Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION**(R&S)**, MAY 2019

Course Code: CS302

Course Name: DESIGN AND ANALYSIS OF ALGORITHMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1 Define the terms Best case, Worst case and Average case time complexities. (3)

2 What is the smallest value of n such that an algorithm whose running times is $100n^2$ runs faster than an algorithm whose running time is 2^n on the same machine? (3)

3 State Master Theorem. (3)

4 Explain the UNION and FIND-SET operations in the linked-list representation of disjoint sets. Discuss the complexity. (3)

PART B

Answer any two full questions, each carries9 marks.

5 a) Determine the time complexities of the following two functions fun1() and fun2(): (2)

```
int fun1(int n)
{
   if (n <= 1) return n;
   return 2*fun1(n-1);
}

int fun2(int n)
{
   if (n <= 1) return n;
   return fun2(n-1) + fun2(n-1);
}
```

b) Find the solution to the recurrence equation using iteration method: (3)

$T(2^k) = 3\,T(2^{k-1}) + 1,$

$T(1) = 1$

c) Solve the recurrence using recursion tree method: (4)

$T(1) = 1$

$T(n) = 3T(n/4) + cn^2$

6 a) Determine the best case and worst-case time complexity of the following function: (3)

```
void fun(int n, int arr[])
{
   int i = 0, j = 0;
   for(; i < n; ++i)
      while(j < n && arr[i] < arr[j])
         j++;
```

}

b) Explain the advantages of using height Balanced Trees? Explain AVL Rotations. (4)

c) Find the minimum and maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0. (2)

7 a) List the Properties of B-Trees. (2)

b) A 2-3-4 tree is defined as a B-Tree with minimum degree t=2. Create a 2-3-4 tree by successively inserting the inserting the elements (in the given order) 42,56, 24, 89, 1, 5, 87, 8. 61. 6, 78, 7, 12, 34. (4)

c) Delete the elements 89, 78. 12 and 8 from the above resultant tree. (3)

PART C

Answer all questions, each carries3 marks.

8 In a weighted graph, assume that the shortest path from a source 's' to a destination 't' is correctly calculated using a shortest path algorithm. Is the following statement true? If we increase weight of every edge by 1, the shortest path always remains same. Justify your answer with proper example. (3)

9 Define Strongly Connected Components of a graph. (3)

Write the algorithm to find Strongly Connected Components in a graph.

10 Write an algorithm to merge two sorted arrays and analyse the complexity. (3)

11 Write notes on Dynamic Programming Approach. List the sequence of steps to be followed in Dynamic Programming. (3)

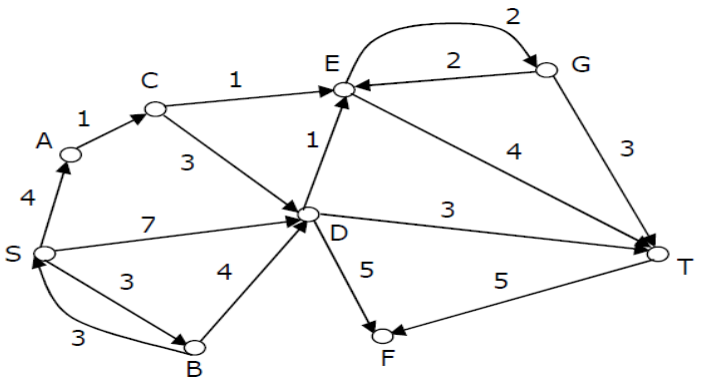
PART D

Answer any two full questions, each carries9 marks.

12 a) State Shortest Path Problem and Optimal substructure of Shortest Path. (2)

b) Write Dijkstra's Single Source Shortest path algorithm. Analyse the complexity. (4)

c) Find the shortest path from s to all other vertices in the following graph using Dijkstra's Algorithm. (3)



13 a) Write the algorithm for DFS and analyse its complexity. (4)

b) Multiply the following two matrices using Strassen's Matrix Multiplication Algorithm. (5)

$A = \begin{bmatrix} 6 & 8 \\ 9 & 7 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 5 \\ 3 & 6 \end{bmatrix}$

14 a) State Matrix Chain Multiplication Problem. Write Dynamic Programming Algorithm for Matrix Chain Multiplication Problem. (4)

b) Using Dynamic Programming, find the fully parenthesized matrix product for multiplying the chain of matrices< A1 A2 A3 A4 A5 A6 > whose dimensions are <30X35>, <35X15>, <15X5>, <5X10>, <10X20> and <20X25> respectively. (5)

PART E

Answer any four full questions, each carries10 marks.

15 a) Explain Greedy Approach. Write the general greedy algorithm. (3)

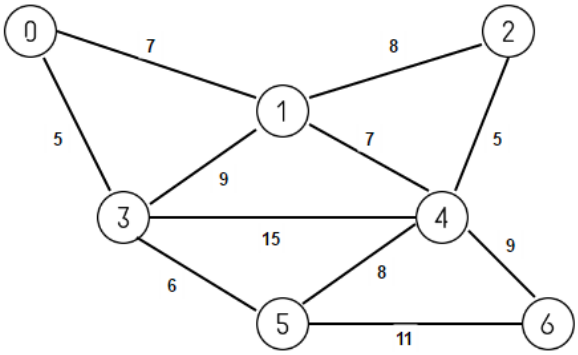
b) Formulate Fractional Knapsack Problem. Write Greedy Algorithm for fractional Knapsack Problem. (4)

c) Find the optimal solution for the following fractional Knapsack problem. (3)

n=4, m = 60, W={40, 10, 20, 24} and P={280, 100, 120, 120}

16 a) Write the Kruskal's algorithm for Minimum Spanning Tree. Analyse its complexity. (6)

b) Compute the Minimum Spanning Tree and its cost for the following graph using Kruskal's Algorithm. Indicate each step clearly. (4)



17 a) An undirected graph G=(V, E) contains n (n > 2) nodes named v_1 , v_2 ,….v_n. Two vertices v_i , vj are connected if and only if 0 < |i – j| <= 2. Each edge (vi, vj) is assigned a weight i + j. What will be the cost of the minimum spanning tree (as a function of n) of such a graph with n nodes? (4)

b) Consider a complete undirected graph with vertex set {0, 1, 2, 3, 4}. Entry wij in the matrix W below is the weight of the edge {i, j}. What is the Cost of the Minimum Spanning Tree T using Prim's Algorithm in this graph such that vertex 0 is a leaf node in the tree T? (6)

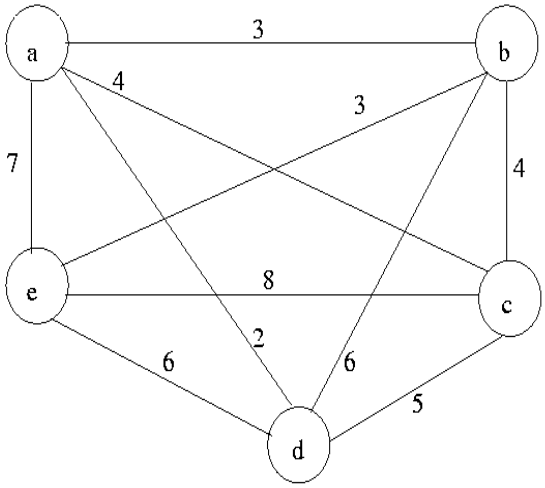
$$W = \begin{pmatrix} 0 & 1 & 8 & 1 & 4 \\ 1 & 0 & 12 & 4 & 9 \\ 8 & 12 & 0 & 7 & 3 \\ 1 & 4 & 7 & 0 & 2 \\ 4 & 9 & 3 & 2 & 0 \end{pmatrix}$$

