FINAL EXAM

**A**

**IT3322E COMPILER CONSTRUCTION**

(60 minutes. Close book. No Laptop) Choose 30/32 questions. Read the questions carefully and choose one option

## 1/ Which of the following are language processors?

1. assembler c) interpreters
2. compilers **d) all of the above**

## 2/Which of the following is not an intermediate code form?

1. Postfix notation c) Three address codes
2. Syntax trees **d) Quadruples**

## 3/Reduction in strength means

1. Replacing run time computation by compile time computation
2. Removing loop invariant computation
3. Removing common sub expression
4. **Replacing a costly operation by a relatively cheaper one**

## 4/Shift- reduce parsers are

* 1. Top down parser c) May be top down or bottom up parser
  2. **Bottom up parser** d) None of the above

## 17/Which of the following statement is correct about array data type in KPL?

1. KPL supports only one- dimensional and two- dimentional arrays
2. KPL supports only one-dimentional arrays
3. **KPL supports arrays with arbitrary number of dimension**
4. KPL does not support arrays

## 18/Program counter in stack calculator is used to?

* 1. store the top of stack address c) store the middle address of the stack
  2. store the base address of stack d) **store the next instruction address**

## 19/Consider the following context free grammar:

**list → ids; ids → id,ids | id**

**Which of the following is a sentential form for this language?**

1. **id,id,ids;** c) ids,ids;
2. ids,id,id; d) all of the above

## 20/Which of the following is a top-down parsing method?

1. Operator precedence parsing c) Shift reduce parsing
2. **Recursive descent parsing** d) None of these

## 5/What are the possible outputs of the following program

program test1; var x:integer;

procedure bar(var y:integer); begin

y := x+1; y:= x+1;

end ; begin

x := 10;

bar(x);

call writeI(x); end.

a)10 b)11 **c)12** d)13

## 6/A compiler is preferable to an interpreter because

1. Debugging can be faster and easier
2. If one changes a statement, only that statement needs re-compilation
3. It is much helpful in the initial stages of program development
4. **It can generate stand alone programs that often take less time for execution**

## 21/Consider the syntax directed definition shown below. S → id : = E {gen (id.place = E.place;);}

**E → E1 + E2 {t = newtemp ( ); gen (t = El.place + E2.place;); E.place = t} E → id {E.place = id.place;}**

**Here, gen is a function that generates the output code, and newtemp is a function that returns the name of a new temporary variable on every call. Assume that ti's are the temporary variable names generated by newtemp. For the statement 'X: = Y + Z', the 3-address code sequence generated by this definition is:**

1. X = Y + Z
2. **t1 = Y + Z; X = t1**

c) t1 =Y; t2 = t1 + Z; X = t2

d) t1 = Y; t2 = Z; t3 = t1 + t2; X = t3

**22/The output of a lexical analyzer is**

# Machine code

1. Intermediate code
2. **A stream of tokens**
3. A parse tree

## 7/A grammar that produces more than one parse tree for some sentence is called

1. **Ambiguous** c) Regular
2. Unambiguous d) None of these

## 8/Code can be optimized at

1. Source from user c) Intermediate code
2. Target code **d)All of the above**

## 9/Backus-Naur Form (BNF) is a notation for which of the following:

1. **context-free grammars**
2. context-sensitive grammars
3. unrestricted grammars
4. all of the above

## 10/How many tokens are there in the following assignment ac := ba (\*1.) of KPL?

* 1. 6 **c) 3**
  2. 4 d) None of the above

## 11/Language which have many types, but the type of every name and expression must be calculated at compile time are

1. **strongly-typed languages** c) loosely typed languages
2. weakly typed languages d) none of these

## 12/The most general phrase structured grammar in the following list is:

1. **Context sensitive**
2. Context free
3. Regular
4. None of these

**23/ is a graph representation of a derivation**. **a)The parse tree** c) The balanced tree

b) The binary tree d) The symetric

## 24/LR stands for

1. Left to right c) Right to left
2. Left to right reduction **d) Left to right and right most derivation**

**in reverse**

## 25/Given the following expression grammar:

**E -> E \* F | F + E | F**

**F -> F - F | id**

**Which of the following is true?**

1. \* has higher precedence than +
2. – has higher precedence than \*

**c) + and — have same precedence**

d) + has higher precedence than \*

## 26/Consider the context free grammar {L  TL’, L’  TL’, L’  , T  PT’, T’  PT’, T’  , P  i, P  (L)}.What is Follow(T)?

a) {(, } **c) {, $, )}**

b) {****, ), } d) None of the above

## 27/Consider the grammar A  xCB, B  z | Ax, C  yBz | . What does the predictive parsing table(A, x) contain?

1. error **c) xCB**
2.  d) Ax

## 28/ Which of the following grammars is not LL(1)?

a) S  1SA, S  0A1, S  2, A  0A1, A  1

1. S  aAS | b, A  cS | d, B  c
2. S → aSa | bSb | cSc | d
3. **S → aB ∣ bA ∣ ε, A→aS ∣ bAA, B→b**

## 13/How many blocks are there in the following code (1) X := 20

**(2) if X>=10 goto (8) (3) X := X-1**

**(4) A[X] := 10**

**(5) if X<>4 goto (7) (6) X := X-2**

**(7) goto (2) (8) Y := X+5**

1. 2
2. 3
3. 4
4. **6**

## 29/The following object code CV

**<code of exp1> ST; L1:CV; LI;**

**<code of exp2> LE**

**FJ L2**

**<code of statement> CV;CV;LI;LC 1;AD;ST;**

**L2: DCT 1**

**is generated from which statement?**

1. if <condition> then <statement>
2. **for <variable> := <expression> to <expression> do**
3. while <condition> do<statement>
4. do <statement> while <condition>

## 14/Which of the following systems describes syntax of a programming language?

* 1. Push down automaton c) Finite automaton
  2. Syntax directed definition **d) Generative grammar**

## 15/ Which of the following statements is correct for attributes of a syntax directed definition:

1. Synthesized attributes are initialized by the scanner.
2. **Synthesized attributes depend only on information below them in the parse tree**
3. Inherited attributes are useful only in object-oriented languages.
4. Synthesized attributes are computed at run time.

## 16/Which one of the following is FALSE?

1. A basic block is a sequence of instructions where control enters the sequence at the beginning and exits at the end
2. Available expression analysis can be used for common subexpression elimination
3. Live variable analysis can be used for dead code elimination
4. **x = 4 ∗ 5 => x = 20 is an example of common subexpression elimination**

## 30/One language that is commonly interpreted rather than compiled is . . .

* 1. C c) Fortran
  2. C++ **d) Python**

## 31/Consider the context free grammar: E E ; E, E  a, E  

**where {E} is the set of nonterminal symbols,{a,;} is the set of terminal symbols A is the start symbol. What is FIRST (E;E)?**

a){a,;} c) {a}

b}{} **d) {a,;,}**

## 32/A fragment of code that resides in the loop and computes the same value at each iteration is called a/an?

1. induction analysis
2. strength reduction
3. **loop-invariant code**
4. None of the above