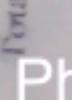
OR

- Explain how the piezoelectric effect originates.*
03

- (iv) Establish relation between E , D and P vectors for a dielectric material.
05

OR

Write a note on various applications of piezoelectric materials.



Total Printed Pages: 04

Roll No.

ITC-101

Examination - June - 2023

B.Tech. II Sem : CE, AE, EE, EI, EC, CSE, IT, AIADS, CSE(BC), IoT Python Programming

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.

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Part c - Max 100 words and Part d - Max 400 words.

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- Q.1 (a) (i) Computer uses which number system to perform calculations and store data:
1. Hexadecimal 2. Decimal 3. Octal Binary
(ii) What type of programming is supported by Python:
1. Object-Oriented-Programming 2. Structured Programming
3. Functional Programming 4. All of the above
(b) The correct extension of python file is .py.
(c) List the standard data types in python with one example in each.
OR
What is a variable in python? What are the rules for naming a variable? Explain by giving examples. 05
(d) Write a Python program to check whether a number is prime or not prime.
- 05
OR
What are the various arithmetic and logical operators that python support? Write syntax for each operator.
- Q.2 (a) (i) Which of the following operators has its associativity from right to left?
1. 2. // 3. % 4. **
(ii) What will be the output of the following code:
n=7
c=0
while(n):
 if (n>5):
 c = c+n-1
 n = n-1
 else:
 break
print(n)
print(c)
- Max. Marks : 60
Min. Marks : 19
1. 511 2. 39 711 4. 52
- ITC-101



Photo

- (b) What will be the output of the following python code?
for i in range(0,2,1):

```
print("Hello")
```

- (c) Explain the various control statements in Python with syntax.

03

- Write a program to check whether a person is eligible to vote or not. Take age as input from user.

OR

- (d) Write the output of the following code:

x=5

while (x<15):

```
print(x**2)
```

x+=3

Ans :
OR
for i in range(1,12):
 print(i*12)
 = 2 numbers {1,12}

Write a program to print the table of a number accepted from user.

- (a) (i) What will be the output of:

```
str1 = "PYthon class"  
print(str1[1:4],str1[0:-1])
```

1. Yth Python clas

2. PYt Python class

3. PYth Python elass

- (ii) What will be the output of:

```
str1 = "PythoN.Lab"
```

```
print(len(str1))
```

Ans : 9 2. 10 3. 11 4. 12

- (b) Write the output of the following:

```
str1="PYTHON"
```

```
Print(str1.lower())
```

- (c) How to split strings and what function is used to perform that operation?

Write syntax to take a input from a user and typecast it to an integer.

- (d) What is a directory? Which module in Python allows to use various methods with os directory. Write the syntax for the following: (i) to get current directory in Python

- (ii) change directory in python (iii) making a new directory in python

Explain the various functions for reading data from a text file.

05

Photo



Q.4 (a) What is the output
colors = ["red", "blue", "green", "pink"]
print(colors[2])

What is the output?
colors = ["red", "blue", "green", "pink"]
print("yellow" in colors)

(c) What is the difference between tuples and list?

OR

Explain how to create a dictionary in python.

(d) Explain indexing and negative indexing in tuple with example.

OR

Find the output of the following:

L1 = [100, 900, 300, 800]

START = 1

SUM = 0

for C in range(START,4):

SUM = SUM + L1[C]

print(C, ":", SUM)

SUM = SUM + L1[0]*10

print(SUM)

Q.5 (a) What is the output of the following code:
class Student:

```
def __init__(self, name, id):
```

```
    self.name = name
```

```
    self.id = id
```

```
    print(self.id)
```

```
std = Student("Suman", 1)
```

```
std.id = 2
```

```
print(std.id)
```

(b) In Python, what is method inside class?
1. Attribute 2. Object 3. Argument 4. Function

02

02

02

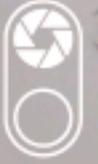
03

03

05

05

QUESTION PAPER



Q) Explain operator overloading with an example in python.
OR

(c) What is the output of the following code:

```
class A():  
    def disp(self):  
        print("A dispO")  
class B(A):  
    pass  
obj = B()  
obj.disp()
```

03

05

OR

(d) Explain exception handling with example.
OR
Explain Method Resolution order in Python with an example.