18 a) State and Explain N Queens Problem. Write the backtracking algorithm for solving N Queens problem. (5)

b) Show the state space tree for 4 Queens problem. Show the steps in solving 4 Queens problem using backtracking method to print all the solutions. (5)

19 a) Explain Branch and Bound method for solving Travelling Salesman Problem. (5)

b) Solve Travelling Salesman problem for the following graph using Branch and Bound Technique. (5)



20 a) Define NP- Hard and NP – Complete Problems. (2)

b) What are the steps used to show a given problem is NP-Complete? (4)

c) Write notes on polynomial time reducibility. Give Examples. (4)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE(S) EXAMINATION(S), DECEMBER 2019

Course Code: CS302

Course Name: DESIGN AND ANALYSIS OF ALGORITHMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1 Analyse the complexity of the following function (3)

```
void function(int n)
{       int count = 0;
        for (int i=n/2; i<=n; i++)
          for (int j=1; j<=n; j = 2 * j)
            for (int k=1; k<=n; k = k * 2)
                        count++;
}
```

2 Solve using Iteration method T(n)=2T(n/2)+n,T(1)=1 (3)

3 Define B-tree. Discuss the significance of B-tree (3)

4 Explain Asymptotic notations in algorithm analysis (3)

PART B

Answer any two full questions, each carries9 marks.

5 a) Solve using Recursion Tree method (5)

$T(n)=3T(n/4)+n^2$

b) Analyse the complexity of the following functions (4)

i)function(int n)

```
{       if (n==1) return;
        for (int i=1; i<=n; i++)
        { for (int j=1; j<=n; j++)
                { printf("*"); break; }
        }
}
```

ii) void function(int n)

```
{
   int i = 1, s =1;
   while (s <= n)
   {
      i++;
      s += i;
      printf("*");
   }
}
```

6 a) Construct a Red Black tree by inserting 10,20,30,15,16 and 27 into an initially empty tree and also delete 15,16 and 30 from the tree (9)

7 a) Solve using Masters theorem (5)

i) $T(n)=2T(n/4)+\sqrt{n}$

ii) $T(n)=7T(n/2)+ n^2$

b) Explain AVL rotations with examples (4)

PART C

Answer all questions, each carries3 marks.

8 Define spanning tree of a graph. Write the total number of spanning trees possible for a complete graph with 6 vertices. (3)

9 Write the applications of BFS and DFS (3)

10 List and explain the characteristic properties associated with a problem that can be solved using dynamic programming. (3)

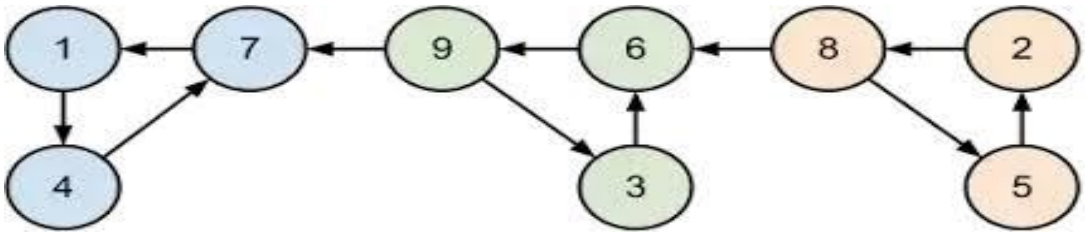
11 Explain Divide and Conquer strategy. (3)

PART D

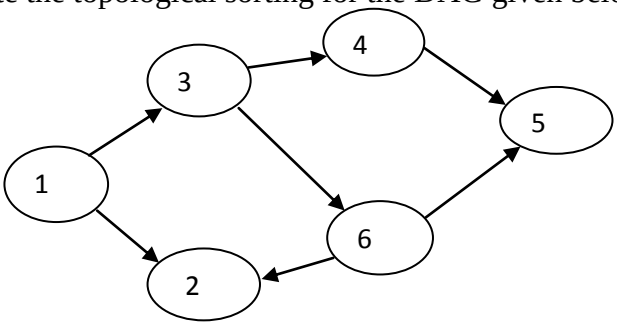
Answer any two full questions, each carries9 marks.

12 a) What are different classification of edges that can be encountered during DFS operation and how it is classified? Explain with example (4)

b) Find strongly connected components of the digraph using the algorithm showing each step (3)



c) Write the topological sorting for the DAG given below (2)

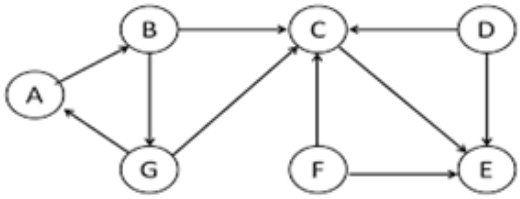


13 a) Given a chain of 4 matrices <A1,A2,A3,A4> with dimensions <5X4>,<4X6>,<6X2>,<2X7> respectively. Using Dynamic programming find the minimum number of scalar multiplications needed and also write the optimal multiplication order. (5)

b) Write down Bellman Ford algorithm and analyse the complexity .What is the time complexity of Bellman-Ford single-source shortest path algorithm on a complete graph of n vertices? (4)

14 a) Write a short note on graph traversals (2)

Perform BFS traversal on the above graph starting from node A. If multiple node choices may be available for next travel, choose the next node in alphabetical order. (2)



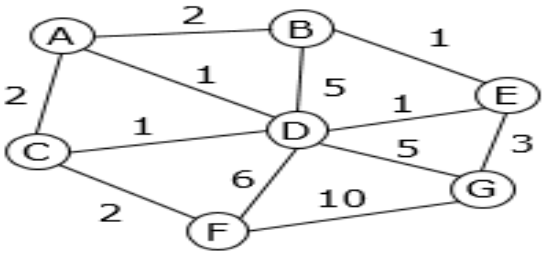
b) Explain Strassen's matrix multiplication and analyse its complexity (5)

PART E

Answer any four full questions, each carries10 marks.

15 a) Give a comparison between dynamic programming and Divide and conquer strategy (4)

b) Apply Prim's algorithm on the following graph. Let A be the source vertex (6)



16 a) Formulate Fractional Knapsack Problem. Write Greedy Algorithm for fractional Knapsack Problem. (5)

b) Find the optimal solution for the following fractional Knapsack problem. Given number of items(n)=4, capacity of sack(m) = 60, W={40,10,20,24} and P={280,100,120,120} (5)

17 a) Define NP hard and NP-Complete problems (4)

b) Write short notes on Polynomial time reductions with example (4)

c) Define class P and class NP (2)

18	a)	Define Travelling Salesman Problem (TSP). Explain the basic steps that are to be followed to solve TSP using branch and bound with an example.	(10)
19	a)	Write the Kruskal's algorithm for finding minimum cost spanning tree and explain the Kruskal's algorithm with an example. Analyse the complexity of the algorithm.	(7)
	b)	Explain greedy strategy	(3)
20	a)	State and explain N-queens problem	(2)
	b)	Draw the state space tree of 4-queens problem	(5)
	c)	Define backtracking strategy	(3)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth semester B.Tech examinations (S), September 2020

Course Code: CS302
Course Name: DESIGN AND ANALYSIS OF ALGORITHMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1 Express the return value of the function "mystery" in $\theta - notation$. (3)

```
intmystery(int n) {
int j=0,total=0;
   for (int i=1;j<=n;i++){
      ++total;
      j+=2*i;
   }
   return total;
}
```

2 Is $2^{n+1}=O(2^n)$? Is $2^{2n}=O(2^n)$? Justify (3)

3 Define a B-tree. Give an example. (3)

4 Implement UNION using linked list representation of disjoint sets. (3)

PART B

Answer any two full questions, each carries9 marks.

