Total No. of Questions : 8]

SEAT No. :

P3130

[Total No. of Pages : 2

[5154]-696

B.E. (Information Technology)

MODERN COMPILERS

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

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 wherever necessary.***
4) ***Neat diagram must be drawn where ever necessary.***

Q1) a) Write Tree representation of a straight - line program statements: **[6]**

```
a = a + 10;
b = b + 20;
print(a, b);
```

b) Compare CISC machine and RISC machine architecture. What is the architecture of Pentium Processor? **[6]**

c) Explain copying garbage collection with a neat diagram. Write Cheney's algorithm and comment on its cost. **[8]**

OR

Q2) a) Define callee-save and caller-save registers. How do the use of registers save time for programming languages? **[6]**

b) What is a trace? Write the algorithm for traces generation. **[6]**

c) Explain reference counting for garbage collection. Discuss the problems with this technique using suitable example. **[8]**

Q3) a) Define inline expansion. Explain the rules for inline expansion. **[6]**

b) What are the facilities for testing class membership in Java? Explain type coercions and type cases in brief. **[6]**

c) Explain different techniques for optimization of lazy functional programming. **[6]**

OR

P.T.O.

Q4) a) Explain Higher-order functions and Functional programming language in brief. What are three flavors of Functional programming language? **[6]**

b) Explain call-by-name and call-by-need with respect to lazy evaluation. **[6]**

c) Explain tail position with suitable example. Write the steps to implement tail call. **[6]**

Q5) a) What is inter-procedural optimization? Describe different kinds of inter-procedural optimizations. **[8]**

b) Differentiate between register allocation and assignment? Discuss different approaches for the same. **[8]**

OR

Q6) 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]**

Q7) a) What are the different techniques to speed up dataflow analysis? **[8]**

b) Explain Worklist algorithm. **[4]**

c) What is incremental dataflow analysis? Explain any one technique to avoid repeated computation. **[4]**

OR

Q8) a) What are reasons for variable aliases? Explain variable aliases based on type and based on flow. **[8]**

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