

Total No. of Questions :8]

SEAT No. :

P3637

[Total No. of Pages :3

[4959] - 1126

B.E. (Information Technology)

C - MODERN COMPILERS

(End - Sem - Semester - I) (Elective - I) (2012 Pattern)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Neat diagrams must be drawn wherever necessary.

- Q1)** a) Explain with a neat diagram the two layers of abstraction with respect to Tiger compiler. [6]
- b) Draw control - flow graph for the given code. Find the live ranges of a, b, c. [6]

```
a = 0
L1 : b=a+1
c =c+b
a=b*2
if a <N goto L1
return c
```

- c) What is incremental garbage collection? Explain Baker's algorithm and comment on its cost of collection. [8]

OR

P.T.O.

- Q2) a)** When we say that a “variable escapes”? For each variable a, b, c, d in the given program, find whether it escapes and why? [6]

```
int f(int a, int *b)
{
    int c[3], d;
    d=a+1;
    b=g(c, &b);
    return c[1]+b;
}
```

- b) Define canonical trees. Describe any two identities for transformation on ESEQ. [6]
- c) Explain copying garbage collection with a neat diagram. Write Cheney’s algorithm and comment on its cost. [8]

- Q3) a)** What are the facilities for testing class membership in Java? Explain type coercions and type cases in brief. [6]
- b) What is Closure? How it can be implemented using Heap-allocation? [6]
- c) What is meant by private field in programming language? What are various ways to support it in programming language? [6]

OR

- Q4) a)** Define inline expansion. Explain the rules for inline expansion. [6]
- b) Explain different techniques for optimization of lazy functional programming. [6]
- c) Explain strictness analysis. [6]
- Q5) a)** Explain Inter - procedural data-flow analysis in brief. Describe different functions for flow-insensitive side effect analysis. [8]
- b) What are possible caches in a system? Describe different approaches for instruction-cache optimization. [8]

OR

- Q6) a)** Define program summary graph. Draw program summary graph for given code: [8]

```
procedure f()
begin
    call g()
    call h()
End
procedure g()
begin
    call h()
    call i()
end
procedure h()
begin
end
procedure i()
begin
end
```

- b) What is inter-procedural optimization? Describe different kinds of inter-procedural optimizations. [8]

- Q7) a)** What are reasons for variable aliases? Explain variable aliases based on type and based on flow. [8]

- b) Explain incremental dataflow analysis. [8]

OR

- Q8) a)** Explain transformations using dataflow analysis using suitable examples. [8]

- b) What is reaching definitions? Write in and out definitions for reaching definitions. [8]

