B.E. Fifth Semester (Information Technology) (C.B.S.)

System Programming

P. Pages : 4 **NKT/KS/17/7354**

Time : Three Hours * 0 0 6 8 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness.
9. Assume suitable data whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the following system programs : **8**

(i) Operating System (ii) Compiler

(iii) Assembler (iv) Macro processor

b) Explain the instruction formats used by IBM 360/370 machine with neat sketch. **5**

OR

2. a) Explain the following : **any two.** **6**

(i) Views of system software.

(ii) Goals of system software

(iii) Virtual machine

b) Draw and explain the components of general machine structure of IBM 360/370 machine. **7**

3. a) List the databases used by pass - 2 of assembler and draw the format of each databases. Draw the flowchart of pass - 2 of assembler. **6**

b) For the source dick given below, produce symbol table, literal table and base table. **8**

Statement No.

1	PROG1	START	0
2		USING	*, 15
3		LA	15, INIT
4		SR	TOT, TOT
5	RC	EQU	3
6	INDEX	EQU	4
7	TOT	EQU	5
8	DTBASE	EQU	13

```
9     INIT    EQU          *
10            USING INIT,  15
11            L            DTBASE = A (DT1)
12            USING        DTAREA, DTBASE
13            SR           INDEX, INDEX
14    LOOP    L            RC, DT1 (INDEX)
15            AR           TOT, RC
16            A            RC, = F '5'
17            ST           RC, SAVE (INDEX)
18            A            INDEX, = F '4'
19            C            INDEX, = f '8000'
20            BNE          LOOP
21            LR           1, TOT
22            BR           14
23            LTORG
24    SAVE    DS           2000 F
25    DTAREA  EQU          *
26    DT 1    DC           F' 36, 37, 97, 201, .....
                           [2000 Numbers]
27            END
```

OR

4. a) Sort the following elements using : **8**

i) Address Calculation sort

ii) Radix sort
29, 23, 15, 37, 11, 36, 41, 26, 12, 19, 21, 31

b) Mention the 6 steps required, for the general design of an assembler. Also, write the purpose of pass 1 and pass 2 of assembler. **6**

5. a) What are the features of Macro facility. Explain any two features with suitable example. **7**

b) Write the four basic tasks performed by any macro instruction processor. Explain each task in short. **6**

OR

6. a) Write the expanded source (level 1 and level 2) for the following source : **8**

```
:
:
MACRO
ADD1        & ARG
L           1, & ARG
A           1, = F '2'
ST          1, & ARG
MEND
```

```
MACRO
    ADDS        & ARG1, & ARG2, &ARG3
    ADD1        & ARG1
    ADD1        & ARG2
    ADD1        & ARG3
MEND
    :
    :
ADDS            D1, D2, D3
    :
    :
D1              DC  F '10'
D2              DC  F '12'
D3              DC  F '13'
    :
    :
```

b) Draw and explain the format of following databases used by macro processor : **5**
(i) MDT (Macro Definition Table)
(ii) MNT (Macro Name Table)
(iii) ALA (Argument List Array)

7. a) Write the 4 functions performed by the loader. **4**

b) Explain with neat diagram the following loading schemes. Also, state the advantages and disadvantages of these loading schemes : **10**
(i) General loader scheme
(ii) "Compile - and - Go" loaders
(iii) Absolute loader

OR

8. a) Explain the Relocating loaders. Write the advantages and disadvantages of relocating loaders. **7**

b) Explain the following : **any two.** **7**

(i) Binder.

(ii) Overlay structures.

(iii) Direct - linking loaders.

(iv) Format of Data bases - LESA and GEST.

9. a) Explain with neat diagram, phases of compiler and task performed by any three phases of compiler. **7**

b) Explain the concept of cross compilation or cross compiler and bootstrapping, with example. **6**

OR

10. a) Explain the following compiler writing tools : **6**

i) lex compiler writing tool.

ii) YACC compiler writing tool.

b) Explain the format of databases used in compilation process given below : **7**

i) Literal table created by optimization phase

ii) Uniform symbol table created by the Lexical phase

iii) Identifier table created by lexical analysis.

11. a) Define the term device driver & write the steps required during driver installation? Explain each one of them. **7**

b) Explain the entry points or functions used by the following device drivers (i) Block Device Drivers (ii) Character device Drivers. **6**

OR

12. a) Write about the 3 categories of major design issues related to the device drivers. **5**

b) Draw the neat diagrams of the following : **8**

(i) STREAM Device Drivers.

(ii) Relationship of application S/W, Kernel, Hardware device drivers and its interfaces in UNIX operating system.

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