

Register Number:

Date: 02/ 03 /2022

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

**BCA - V SEMESTER**

**END SEMESTER EXAMINATION: OCTOBER 2021**

(Examination conducted in January-March 2022)

**CA 5218 – System Software**

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| **Time- 2 ½ HOURS**  |  **Max Marks-70** |

**This paper contains THREE printed pages and THREE parts**

**PART A**

Answer **ALL** of the following question. (10 x 2 = 20)

1. Mention any two differences between compiler and interpreter.
2. Mention the purpose of MAR and MDR in the structure of CPU.
3. Name the pseudo-ops used for

a. Defining variables

b. reserve areas of memory and associate names with them

1. Explain EXTRN and ENTRY statements used in linking.
2. What is the purpose of

a. OPTAB

b. SYMTAB

1. Differentiate between local and global optimization.
2. What are the two variables introduced in one pass macro processor.
3. What is a parse tree? Mention the rules for converting into a parse tree.
4. What are the uses of macro processor?
5. What is a relocatable program?

**PART B**

Answer any **FIVE** of the following questions. (5 x 6 = 30)

1. Mention the multi-pass distribution sorting algorithm that examines the digits from the LSD to the MSD, one digit at a time. Explain the same sorting technique by sorting the below mentioned entries.

181, 289, 390, 121, 145, 736, 514, 212.

Explain by mentioning all the passes included in arriving at the solution.

1. a. What is the purpose of Assembler Directive statements? Differentiate between START and ORIGIN assembler directive with its syntax. (4 marks)

b. What is macro definition? How is it different from closed sub-routine? (2 marks)

1. Name the system software/s involved in converting the source code into the executable code that is loaded in the main memory. Explain in detail
2. What does a macro definition consist of? Explain nested macro call with a suitable macro definition example.
3. a. Write a short note on expansion time statements for flow of control during macro expansion. (3 marks)

b. What is a binder in loaders? Explain core image builder. (3 marks)

1. Mention the sections of object deck database of a loader. Write a note on type of data each one of these sections contain by making database entries to each one of the sections for the source code given below.

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| --- | --- | --- |
| **Source Card Reference**  | **Relative Address**  | **Sample Program**  |
| 1  | 0  | PG1 START  |
| 2  |  | ENTRY PG1X, PG1Y  |
| 3  |  | EXTRN PG2X, PG 2  |
| 4  | 20  | PG1X  |
| 5  | 30  | PG1Y  |
| 6  | 40  | DC A (PG1 X)  |
| 7  | 44  | DC A (PG1Y+15)  |
| 8  | 48  | DC A(PG1Y – PG1X -3)  |
| 9  | 52  | DC A(PG2)  |
| 10  | 56  | DC A(PG2X+PG2-PG1X+4)  |
| 11  |  | END  |

1. a. What are the functions of syntax analysis phase? Write the steps involved in syntax parser. (4 marks)

b. Explain uniform symbol table. (2 marks)

**PART C**

Answer any **THREE** of the following questions. (2 x 10 = 20)

1. a. Write an algorithm explaining the steps involved in a Single-Pass Assembler (One - Pass Assembler) (5 marks)

b. What is Base-register Addressing? Explain RS and RX type of instruction format with suitable example. (5 marks)

1. a. Explain the general loader scheme with a neat diagram. (5 marks)

b. Name the databases used in the Pass 1 of macro implementation. Consider the source code given below, and fill the entries for the databases associated with Pass 1 of macro implementation. (5 marks)

 MACRO

 & LAB INCR & ARG1 , &ARG2 , & ARG 3

 &LAB ADD AREG, &ARG1

 ADD AREG, &ARG2

 ADD AREG , &ARG3

 MEND

 START

 LOOP INCR A,B,C

 LABEL INCR DATA 1, DATA 2, DATA 3

 A DC 2

 BDC2

 C DC 2

 DATA 1 DC 3

 DATA 2 DS 2

 DATA 3 DC 4

 END

1. a. What is a compiler? Define phase in compiler design? (2 marks)

b. Explain the 4 phases involved in the general structure of a compiler from source code to object code, with a neat diagram. (8 marks)