05



Examination - Dec- 2022
B.Tech. I Sem : EE, ME, EI, EC, IoT
Applied Physics

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 down the postulates of planck's quantum hypothesis. 02

(b) Define the phase velocity and group velocity. 02

(c) What is wave function, write its properties. 03

OR

A microscope using photon is employed to locate an electron in an atom to within a distance 2×10^{-11} meter. What is the uncertainty in the momentum of electron located in this way? 03

(d) Deduce an expression for the compton shift. 05

OR

Obtain scherodinger time dependent wave equation. 05

Q.2 (a) What are the main properties of LASER? 02

(b) Write the two important applications of LASER. 02

(c) Calculate the numerical aperture and acceptance angle for an optical fiber, given that refractive index of the core and the cladding is 1.41 and 1.40 respectively. 03

OR

Explain population inversion process. 03

(d) Discuss the He - Ne LASER on the basis of ray diagram, construction and working. 05

OR

Explain the construction and re construction of image on hologram. 05

Q.3 (a) What is effective mass? 02

(b) Define mobility of charge carriers. 02

(c) Explain the properties of PN junction. 03

OR

Differentiate between direct and indirect band gap of semiconductor. 03

(d) Explain the radiative and non radiative recombination mechanism in semiconductors. 05

OR

Explain the structure and characteristics of LED. 05

Q.4 (a) Define superconductor. 02

(b) Differentiate type I and Type II superconductors. 02

(c) What are the applications of superconductors? 03

OR

What are the applications of nanotechnology? 03

(d) Discuss the BCS theory of superconductors. 05

OR

Explain the properties and uses of fullerene. 05

Q.5 (a) Differentiate between polar and non polar dielectric. 02

(b) Define dielectric constant 02

(c) What is piezoelectric effect? Give two application of piezoelectric material. 03

OR

What is piezo ceramics? Name the two mostly used piezo ceramics material. 03

(d) Obtain the expression for gauss's law in dielectric. 05

OR

Define ferroelectric material. Write its properties. 05



MAB-102**Examination – June - 2023****B.Tech. II Sem : Common for all Branches
Statistics; Probability Distributions and Differential Equations**

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 & b – Objective type/Fill in the blanks/One sentence answer.

Part c – Max 100 words and Part d – Max 400 words.

Word limit NOT to be followed for diagram, numerical, derivation.

- Q.1** (a) The variance of the Binomial distribution is 02

(i) $n p q$ (ii) $n p$ (iii) $\sqrt{n p q}$ (iv) $n q$

- (b) The formula of Poisson's distributions.....

- (c) Find the mean of the Binomial distribution.

OR

Find the mean of the Normal distribution.

- (d) Fit a straight line to the following data:

X: 0	1	2	3	4
Y: 1	1.8	3.3	4.5	6.3

OR

If the probability that an individual suffers a bad reaction from a certain injection is 0.001, 05

Determine the probability that out of 2000 individuals.

- (i) exactly 3 (ii) More than two individuals (iii) More than one individuals will suffer a bad reaction.

- Q.2** (a) What is the mean of Chi-square distribution with six degree of freedom? 02

(i) 4 (ii) 12 (iii) 6 (iv) 8

- (b) A part is selected from the population is called.....

- (c) What is the purpose of Chi- square Test.

OR

Define null hypothesis and alternative hypothesis. 03

- (d) The height of ten males of a given locality is found to be 70, 67, 62, 68, 61, 68, 70, 69, 64, 66 05

inches. Is it reasonable to believe that the average height is 64 inches?

Test at 5% significance level assuming that for 9 degree of freedom is 1.83.

The demand for a particular in a factory was found day to day. In sample study, the 05 following information was obtained:

Days : Mon Tue Wed Thurs Fri. Sat.

No. of parts demanded: 1124 1125 1110 1125 1125 1116

Use Chi- square to test the hypothesis that number of parts demanded does not depend on the day of the week at 5% level of significance (5df= 11.07).

1

MAB-102

 $q e^{-q}$

Photo

Q.3 (a) The number of arbitrary constants in the general solution of differential equation of second order is 02

- (i) 1 (ii) 0 (iii) 2 (iv) 3
- (b) The general equation of exact differential equation is..... 03
- (c) Solve: $y = 2px + p^n$

OR

$$\text{Solve: } (D^2 - 5D + 6)y = e^{4x}$$

$$(D^2 - 2D + 1)y = x \sin x.$$

OR

$$\text{Solve: } (D^2 - 4D + 4)y = 8x^2 e^{2x} \sin 2x.$$

Q.4 (a) The Cauchy's Linear differential equation $x^n \frac{d^n y}{dx^n} + a_1 x^{n-1} \frac{d^{n-1} y}{dx^{n-1}} + \dots + a_n y = f(x)$ can be reduced to a linear differential equation with constant coefficient by using substitution
 (i) $x = e^z$ (ii) $y = e^z$ (iii) $z = e^y$ (iv) $z = e^y$