5 a) Solve T(n)=2T(n/2)+2 if n>2 (4)
=1 if n=2 Using iteration method.

b) Solve T(n)=2T($\sqrt{n}$)+logn (5)

6 a) Show the red-black tree that result after successively inserting the keys 41,38,31,12,19,8 into an initially empty red-black tree. (9)

7 a) Consider the following C function (4)

```
intcheck(int n){
inti,j;
   for (i=1;i<=n;i++){
```

```
        for (j=1;j<n;j+=i){
printf("%d",i+j);
        }
    }
}
```

Find the time complexity of **check** in terms of $\theta - notation$.

b) Find the minimum and maximum height of any AVL-tree with 11nodes. Assume that height of the root is 0. (5)

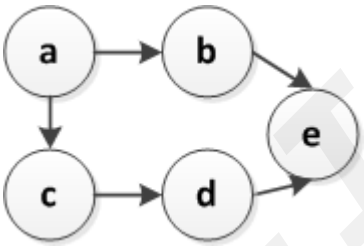
PART C

Answer all questions, each carries3 marks.

8 What is principle of optimality? (3)

9 Explain the characteristics of problems that can be solved using dynamic programming. (3)

10 Find the possible topological orderings for the following graph (3)



11 How the edges of a graph can be classified based on DFS? (3)

PART D

Answer any two full questions, each carries9 marks.

12 a) Give a control abstraction for Divide and Conquer method. Explain with an example. (5)

b) Explain the effect of negative weight edges and negative weight cycles on shortest paths. (4)

13 a) Define strongly connected components. How DFS can be used to find strongly connected components? (4)

b) Find an optimal paranthesizationof a matrix-chain product whose sequence of dimensions is 4x10,10x3,3x12,12x20,20x7. (5)

14 a) Write Dijkstra's Single Source Shortest path algorithm. Analyse the complexity. (7)

b) Is it possible to find all pairs of shortest paths using Dijkstra's algorithm? Justify. (2)

PART E

Answer any four full questions, each carries10 marks.

15 a) Compare Divide and Conquer and Dynamic programming methodologies. (4)

b) Write an algorithm to merge 2 sorted arrays into a single sorted array. (6)

16 a) Explain Branch and bound technique. (3)

b) How Travelling Salesperson Problem can be solved using Branch and bound. (7)

17 a) Explain Kruskal's algorithm with an example. (6)

b) Derive its complexity of kruskal'salgorithm.. (4)

18 a) Explain control abstraction of greedy method. (3)

b) Write greedy algorithm for knapsack problem. (4)

c) Find an optimal solution to the knapsack instance n=7, m=15,$(p_1,p_2,.....p_7)$=(10,5,15,7,6,18,3) and $(w_1,w_2,.....w_7)$=(2,3,5,7,1,4,1). (3)

19 a) Explain the concept of backtracking. (3)

b) How backtracking can be used to solve N-queens problem. (4)

c) Draw the state space tree for 4 Queens problem. (3)

20 a) Define NP-Hard and NP-complete problems. (4)

b) With examples explain polynomial time reducibility. (4)

c) What do you mean by intractable problems? (2)

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Scheme of Valuation/Answer Key

(Scheme of evaluation (marks in brackets) and answers of problems/key)

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), SEPTEMBER 2020

Course Code: CS302

Course Name: DESIGN AND ANALYSIS OF ALGORITHMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks.

1 Correct answer Θ(√**n)** - 3 marks.

2 Yes-justification(1.5) No-justification(1.5)

3 Definition-2 Marks. Example- 1 Mark

4 Linked list representation-1 mark. Implementation of Union-2 Marks

PART B

Answer any two full questions, each carries9 marks.

5 a) Solution using iteration-4 Marks. Correct answer :**Theta(n)**

b) Solution by using change of variables,Master Method-5 Marks.**Ans:lognloglogn**

6 a) Correct tree- 9 Marks. Marks may be given for partial correctness

7 a) Complexity in Theta notation Θ(**n log n**)-4 Marks.

b) Min height- 2.5 Marks Max height-2.5 Marks

PART C

Answer all questions, each carries3 marks.

8 Principle of optimality-3 Marks

9 4 Characteristics- 3 Marks

10 3 orderings-1 Mark each Answer: **abcde,acbd,acdbe**

11 Classification of edges-4 types-3 Marks**. Forward edge, backward edge, cross edge, Tree edge**

PART D

Answer any two full questions, each carries9 marks.

12 a) Control Abstraction- 3 Marks Example-2 Marks.

b) Effect of negative edges+negative cycles(2+2)

13 a) Strongly Connected Components-1 Mark. Algorithm to find strongly connected components-3Marks

b) Correct Answer- 5Marks. **M[1,5]=1344.**

14 a) Dijikstra's Algorithm-5 Marks, Complexity-2 Marks

b) Yes- 1 Mark, Justification- 1 Mark**. Run the algorithm once taking each vertex as source.**

PART E

Answer any four full questions, each carries10 marks.

15 a) Comparison-At least 3 points-4 Marks

b) Algorithm to Merge- 6 Marks.

16 a) Basic concept of Branch and bound-3 Marks

b) TSP solution-7 Marks

17 a) Kruskal's algorithm- 4 Marks. Example-2 Marks

b) Complexity-4 Marks

18 a) Control Abstraction-3 Marks

b) Algorithm for knapsack problems- 4 Marks

c) Solution-3 Marks**. total profit = 52 + 5 x 2/3 = 52 + 3.33 = 55.3**

19 a) Backtracking-3 Marks

b) Solution to N-Queens problem-4 Marks

c) state space tree for 4 Queens problems-3 Marks

20 a) NP-Hard-2 Marks NP-complete-2 Marks

b) polynomial time reducibility-2 Example-2 Marks

c) intractable problems-2 Marks

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CS304

Course Name: COMPILER DESIGN

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1		Describe input buffering scheme in lexical analyzer.	(3)
2		Construct a regular expression to denote a language L over ∑= {0,1} accepting all strings of 0's and 1's that do not contain substring 011	(3)
3		Consider the context free grammar S->aSbS | bSaS | € Check whether the grammar is ambiguous or not	(3)
4		What is Recursive Descent parsing? List the problems faced in designing such a parser.	(3)

PART B

Answer any two full questions, each carries9 marks.

5	a)	Explain the different phases in the design of a compiler.	(5)
	b)	Find the FIRST and FOLLOW of the non-terminals in the grammar S->aABe A->Abc|b B->d	(4)
6	a)	Design a recursive descent parser for the grammar E->E + T | T T->T*F | F F->(E) | id	(5)
	b)	Develop a lexical analyzer for the token identifier.	(4)
7	a)	What is left recursive grammar? Give an example. What are the steps in removing left recursion?	(5)
	b)	Explain any four compiler writing tools	(4)

PART C

Answer all questions, each carries3 marks.

8	Explain the main actions in a shift reduce parser	(3)
9	What are different parsing conflicts in SLR parsing table?	(3)
10	What are annotated parse trees? Give examples.	(3)
11	What are L-attributed definitions and S-attributed definitions in a syntax directed translation scheme?	(3)

PART D

Answer any two full questions, each carries9 marks.

12	a)	Find the LR(0) items for the grammar S->SS | a| €.	(4)
	b)	Explain bottom- up evaluation of s-attributed definitions.	(5)
13	a)	Derive LALR (1) parsing algorithm for following grammar S→AS/b A→SA/a	(6)
	b)	Design a type checker for simple arithmetic operations.	(3)
14	a)	Explain the syntax directed definition of a simple desk calculator.	(5)
		Explain operator grammar and operator precedence parsing	(4)

PART E

Answer any four full questions, each carries10 marks.

