Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

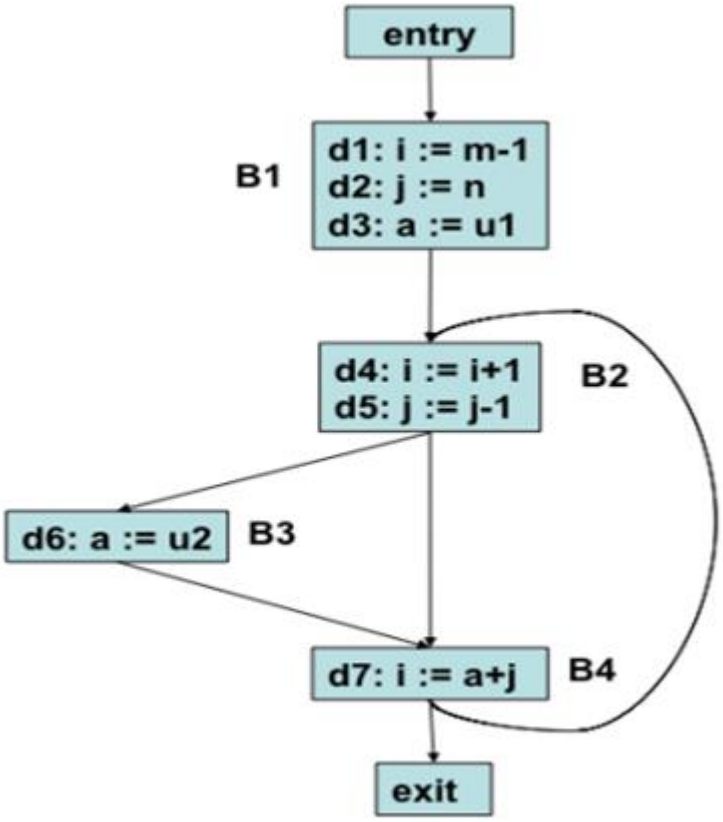
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Course: Compiler Design **Semester: VI**
Program: B. Tech. CSE **Time 03 hrs.**
Course Code: CSEG3015 **Max. Marks: 100**

SECTION A (All Questions Are Compulsory)
Each Question will carry 5 Marks

S. No.	Question	CO
Q 1	(i) Which phase of compiler is optional:_____ (ii) Type checking is done before parsing: True/False_____ (iii) Name the compiler module which interact with all phases of compiler: _____ (iv) Name of the mathematical model used for implementation of lexical analyzer:_____ (v) Assembly language are machine independent: True/False_____	**CO1**
Q 2	Write all the tokens in the following statement: printf("i=%d, &i=%x, hello,++i",i,&i);	**CO2**
Q 3	Find the first and follow for the following set of production rule: S→ iCtSS`|a S`→ eS| ε C → b	**CO3**
Q 4	Identify the type of syntax directed translation(SDT) scheme for the following: (i) A->LM {L.val=A.val, M.val=L.val, A.val=M.val} (ii) A->QR {R.val=A.val, Q.val=R.val, A.val=Q.val} (iii) A->BC {B.val=A.val} (a) S-attribute SDT (b) L-attribute SDT (c) Both S and L attribute SDT (d) None of the above	**CO4**
Q 5	Identify the blocks and statements in the respective block for the following code: <S1> a := b <S2> L1: b := c <S3> if (...) goto L2 <S4> c := d <S5> if (...) goto L1 <S6> L2: d := a	**CO5**
Q 6	i. Postfix notation for the expression a*d-(b+c) is: _____	**CO4**

	ii. What is the result of the given postfix expression? abc*+ where a=3, b=2, c=1: _____	
SECTION B (All Questions Are Compulsory) **Each Question will carry 10 Marks**		
Q 7	Write short note on the following: i. Bootstrapping ii. Cross Compiler iii. Multi-pass compiler **(4+3+3) marks**	**CO1**
Q 8	A desktop calculator generally accepts the symbols: +, -, *, and / as operators and digits viz. 0, 1, 2, …, 9 as operands. Develop a YACC code that evaluates a supplied input expression consisting of such operators and operands.	**CO2**
Q 9	G = ({S, B}, {a,b}, P, S) with the set of productions P: S→aBa B→bB| ε i. Is this LL(1) grammar. Give reason for your answer. **5 marks** ii. Do the parsing of the string **abba** **5 marks**	**CO3**
Q 10	Consider the grammar with E as the start symbol. E → E*T | T T → T+F | F F → num **i.** Write the semantic action corresponding to each production rule. **3 Marks** **ii.** Draw the syntax tree and Compute E.value for the root of the parse tree for the expression: 2 * 3 + 5 * 6 + 4 **7 Marks**	**CO4**
Q 11	Generate the DFA and Parsing table in SLR parser for the following set of production rules: S→AA A→aA|b **(5+5) marks**	**CO3**
SECTION-C (All Questions Are Compulsory) **Each Question will carry 20 Marks**		
	What is DAG? Discuss the steps for construction of DAG. Also explain the applications of DAG. Draw the DAG for the following three address code: 1. S1:= 4 * i 2. S2:= a[S1] 3. S3:= 4 * i 4. S4:= b[S3] 5. S5:= s2 * S4 6. S6:= prod + S5 7. Prod:= s6 8. S7:= i+1 9. i := S7 10. if i<= 20 goto (1)	

Q 12	**(2+2+2+14) marks** **OR** What is Global Data Flow Analysis? Explain the terminology associated with it. Write the algorithm for computing the reaching definitions. Do the reaching definition analysis of the flow graph given below and represent it in bit vector form:  **(3+3+4+10) marks**	**CO5**