(b) The general equation of Legendre's Linear Differential equation is 02

(c) Solve: $Dx + \omega y = 0$

$$Dy - \omega x = 0$$

OR

$$\text{Solve: } (x^3 D^2 - 4x^2 D + 6x)y = x.$$

(d) Solve by the method of variation of parameter $(D^2 + 1)y = x.$
 OR

$$\text{Solve: } (x^3 D^3 + 2x^2 D^2 + 2)y = 10(x + 1/x).$$

Q.5 (a) The partial differential equation formed from $z = f(x+iy) + F(x-iy).$
 (i) $p + q = 0$ (ii) $r + s = 0$ (iii) $r + t = 0$ (iv) $p + q = f$

(b) The complementary function of $p + q = \sin 2x$ is..... 03

$$\text{Solve: } (z^2 - 2yz - y^2)p + (xy + zx)q = xy - zx.$$

OR

Solve by Charpit's method $z = pq.$
 (d) Solve: $r - s - 2t = (y - 1)e^x.$

OR

Solve $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$ by the method of separation of variables where $u(x, 0) = 6e^{-3x}.$

$\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$
 $\frac{\partial u}{\partial x} - 2 \frac{\partial u}{\partial t} = u$
 $\frac{\partial u}{\partial x} - u = 2 \frac{\partial u}{\partial t}$

$$f = pq - z^2$$



Max. Marks : 60

Min. Marks : 19

Time : 2 Hrs

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Q.1 (a) Define the syntax of pointer in C. 02

(b) Write one difference between static and dynamic data structure. 02

(c) If $f(n) = O(g(n))$, then $g(n) = \Omega(f(n))$. 03

State whether above statement is true or false. Justify your answer.

OR

Distinguish between Top-down and Bottom-up approach of programming design on the basis of merits and demerits. 03

(d) What is an array? Write algorithms for insertion and deletion of n elements from array with their complexities. 05

OR

Compare and contrast the various asymptotic notations with graphs. 05

Q.2 (a) Write one difference between array and linked list. 02

(b) Write one comparison between doubly and singly linked list. 02

(c) How do we implement link list. 03

OR

Name & describe different operations which you can perform on link list. 03

(d) What is a Doubly link list? Write an algorithm for insertion and deletion a key element from doubly link list. 05

OR

What is a linear link list? Create a list for elements: 3,4,1,6,7,8,9,10 assuming suitable addresses. Perform the deletion for key elements: 6,3,10 and insertion for key elements: 6,3,10. 05

Q.3 (a) Enumerate one drawbacks of linear queue 02

(b) List the any one application of queue. 02

Photo

(c) Define the check for underflow and overflow problem of a stack. 03

OR

Explain the overflow and under flow checks for circular queue. 03

(d) Write an algorithm to perform insertion and deletion operations of linear queue. 05

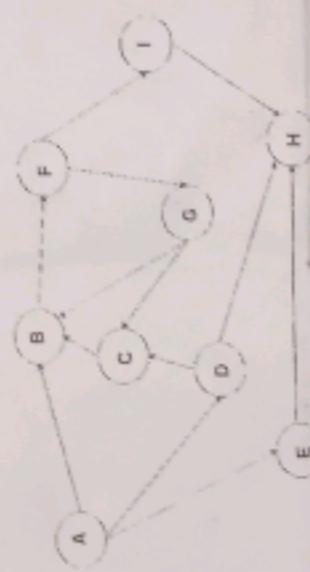
OR
Explain the overflow and under flow checks for circular queue.

- Q.4 (a) List out the one applications of tree structure? 02
(b) Differentiate full binary tree and complete binary tree. 02
(c) Form a binary search tree for the following list: 1,2,3,4,5,6,0 03

OR

What is a graph? Explain null graph, connected graph and complete graph. 03

(d) Write the steps of DFS and BFS algorithm? Apply DFS and BFS for the given graph. 05



OR

What is a binary tree? Make a binary tree using following data:

Inorder: 4,2,7,5,1,8,6,3.

Preorder: 1,2,4,5,7,3,6,8

- Q.5 (a) Write one difference between insertion sort and selection sort. 02
(b) Define RADIX sort. 02
(c) Compare linear and binary search. 03

OR

Apply the binary search over the given data and find the key element=1 writing all steps. 03
(1,3,5,8,9,10,12,14)

- (d) Apply merge sort the following elements using it. 05
10,50,3,6,8,9,0,12

OR

Apply the quick sort to sort the list 10,50,3,6,8,9,0,12. 05

Photo

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

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

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

OR

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

- Q.3 (a) Implement the Boolean expression $F(A,B,C) = \sum m(0,3,5,6)$ using 4:1 multiplexer.
 (b) Explain the working of Encoder.
 (c) Explain full subtractor.