15	a)	Explain storage organization and storage allocation strategies	(10)
16	a)	Explain intermediate code generation of an assignment statement	(10)
17	a)	Explain quadruples, triples and dags with an example each.	(10)
18	a)	Explain the principal sources of optimization	(10)
19	a)	Explain optimization of basic blocks	(5)
	b)	With suitable examples explain loop optimization.	(5)
20	a)	Explain issues in design of a code generator	(5)
	b)	Explain simple code generation algorithm	(5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: CS304

Course Name: COMPILER DESIGN

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1 Scanning of source code in compilers can be speeded up using input buffering. Explain. (3)

2 Draw the DFA for the regular expression (a | b)* (abb | a+ b). (3)

3 Differentiate leftmost derivation and rightmost derivation. Show an example for each. (3)

4 Find out context free language for the grammar given below: (3)

S -> abB
A -> aaBb | ε
B -> bbAa

PART B

Answer any two full questions, each carries9 marks.

5 a) Explain compiler writing tools. (5)

b) Given a grammar : (4)

S→ (L)|a

L→ L,S | S

(i) Is the grammar ambiguous? Justify

(ii) Give the parse tree for the string (a,((a,a), (a,a)))

6 a) Construct the predictive parsing table for the following grammar: (5)

S -> (L) | a
L -> L,S | S

b) Explain how the regular expressions and finite state automata are used for the specification and recognition of tokens? (4)

7 a) Explain the working of different phases of a compiler. Illustrate with a source language statement. (5)

b) Can recursive descent parsers used for left recursive grammars? Justify your answer. Give the steps in elimination of left recursion in a grammar. (4)

PART C

Answer all questions, each carries3 marks.

8		Compute FIRST and FOLLOW for the grammar: S -> SS+ | SS* | a	(3)
9		Write the algorithm to construct LR(1) collection for a grammar.	(3)
10		What is an SDD? Show an example.	(3)
11		Distinguish between synthesized and inherited attributes.	(3)

PART D

Answer any two full questions, each carries9 marks.

12	a)	Write algorithm for SLR paring table construction.	(5)
	b)	Construct syntax directed translation scheme for infix to postfix translation.	(4)
13	a)	Construct the SLR table for the grammar: S -> aSbS | a	(5)
	b)	Give the annotated parse tree for the expression: 1*2*3*(4+5) **n**	(4)
14	a)	Differentiate CLR and LALR parsers.	(4)
	b)	Explain the specification of a simple type checker.	(5)

PART E

Answer any four full questions, each carries10 marks.

15	a)	Explain how DAGs help in intermediate code generation?	(4)
	b)	Explain the code generation algorithm. Illustrate with an example.	(6)
16	a)	Define the following and show an example for each. i). Three-address code iii). Triples ii). Quadruples iv). Indirect triples	(6)
	b)	State the issues in design of a code generator.	(4)
17	a)	Explain different stack allocation strategies with suitable examples.	(10)
18	a)	Explain different code optimization techniques available in local and global optimizations?	(10)
19	a)	How is storage organization and management done during runtime?	(4)
	b)	How the optimization of basic blocks is done by a compiler?	(6)
20	a)	Write the algorithm for partitioning a sequence of three-address instructions into basic blocks.	(4)
	b)	Construct the DAG and three address code for the expression a+a*(b-c)+(b-c)*d	(6)

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth semester B.Tech examinations (S), September 2020

Course Code: CS304
Course Name: COMPILER DESIGN

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1 State the role of lexical analyzer. Identify the lexemes and their corresponding tokens in the following statement: printf ("Simple Interest=%f\n", si); (3)

2 Explain any three tools that help a programmer in building a compiler efficiently. (3)

3 Eliminate the ambiguity from the given grammar (3)

E → E*E | E-E | E^E | E/E | E+E | (E) | id.

The associativity of the operators is as given below. The operators are listed in the decreasing order of precedence.

(i) ( )

(ii) / and + are right associative

(iii) ^ is left associative.

(iv) * and – are left associative

4 For what type of grammar, recursive descent parser cannot be constructed? Show the steps involved in recursive descent parsing with backtracking for the string *cad* with the given grammar: S -> cAd A -> ab | a (3)

PART B

Answer any two full questions, each carries 9 marks.

5 a) Trace the output after each phase of the compiler for the assignment statement: **a = b + c * 10**, if variables given are of float type. (6)

b) Show that the following grammar is ambiguous. (3)

bexpr → *bexpr* **OR** *bterm* | *bterm*

bterm → *bterm* **AND** *bfactor* | *bfactor*

bfactor → **NOT** *bfactor* | *(bexpr)* | **TRUE** | **FALSE**

6 a) Left factor the following grammar and then obtain LL(1) parsing table (6)

E → T+E | T

T → float | float * T | (E)

b) What is the relevance of input buffering in lexical analysis? (3)

7 a) Write Non-recursive predictive parsing algorithm. (5)

b) Write regular expressions for the following languages: (4)

i) All strings over the English alphabet that contain the five vowels in order.

ii) All strings of a's and b's that do not contain the subsequence *abb*.

PART C

Answer all questions, each carries 3 marks.

8 What is handle pruning? Indicate the handles in the reduction of the right sentential form **S S+ a *** to the start symbol using the grammar below: (3)

S -> S S+ | S S * | a

9 What are viable prefixes? For the given grammar S → 0 S 1 |0 1 write all the viable prefixes for the string 00001111 (3)

10 Give the S-attributed SDD of a simple desk calculator and show annotated parse tree for the expression (3+4)*(5+6). (3)

11 Write a translation scheme for performing type checking of statements. (3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) Construct canonical collection of LR(1) items for the following grammar: (5)

S → AA

A → Aa | b

b) Differentiate between S-attributed and L-attributed definitions with suitable examples. (4)

13 a) Write the SDD for a simple type declaration and draw the annotated parse tree for the declaration **float a, b, c**. (5)

b) Construct SLR parsing table for the grammar A → a | (A). (4)

14 a) Using operator precedence relations, parse the string id + (id * id). (5)

b) Construct DAG for the expression (a/10 + (b -10))*(a/10 + (b-10)). Also write the sequence of instructions used for the DAG construction. (4)

PART E

Answer any four full questions, each carries 10 marks.

15 a) Using necessary figure, illustrate how the caller and callee cooperate in (6)

managing various tasks in stack allocation strategy when a procedure is activated.

b) Explain copy propagation with an example. (4)

16 a) Write SDD to produce three-address code for Boolean expressions and obtain the three-address code for the statement given below: (6)

```
while a < b do
    if c < d then
        x = y + z
    else
        x = y – z
```

b) Explain common sub expression elimination with an example. (4)

17 a) Identify any four issues in the design of a Code Generator. (6)

b) Write the three address code sequence for the statement x=y*z + y*-z. Also give its triple representation. (4)

18 Write the code generation algorithm. Using this algorithm generate code sequence for the expression **x = (a – b) + (a + c)**. (10)

19 a) With suitable example of a basic block, explain the code-improving transformations of a basic block. (6)

b) Describe the various fields in an activation record. (4)

20 a) Explain the 3 representations of three-address code statements. (6)

b) What is static allocation strategy? What are its limitations? (4)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CS306

Course Name: COMPUTER NETWORKS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks.

			Marks
1		Distinguish between interface, protocol and layer in network software.	(3)
2		What are point to point and broadcast networks?	(3)
3		Draw the different frame formats in HDLC.	(3)
4		How does pure aloha and slotted aloha differ?	(3)

PART B

Answer any two full questions, each carries9 marks.

