Registration No: | | | | | | | | | | |

Total Number of Pages: 3 **B.TECH**
PCS3I103

3rd Semester Regular Examination 2016-17
SYSTEM PROGRAMMING
BRANCH: CSE
Time: 3 Hours
Max Marks: 100
Q.CODE: Y656

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions: *fill up the blank*** **(2 x 10)**

a) In IBM system 360 and 370 the value of PC, protection information and interrupt status is stored in ----------.

b) The Mnemonics form to set aside a 100 full word area in IBM System 360/370 is ----------.

c) In "Compile-and-Go" loaders, when assembling of the source is finished, the control of the program transferred to _____ location of the program.

d) _____ table is used to substitute macro call arguments for the index markers in the stored macro definition

e) If "d" is the distance used in Shell sort, then ---------- number of passes are required to complete the sorting of the addresses.

f) The body of the macro definitions is stored in _____ table.

g) A compiler for a high level language that runs on one machine and produce code for different machine is called **----------.**

h) The lexical analyzer takes_____as input and produces a stream of_____as output.

i) A system program that combines the separately compiled modules of a program into a form suitable for execution Is called ----------.

j) In an absolute loading scheme ----------loader function is accomplished by assembler.

Q2 **Answer the following questions: *Short answer type*** **(2 x 10)**

a) Will the following divide 10 by 2? Justify.

```
L     3 , = F'10'
D     2,  =F'2'
ST    3,  1000
```

b) What is the significance of this instruction?
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c) Represent this number -1265 using Packed Decimal Format.

d) Explain Assembler Linkage Pseudo-operation with suitable examples.

e) In case of Direct-Linking Loader what information must be provided by the assembler with each procedure or data segment?

f) Explain LESA with suitable example.

g) What are the similarities and difference between controlled and based storage?

h) Define and differentiate between terminal and non terminal symbols with examples

i) What is the use of Linkage editor?

j) Define and differentiate between AIF and AGO

Part – B (Answer any four questions)

Q3 a) For the following code **(10)**

```
SIMPLE  START
        BALR    15,0
        USING   *,15
LOOP    L       R1,TWO
        A       R1,TWO
        ST      R1,FOUR
        CLI     FOUR+3,4
        BNE     LOOP
        BR      14
R1      EQU     1
TWO     DC      F'2'
FOUR    DS      F
        END
```

i) Find the symbol table at the end of pass 1 Assembler.
ii) Find the literal table at end of pass 1 Assembler.
iii) Show the changes in the base register table during pass 2 of Assembler.
iv) Show the generated machine code from pass 2 of Assembler.

b) Sort the following addresses in non-decreasing order by using address calculation sort. 43, 07, 36, 11, 2, 28, 19, 33, 17, 7. **(5)**

Q4 a) Consider the following code and answer questions: **(10)**

```
MACRO
        XYZ     &A
        ST      1, &A
        MEND
        MACRO
        AR      4,&W
        XYZ     ALL
        MEND
ALL     DC      F'3'
        END
```

i) Expanded the MACRO into assembly language programming
ii) Design the MDT table macro processing
iii) Design MNT table after processing.

b) Explain the different data structures used in case of designing direct linking loader. **(5)**

Q5 **a)** What is Backus Normal Form (BNF)? Explain the grammar rules or production rules and design the parse tree for the given expression. **(10)**
Z = (2* x + 5) * y -7.

b) List four ways in which formal systems are useful in compilers or programming languages. **(5)**

Q6 **a)** Draw the micro-flow chart for the given instruction: ADD 5, 276 and explain details contents of registers used in micro flow chart for ADD instruction. **(10)**

b) What does an assembler perform when it encounters LTORG assembler directive? **(5)**

Q7 **a)** Write a machine language program to add the contents of 10 adjacent full words in memory to the number 29 under following set of assumptions : **(10)**
i) The program is in core at absolute location 48.
ii) The 10 adjacent full words are starting at absolute location 900.
iii) The number 29 to be added is at absolute location 896.
iv) The number 10 is at absolute location 892
v) Register No. 1 contains 900

b) How could a non-recursive macro pre-processor allow for the invocation of macros within the macros? What would be the advantages and disadvantages of such an approach? **(5)**

Q8 **a)** With a neat block diagram explain the working principle of different phases of a compiler. **(10)**

b) What is the need of code optimization? Analyze the various code optimization techniques with suitable examples. **(5)**

Q9 **a)** Explain the various data bases required in design of an assembler and also mention their use during the different phases of assembling. **(10)**

b) Explain different types instructions format supported by IBM 360/370 machine. **(5)**