OR

Construct a 5 \square 32 decoder using four 3 \square 8 decoder and one 2 \square 4 decoder

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

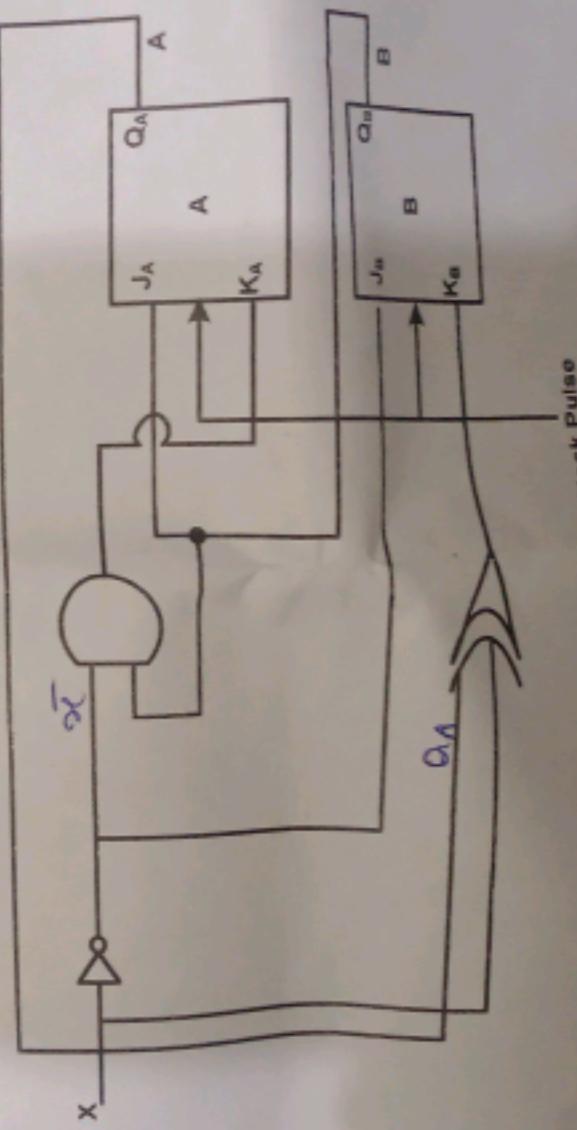
OR

Design a Binary to Gray code converter.

- Q.4 (a) What is the difference between Sequential Circuit and combinational circuit?
 (b) Explain SR Latch flip-flop using NAND Gate.
 (c) Explain JK flip-flop with characteristics and Excitation table.

OR
 Convert JK Flip Flop to T Flip Flop.

- (d) Find the state diagram



OR

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

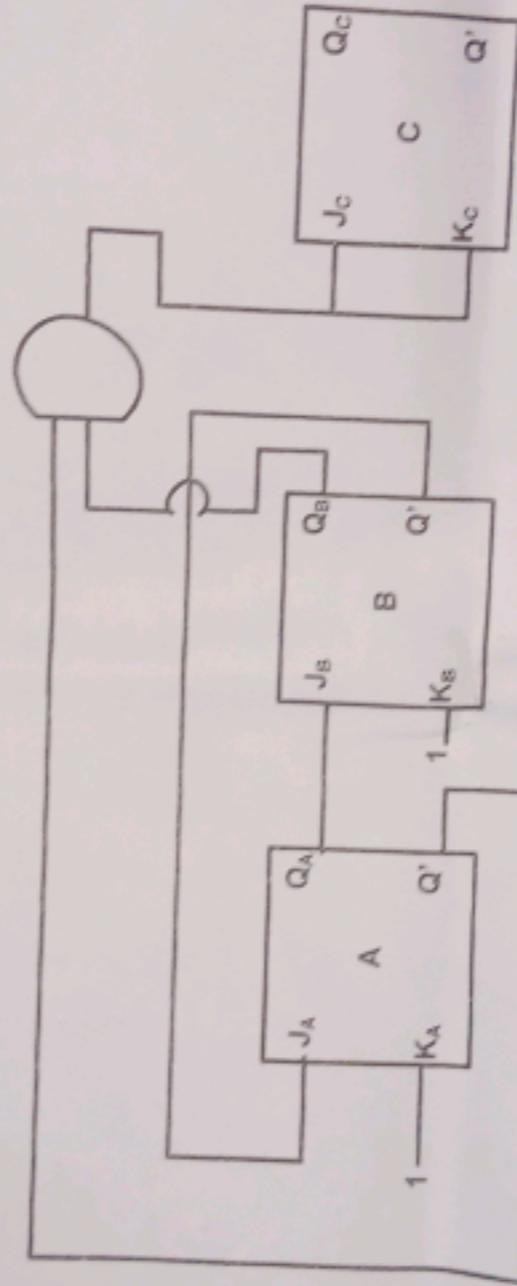
05

- 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.