5	a)	List the design issues of layered network software.	(3)
	b)	Explain WAN and communication subnet?	(3)
	c)	Compare TCP/IP Reference model and OSI Reference model.	(3)
6	a)	With neat diagram, explain OSI reference Model.	(6)
	b)	Explain the working of CSMA/CD?	(3)
7	a)	Explain how Token management is done in IEEE 802.5.	(3)
	b)	Distinguish between switches and bridges.	(3)
	c)	List the features of Gigabit Ethernet.	(3)

PART C

Answer all questions, each carries3 marks.

8	List the network layer functions.	(3)
9	Differentiate between Flooding and broadcasting	(3)
10	How token bucket algorithm performs congestion control?	(3)
11	List the private IP address ranges of class A, B and C?	(3)

PART D

Answer any two full questions, each carries9 marks.

12	a)	Explain how routing is performed using link state algorithm? Illustrate with an example.	(6)
	b)	Give the relevance of age field in a link state packet.	(3)
13	a)	Explain any two congestion control algorithms	(5)

	b)	Discuss about the routing for mobile hosts.	(4)
14	a)	What is QoS? Explain any two methods to ensure QoS.	(6)
	b)	Subnet the Class C IP Address 206.16.2.0 so that you have 30 subnets. What is the subnet mask for the maximum number of hosts? How many hosts can each subnet have?	(3)

PART E

Answer any four full questions, each carries10 marks.

15	a)	How does BGP avoid count to infinity problem?	(3)
	b)	Draw the IPv6 fixed header format.	(3)
	c)	Explain the role of ICMP.	(4)
16	a)	Define address resolution problem. Explain about RARP	(6)
	b)	Give the importance of BOOTP.	(4)
17	a)	Discuss about the issues with IPv6	(3)
	b)	Explain how IGMP supports internet multicasting	(7)
18	a)	What are port numbers, give its importance in computer communication?	(3)
	b)	Distinguish between TCP and UDP header format.	(7)
19	a)	How FTP handles file transfer?	(3)
	b)	Explain various features of MIME?	(4)
	c)	What is the role of SMTP in E Mail message transfer?	(3)
20	a)	Explain DNS message types	(4)
	b)	List the components of SNMP?	(3)
	c)	Explain the procedure for calculating the UDP checksum?	(3)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: CS306

Course Name: COMPUTER NETWORKS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

			Marks
1		What are service primitives in computer networks?	(3)
2		Differentiate between 1 persistent and p-persistent CSMA.	(3)
3		Draw the frame format of Ethernet.	(3)
4		List the features of LAN.	(3)

PART B

Answer any two full questions, each carries 9 marks.

5	a)	Explain Stop-and-wait, Go-Back-N and Selective Repeat ARQ techniques.	(6)
	b)	Differentiate between connection oriented and connectionless services.	(3)
6	a)	How computer networks are categorized based on transmission technology and scale? Explain the features of each network.	(6)
	b)	Distinguish between bit stuffing and character stuffing in framing.	(3)
7	a)	Explain about the MAC protocol in Ethernet.	(5)
	b)	With the TCP/IP protocol stack, explain TCP/IP Reference model.	(4)

PART C

Answer all questions, each carries3 marks.

8	List the features of RIP.	(3)
9	List the message types in OSPF.	(3)
10	What is IP subnetting? Illustrate with example.	(3)
11	List the IP address ranges and subnet masks of class A, class B and class C.	(3)

PART D

Answer any two full questions, each carries9 marks.

12	a)	Illustrate distance vector routing algorithm with an example.	(5)
	b)	Differentiate classfull and classless addressing schemes	(4)
13	a)	Explain OSPF routing algorithm.	(5)
	b)	Discuss about any two congestion control algorithms.	(4)
14	a)	How routing is handled in mobile hosts?	(4)

b) Subnet the Class C IP Address 195.1.1.0 So that you have 10 subnets each with a maximum 12 hosts on each subnet. (5)

PART E

Answer any four full questions, each carries10 marks.

15 a) Draw and explain the message format for the ICMP echo request and echo reply messages. (5)

b) Explain about the controversies regarding IPv6 (5)

16 a) How BOOTP performs when the client and the server are on different networks? (5)

b) What is multicasting? Mention the role of IGMP in IP multicasting. (5)

17 a) How the routing updates are communicated among different Autonomous systems? Give the features of any one Exterior Gateway Protocol. (6)

b) Draw and explain IPv6 header format. (4)

18 a) List the transport layer functions. (3)

b) Differentiate between TCP and UDP. (7)

19 a) How SMTP handles a mail transfer from Alice to Bob? (4)

b) Give the importance of MIME. What are the different MIME types? (6)

20 a) What is the role of SNMP? Explain its components. (7)

b) Differentiate between DNS query and response messages. (3)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth semester B.Tech degree examinations (S), September 2020

Course Code: CS306

Course Name: COMPUTER NETWORKS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1		Discuss the uses of computer networks in home applications	(3)
2		Why are the layers from Transport layer and above called truly end to end layers?	(3)
3		Describe error control and flow control in data link layer.	(3)
4		Demonstrate the significance of sequence numbers in stop and wait ARQ.	(3)

PART B

Answer any two full questions, each carries 9 marks.

5		Discuss the purpose of the various layers in ISO-OSI reference model with the help of a diagram.	(9)
6	a)	Show the design issues of physical layer and network layer.	(4)
	b)	Discuss about Go-Back-N ARQ. The timer for only the first outstanding frame is set in Go-Back-N ARQ. Analyse the protocol and illustrate how all the outstanding frames are managed with just one timer.	(5)
7		How does Multiple Access with Collision Avoidance solve the hidden node problem and exposed node problem in Wireless LANs?	(9)

PART C

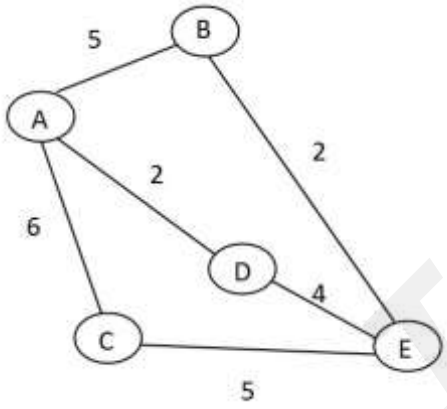
Answer all questions, each carries 3 marks.

8	How is routing table different from forwarding table?	(3)
9	Demonstrate reliable flooding with the help of an example.	(3)
10	Describe any two congestion control methods in virtual circuit subnets.	(3)
11	Describe the techniques for achieving good Quality of Service.	(3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) Build the routing table for node C in the given network using Link State Algorithm. Show step wise progress of the table's tentative and confirmed list with explanation. (6)



b) Enumerate the additional features added by OSPF to the basic link state algorithm. (3)

13 a) Compare datagram network with virtual circuit network. (3)

b) Specify the significance along with the size of the following fields in an IP packet header: DF, MF, Fragment offset, Time-to-live. (6)

14 a) How does Random Early Detection work? (3)

b) Illustrate the working of leaky bucket algorithm with the help of diagram. (6)

PART E

Answer any four full questions, each carries10 marks.

