(Time: 3 Hours) **Total Marks: 80**

N.B: (1) Question No. 1 is compulsory
(2) Attempt ant three questions out of remaining five questions

Q.1 (a) Differentiate between system software and application software. **[05]**
(b) Explain different functions of loader. **[05]**
(c) Explain forward reference problem and how it is handled in assembler design. **[05]**
(d) Explain macro and macro expansion. **[05]**

Q.2 (a) Find FIRST & FOLLOW for the following grammar **[05]**
S→Bb | Dd
B→aB | ϵ
D→cD | ϵ
(b) Generate three address code for following code **[05]**

```
while(a<b) do
    if(c<d) then
        x=y+2
    else
        x=y-2
```

(c) With reference to assembler explain the following table with suitable example **[10]**
(i)MOT (ii)POT (iii)ST (iv)BT

Q.3 (a) Explain Synthesized and Inherited attribute with example. **[10]**
(b) Explain different code optimization techniques with example. **[10]**

Q.4 (a) Apply dead code elimination techniques for following code **[05]**

```
int count;
void foo( )
{
    int i;
    i=1;
    count=1;
    count=2;
    return
    count=3;
}
```

(b) Eliminate left recursion from the following grammar **[05]**
S→(L) | x
L→ L,S | S
(c) Explain different types of loaders in detail. **[10]**

Q.5 (a) Draw flowchart of a Pass-I of two pass assembler design and explain in detail. **[10]**

(b) Explain different features of macro with example. **[10]**

Q.6 (a) For the following grammar construct LL(1) parsing table and parse the string (a-a) **[10]**

S→F
S→(S-F)
F→a

(b) Explain different issues in code generation. **[10]**

****