- (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

Time : 2 Hrs

Principles of System Software

B.Tech. II Sem : CSE, IT, AI BC

Examination - June - 2023

CSA-104

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Min. Marks : 19

Max. Marks : 60

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

(i) A bridges an execution gap to Machine Language of a computer System.

(ii) Two Approaches to collision handling are to accommodate a colliding entry elsewhere in the hash table using Technique

(iii) (A) Language Translator (B) Pre-processor (C) Migrator (D) Detranslator

(iv) (A) Chaining (B) Overflow (C) Rehashing (D) Symbol Table

(b) What is Language Processor? Write Their Types. 02

(c) Why are system use Language processor? Give Example. 03

(d) How does Semantic gap fill between application domain and execution domain? 05

Write Different Language processor Development Tools. 05

OR

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

(i) Use of for machine instructions eliminates the need to memorize numeric operation codes. 02

(ii) (A) Symbolic codes (B) Data Codes (C) Mnemonic operation Codes (D) Declaration Codes

(iii) An Imperative statement indicates an action to be performed during the execution of the assembled program. (TRUE/FALSE) 03

(b) What is Assembler? 03

What is literal? How it differ from Constant? 03

OR

Q.3 (a) What are different Assembly language statements? Explain with example. 03

CSA-104

Total Printed Pages: 03

Roll No. : 28



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Photo

- (d) Write an Assembly language programming for calculating factorial of any Number. 05
OR

Explain the Pass Structure of Assemblers.

- Q.3 (a) **Q** Macros are used to provide generation facility through macro expansion. 02
(TRUE/FALSE)
(ii) A model statement in a macro many constitutes a call another macro, such call are known as
(A) Nested Macro call (B) Liner Macro call
(C) Expansion Macro Call (D) Non Linear Macro Call

- (b) What is Lexical substitution? 02
(c) What is the Macro Preprocessor? 03

OR

Write the Design parameters of a macro preprocessor. 03

- (d) Explain that a macro is a unit of specification for program generation through expansion. 05

OR

How does macro call the macro name in the mnemonic field? Explain with example. 05

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

- (i) The holds information concerning entities in the source program
(A) Data Table (B) Error Table (C) Data Table (D) Symbol Table
(ii) A/An.....Perform some preliminary processing of the source program to reduce the analysis overhead.

- (A) Pure Interpreter (B) Impure Interpreter (C) Toy Interpreter (D) Open Interpreter
(b) Explain "average compilation time per statement" for Interpreter. 02
(c) Why does interpretation expensive in terms of CPU Time? 03

OR

Write properties of Interpreter. 03

- Q** Write the three main components of Interpreter. 05
OR

Explain Pure and Impure Interpreter with neat and clean Diagram. 05

- Q.5 (a) (i) Linking of the program with other programs needed for its execution. 02
(TRUE/FALSE)
(ii) Relocation of the program to execute from the specific memory area pre-allocated to it. (TRUE/FALSE)
(b) Define Translated Origin. 02

Photo

(e) Write and Explain a schematic diagram of program execution. 03

OR

Define address sensitive instruction with example.

(d) Program Relocation is the process of modifying the addresses used in its translated origin. Explain it. 05

OR

How does a relocating loader performs relocation while loading a program for execution? 05

Photo**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

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Word limit NOT to be followed for diagram, numerical, derivation.

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?

- (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.

- 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?

- (d) What are data types? Explain its types and its type modifiers. 05
OR
Explain the following control constructs-
If-else, for, while and do-while. 05

- 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

Photo

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

OR

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

Q.4 (a) What are Macros?

(b) How the structure elements are accessed?

(c) How structure is declared?

What are enumerated data types?

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

OR

What is the use of structure in C programming language?

Q.5 (a) What is web development?

(b) What is Block Chain technology?

(c) Explain any three functions of an operating system

OR

Explain different types of cloud computing.

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

OR

Explain the lifecycle of Data Science.

* * * * *

05

05

02

02

03

03

05

05

02

02

03

03

05

05

4