15 a) Give the significance of RARP. (4)

b) Compare the working of BOOTP and DHCP. (6)

16 a) Draw the IPv6 header. Explain the purpose of the fields flow label and hop limit. (6)

b) How is the issue of very large IPv6 packets resolved at routers? (2)

c) Is there any checksum field included in the packet header of IPv6? Justify your answer. (2)

17 a) List the additional issues that an external gateway routing protocol has to deal with. (2)

b) Describe stub networks, multi-connected networks and transit networks. (3)

c) BGP easily solves count-to-infinity problem. Justify the statement by explaining the working of BGP with the help of an example. (5)

18	a)	What is the significance of circular sending and receiving buffers in TCP? How are they used?	(5)
	b)	How does TCP ensure reliable service?	(2)
	c)	Explain flow control and error control in TCP.	(3)
19	a)	Why do we need SNMP protocol? Describe the three components of SNMP.	(5)
	b)	Explain any 5 types of SNMP messages	(5)
20	a)	What do you mean by socket address?	(2)
	b)	Illustrate silly window syndrome.	(2)
	c)	Give the significance of MIME. Explain five message headers defined by MIME.	(6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CS308

Course Name: SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1		Briefly explain the role of management in software development.	(3)
2		List the advantages of using waterfall model instead of adhoc build and fix model.	(3)
3		Explain quality function deployment technique of requirement elicitation. Why a value factor is always associated with every requirement?	(3)
4		List out the characteristics of a good SRS document.	(3)

PART B

Answer any two full questions, each carries9 marks.

5	a)	Explain with suitable examples, the types of software development for which the spiral model is suitable. Is the number of loops of the spiral fixed for different development process? If not, explain how the number of loops in the spiral is determined.	(4)
	b)	Suppose you were to plan to undertake the development of a product with a large number of technical as well as customer related risks, which life cycle model would you adopt? Justify your answer.	(5)
6	a)	What are the major phases in the waterfall model of software development? Which phase consumes the maximum effort for developing a typical software product?	(5)
	b)	What are the crucial steps of requirement engineering? Explain with the help of a diagram.	(4)
7	a)	Explain Capability Maturity Model(CMM). Why is it suggested that CMM is the better choice than ISO-9001?	(3)
	b)	A university has decided to engage a software company for the automation of student result management system of its Mtech Programme. Develop the following documents which may provide holistic view of the system. i. Problem Statement iii. Use case diagram ii. Context diagram iv. ER diagram	(6)

PART C

Answer all questions, each carries3 marks.

8	Assume that the size of an organic type software product has been estimated to be 32000 lines of code. Assume that the average salary of software engineers is Rs.15,000 per month. Determine the effort required to develop the software product and the nominal development time.	(3)
9	Explain the design guidelines that can be used to produce “good quality” classes or reusable classes.	(3)

10 Distinguish between: (3)
i.Structural testing and Functional testing
ii .Cohesion and Coupling
iii. Alpha testing and Beta testing

11 Define cyclomatic complexity. Explain different properties of cyclomatic complexity. (3)

PART D

Answer any two full questions, each carries9 marks.

12 a) What is modularity? List out the important properties of a modular system. (3)

b) What do you understand by the term system testing? What are the different kinds of system testing that are usually performed on large software products? (3)

c) Explain different code review techniques (3)

13 a) Consider the program given below, construct the flow graph and calculate the cyclomatic complexity . (3)

```
i = 0;
n=4; //N-Number of nodes present in the graph

while (i<n-1) do

j = i + 1;

while (j<n) do

if A[i]<A[j] then

swap(A[i], A[j]);

end do;

i=i+1;

end do
```

b) Consider a program to classify a triangle .It's input is a triangle of positive integers(say x,y,z) and the data type for input parameters ensures that these will be integers greater than 0 and less than or equal to 100.The program output may be one of the following words: (Scalene, Isosceles, Equilateral, Not a triangle). (6)
Explain decision table for triangle problem and identify the test cases using the decision table.

14 a) Consider a project to develop a full screen editor. The major components identified are 1.Screen Edit 2.Command Language Interpreter 3.File input and output 4.Cursor movement 5.Screen movement. The sizes of these are estimated to be 4K, 2K, 1K, 2K, and 3K delivered source code lines..Use COCOMO model to determine overall cost and schedule estimates (Assume that i) required software reliability is high ie 1.15,ii)Product complexity is high ie 1.15,iii)Analyst capability is high ie 0.86,iv) Programming language experience is low ie 1.07,all other cost drivers are assumed to be nominal . (5)

b) Consider a project with the following functional units: (4)
Number of user inputs =50
Number of user outputs=40
Number of user enquiries=35
Number of user files=6
Number of external interfaces =4
Assume all complexity adjustment factors and weighting factors are average. Compute the function point for the project.
Functional units with weighting factors
(External input:4, External output:5, External inquiries :4, Internal logic file:10, External interface file:7)

PART E

Answer any four full questions, each carries10 marks.

15 a) What is software maintenance? Describe various categories of maintenance. Which category consumes maximum effort and why? (6)

b) Explain the steps of software maintenance with the help of a diagram. (4)

16 a) What is meant by software configuration management? Explain different activities involved in configuration management. (5)

b) What do you understand by the terms CASE tool and CASE environment. With a neat schematic architecture explain CASE environment. (5)

17 a) Explain different characteristics which are desired for a good user interface. (6)

b) Explain different types of user interface. (4)

18 a) What is risk? Explain different types of software risk. (4)

b) What are risk management activities? Is it possible to prioritize risk? (6)

19 a) Explain the Taute maintenance model. What are the various phases of these model. (6)

b) Annual change traffic for a software system is 15% per year.The development effort is 600 PMs. Compute an estimate for annual maintenance effort(AME).If life time of the project is 10 years,what is the total effort of the project? (4)

20 a) Explain the following CASE tools: (10)
(i) SCM tools
(ii) Documentation tools
(iii) Integration & Testing tools
(iv) Static Analysis tools
(v) Reengineering tools

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: CS308

Course Name: SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks.

		Marks
1	Explain software engineering as a layered technology	(3)
2	Write characteristics of Waterfall model for software development	(3)
3	How prototyping helps in software development	(3)
4	Write the significance of Requirement analysis in software engineering	(3)

PART B

Answer any two full questions, each carries9 marks.

5	a)	Explain Spiral Model for software development with a neat diagram.	(3)
	b)	Describe any three methods of Requirement elicitation process	(3)
	c)	Describe the different levels of Capability Maturity Model	(3)
6	a)	Write the elements of requirements engineering process	(2)
	b)	Discuss the prototyping model. What is the effect of designing a prototype on the overall cost of the project?	(4)
	c)	What is the scope of software engineering	(3)
7	a)	Discuss the maintenance aspects of software engineering.	(3)
	b)	Explain the importance of requirements. How many types of requirements are possible ?	(3)
	c)	Differentiate between Waterfall model and incremental model for software development?	(3)

PART C

Answer all questions, each carries3 marks.

8	Describe any two software size estimation techniques.	(3)
9	Explain all the levels of COCOMO model.	(3)
10	Differentiate between code walk through and codeinspection	(3)
11	Draw the Rayleigh manpower loading curve and state PNR model for staffing	(3)

PART D

Answer any two full questions, each carries9 marks.

12	a)	Explain two types of Black box testing strategies.	(3)
	b)	Differentiate between top down and bottom up design strategies.	(3)
	c)	A simple stand – alone software utility is to be developed in 'C' programming by a team of software experts for a computer running Linux and the overall size of this software is estimated to be 20,000 lines of code. Considering (a, b) = (2.4, 1.05) as multiplicative and exponential factor for the basic COCOMO effort estimation equation and (c, d) = (2.5, 0.38) as multiplicative and exponential factor for the basic COCOMO development time estimation equation, approximately how long does the software project take to complete ?	(3)
13	a)	Define any four types of System testing	(4)
	b)	Differentiate between stamp coupling and content coupling.	(2)
	c)	Explain basis path testing with example	(3)
14	a)	Define Cohesion. Explain different types of cohesion	(5)
	b)	Explain stepwise refinement	(2)
	c)	How Black box testing differ from White box testing	(2)

PART E

Answer any four full questions, each carries10 marks.

15	a)	Write the need for software maintenance. Explain different categories of maintenance	(5)
	b)	Discuss the building blocks of CASE.	(5)
16	a)	Discuss Risk management activities in detail.	(5)
	b)	Write any four rules for user interface design.	(5)
17	a)	Describe the need for software configuration management.	(5)
	b)	Discuss 4 p's of software management concepts.	(5)
18	a)	Describe different categories of risk.	(5)
	b)	Explain different project scheduling techniques	(5)
19	a)	Write the different activities of software project management.	(5)
	b)	Explain architecture of CASE environment.	(5)
20	a)	Discuss how to define a task set for the software project.	(5)
	b)	Explain software configuration management activities.	(5)

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth semester B.Tech degree examinations (S), September 2020

Course Code: CS308

Course Name: SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1		Define the term "software Engineering". Explain the major differences between software engineering and other traditional engineering disciplines.	(3)
2		Why do we feel that characteristics of requirements play a very significant role in the selection of a life cycle model?	(3)
3		Name the umbrella activities in software process.	(3)
4		Write a short note on ISO 9000 quality standards.	(3)

PART B

Answer any two full questions, each carries 9 marks.

5	a)	Illustrate the layered architecture of software engineering with a neat sketch.	(3)
	b)	If you have to develop a word processing software product, which process model will you choose? Justify your answer and examine.	(3)
	c)	List out the major shortcomings that we might face, if we use the classical waterfall model for developing software?	(3)
6	a)	Define "requirements elicitation"? Explain any *two* elicitation techniques in detail.	(6)
	b)	Compare ISO and SEI-CMM models.	(3)
7	a)	Explain Boehm's spiral model of software process with a neat diagram.	(6)
	b)	Distinguish between functional and non-functional requirements with example.	(3)

PART C

Answer all questions, each carries3 marks.

8		Suppose you are developing a software product in the organic mode. You have estimated the size of the product to be about 100,000 lines of code. Determine the effort required to develop the software product and the nominal development time.	(3)

9 List the important shortcomings of LOC for use as a software size metric for carrying out project estimations. (3)

10 Outline equivalence class partitioning? Explain with an example how equivalence class partitioning helps in testing (3)

11 What is meant by a code walkthrough? What are some of the important types of errors checked during code walkthrough? (3)

PART D

Answer any two full questions, each carries9 marks.

12 a) Explain the different types of coupling that might exist between two software modules. What problems are likely to arise if two modules have high coupling? (6)

b) When does software project planning activity start and end in a software life cycle? List the important activities software project managers perform during project planning. (3)

13 a) How can you compute the cyclomatic complexity of a program? How is cyclomatic complexity useful in program testing? (6)

b) One way to measure the design quality of a structure chart is to explore its coupling and cohesion. Differentiate between the two. (3)

14 a) Consider the following Function Point components and their complexity. If the total degree of influence is 52, find the estimated function points. (3)

Function type	Estimated count	Complexity
External Interface Files	2	7
Internal Logical Files	4	10
External Inquiries	22	4
External Outputs	16	5
External Inputs	24	4

b) What is black box testing? Explain the different types of black box testing strategies. For a software that computes the square root of an input integer that can assume values in the range of 0 and 1000. Determine the equivalence class test suite. (6)

PART E

Answer any four full questions, each carries 10 marks.

15 a) Explain in detail about the risk management in a software development life cycle. (5)

	b)	What is a task set? Write the various steps involved in selecting appropriate task set for a project.	(5)
16	a)	Explain the software maintenance steps with the help of a diagram.	(5)
	b)	Describe the golden rules for User Interface Design.	(5)
17	a)	Explain the Boehm's maintenance model with the help of a diagram.	(5)
	b)	Draw the architecture of a CASE environment and explain how the different tools are integrated.	(5)
18	a)	What is software maintenance? Describe in brief various categories of maintenance.	(5)
	b)	Explain change control in detail along with software configuration items and baseline.	(5)
19	a)	What are the various problems during software maintenance? Describe some solutions to these problems.	(5)
	b)	Write a short note on taxonomy of CASE tools.	(5)
20	a)	Explain four P's with respect to Software Project Management.	(5)
	b)	What is meant by Software Configuration Management(SCM)? Discuss the process of SCM in detail.	(5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: HS300

Course Name: PRINCIPLES OF MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks. Marks

1	a)	List and elaborate five important roles of a manager	(5)
	b)	With suitable examples, illustrate the Planning, Organizing, Staffing, Leading and Controlling functions of management	(5)
2	a)	List any four forces of the external environment	(4)
	b)	Why the management of the organizations of the new era differ from old ones?	(4)
	c)	"New generation managers are multi skill experts" What do you mean by this?	(2)
3	a)	Describe the philosophy of Scientific Management"	(5)
	b)	List and illustrate the contributions of Gilbreth's	(5)
4	a)	What is managerial ethics? Illustrate a situation in which whistle blowers perform ethical duty	(5)
	b)	Explain the Mc Kinsey 7S Framework	(5)

PART B

Answer any three full questions, each carries 10 marks.

5	a)	Define the terms: Plan, Objective, Goal, Policy and Rule	(5)
	b)	Differentiate between Strategic, Administrative and Routine type planning	(5)
6	a)	Describe the stages involved in the planning process	(5)
	b)	With a block diagram, outline the structure of Management by Objectives MBO	(5)
7	a)	Distinguish between line and staff functions with the aid of examples	(4)
	b)	Define the term – Span of Control	(2)
	c)	What is an organization chart? What are its merits and demerits?	(4)
8	a)	Illustrate the difference between programmed and non programmed decisions by highlighting suitable examples	(5)
	b)	Describe the following stages in creative process: Unconscious scanning, Intuition, developing insights and logical evaluation	(5)

PART C

Answer any four full questions, each carries 10 marks.

9	a)	Why empowerment is needed?	(3)
	b)	Define delegation. Is it possible to delegate authority and responsibility? Why?	(4)
	c)	What is recentralization of authority?	(3)
10	a)	What is a manager inventory chart?	(3)
	b)	Distinguish the following: Recruitment, Selection, Placement and Induction	(4)
	c)	List the advantages and limitations of interview as a selection technique	(3)
11	a)	What do you understood by the term Job Design?	(3)
	b)	What are the requirements of the staff of the firm in order to call it as a culture responsive firm?	(4)
	c)	How entrepreneurs differ from workers?	(3)
12	a)	List any six qualities of an effective leader	(6)
	b)	Distinguish between trait approach and contingency approach to leadership	(4)
13	a)	Describe transactional and transformational leadership styles	(5)
	b)	Illustrate how power and authority are utilized by an effective leader	(5)
14	a)	Define controlling and illustrate conventional feedback control mechanism	(5)
	b)	With a block diagram and highlighting a situation, explain how a feed forward control mechanism works	(5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: HS300

Course Name: PRINCIPLES OF MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

			Marks
1		What are the ten managerial roles coming under Interpersonal, Informational and Decision roles.	(10)
2	a)	Differentiate between internal and external environment of an organisation.	(4)
	b)	Explain the importance of any four external factors which affect the working of an organisation.	(6)
3	a)	What is Hawthorne experiment ?	(8)
	b)	Discuss the impact of Hawthorne studies on management thought.	(2)
4	a)	What are the assumptions of McGregor Theory X and Theory Y ?	(4)
	b)	Explain Mckinsey 7-S frame work.	(6)

PART B

Answer any three full questions, each carries 10 marks.

5	a)	Explain the system approach to MBO.	(8)
	b)	Explain the benefits of MBO.	(2)
6		Discuss in detail the steps in planning.	(10)
7	a)	What are the limitations in decision making ?	(4)
	b)	How do you evaluate alternatives in decision making ?	(6)
8	a)	Discuss decision under certainty, uncertainty and risk.	(5)
	b)	Differentiate between programmed and non-programmed decisions with respect to organisationizational hierarchy.	(5)

PART C

Answer any four full questions, each carries 10 marks.

9		What is meant by selection of a candidate? Explain the steps of selection process	(10)
10	a)	Distinguish between centralisation and decentralisation of authority.	(4)
	b)	Write any three advantages and disadvantages of decentralisation.	(6)

11	a)	What is meant by job design and explain the factors influencing it.	(6)
	b)	Differentiate between recruitment and selection.	(4)
12	a)	Define leadership.	(2)
	b)	Distinguish between transformational leadership and transactional leadership.	(8)
13	a)	Define the concept of controlling.	(2)
	b)	Explain the basic control process.	(8)
14	a)	What is meant by Break-Even-Analysis ?	(7)
	b)	Explain benefits and limitations of Break-Even Analysis.	(3)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: HS 300

Course Name: PRINCIPLES OF MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

			Marks
1	a)	What are the different levels of Management?	2
	b)	Explain the Macro and Micro environmental factors.	8
2		List and Explain Managerial roles.	10
3	a)	Explain Ouchi's Z theory	5
	b)	Explain McGregor's X and Y theory.	5
4	a)	What is Mckinsey's 7-s frame work?	6
	b)	Explain the systems approach in management.	4

PART B

Answer any three full questions, each carries 10 marks.

5		What is MBO? How is it different from conventional planning process?	10
6		Explain the types of Plans with examples.	10
7	a)	What is the importance of span of control in management?	4
	b)	Explain the line and staff approach in management.	6
8	a)	What is meant by the term Departmentation?	2
	b)	Explain the strategies adopted in Departmentation process with example.	8

PART C

Answer any four full questions, each carries 10 marks.

9	a)	What is the significance of organisational culture in management?	4
	b)	What are the sources of organisational culture? Explain them.	6
10	a)	Explain the process of Job Analysis	5
11	b)	What are the processes involved in Job Design?	5
12		Give an account on the leadership qualities.	10
13		Differentiate Transactional and Transformational leadership.	10
14	a)	Explain Managerial Grid with suitable example.	4
	b)	Explain the basic Control process.	6

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B. TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: HS300

Course Name: PRINCIPLES OF MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

			Marks
1	a)	Define management.	(2)
	b)	Explain the five managerial functions.	(8)
2	a)	Is management a science or art or both?	(4)
	b)	How do you view management in global, innovative and entrepreneurial perspective?	(6)
3	a)	Define scientific management.	(2)
	b)	Explain any four techniques in scientific management.	(8)
4	a)	Explain Ouchi's theory Z by differentiating between American and Japanese management.	(6)
	b)	Explain the postulates of Ouchi's theory and comment on its application in Indian conditions.	(4)

PART B

Answer any three full questions, each carries 10 marks.

5		Explain the various steps involved in planning process.	(10)
6	a)	Define planning and discuss levels of planning.	(6)
	b)	Why planning and controlling are said to be inseparable- the Siamese twins of management.	(4)
7	a)	Define organizing.	(2)
	b)	Explain organisation levels in terms of narrow and wide spans with sketches and discuss its merits and demerits.	(8)
8	(a)	What is meant by decision making and rationality in decision making.	(4)
	(b)	Explain the three approaches to select an alternative in decision making such as experience, experimentation, research and analysis.	(6)

PART C

Answer any four full questions, each carries 10 marks.

9		What is meant by staffing? Discuss the systems approach to staffing.	(10)
10		Define delegation of authority and discuss advantages of delegation.	(10)
11		Explain the steps in selection process of a candidate from receiving application to final selection.	(10)
12	a)	Define leadership.	(2)
	b)	Explain trait theory of leadership and discuss its advantages and limitations.	(8)
13	a)	Define controlling.	(2)
	b)	Differentiate and discuss feedforward and feedback control systems.	(8)
14	a)	Name and explain any four control techniques.	(4)
	b)	Explain the principle of preventive control and also discuss its assumptions and advantages.	(6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: HS 300

Course Name: PRINCIPLES OF MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

			Marks
1	a)	What are the functions of Management?	6
	b)	Why management is called Art and Science?	4
2	a)	What are the challenges of management?	5
	b)	Differentiate between “Entrepreneur” and “Manager”	5
3	a)	What are the contributions of Taylor to management?	5
	b)	List out the contributions of Gilberth to management.	5
4		Differentiate between Classical and Neo-classical approaches in management.	10

PART B

Answer any three full questions, each carries 10 marks.

5	a)	Explain the various levels of planning	5
	b)	What are the salient features of planning?	5
6		Explain the common steps followed in planning process.	10
7	a)	What is meant by SBU?	2
	b)	Discuss about the various steps involved in decision making process.	8
8		List and explain the types of organisational structures	10

PART C

Answer any four full questions, each carries 10 marks.

9	a)	What is meant by the term delegation of authority? Why is it important in management?	5
	b)	Explain the pros and cons of centralisation and decentralisation of authority.	5
10	a)	Explain Manager inventory chart with an example.	4
	b)	What are the factors affecting HR management?	6
11		What are the performance appraisal methods?	10
12		Compare the terms Leading and Managing	10
13		Explain the Trait approach and Contingency approach to leadership	10
14		Differentiate Feedback control and Feed forward control with examples.	10

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth semester B.Tech degree examinations (S) September 2020

Course Code: HS300

Course Name: PRINCIPLES OF MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks. Marks

1	a)	Explain personal characteristics needed for a manager?	(5)
	b)	Discuss the steps involved in planning	(5)
2	a)	Discuss Global, Innovative, and Entrepreneurial perspectives of management?	(5)
	b)	Discuss various challenges in management?	(5)
3	a)	Discuss Taylors principles in scientific management?	(5)
	b)	List out human relations approaches by Mayo	(5)
4	a)	Explain McGregors X Theory.	(5)
	b)	Discuss the characteristics of contingency approach to management?	(5)

PART B

Answer any three full questions, each carries 10 marks.

5	a)	Discuss the importance of planning in an organisation	(5)
	b)	List out and explain the types of plans?	(5)
6	a)	Explain steps involved in planning?	(5)
	b)	List out the elements of most effective MBO system	(5)
7	a)	Explain the organization levels with wide and narrow span of control?	(5)
	b)	List out different types of departmentation?	(5)
8	a)	Discuss benefits and limitation of line and staff organisation?	(5)
	b)	Explain the features of decision making under certainty, uncertainty?	(5)

PART C

Answer any four full questions, each carries 10 marks.

9	a)	Explain the process of staffing?	(5)
	b)	Discuss the advantage and disadvantages of decentralisation?	(5)
10	a)	Differentiate between delegation and decentralisation?	(5)

	b)	What is the importance of cultural responsive organisations?	(5)
11	a)	Explain internal and external sources of recruitment?	(5)
	b)	Discuss different stages of selection process?	(5)
12	a)	Discuss the difference between leading and managing?	(5)
	b)	Explain the important characteristics of a leadership behaviour?	(5)
13	a)	Explain the advantages and disadvantages of a trait approach of leadership?	(5)
	b)	Distinguish between Transactional and Transformational leadership?	(5)
14	a)	Explain the requirement of an effective control?	(5)
	b)	Discuss various control techniques used by the management in an organisation?	(5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth semester B.Tech degree examinations (S), September 2020

Course Code: HS300

Course Name: PRINCIPLES OF MANAGEMENT

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks. Marks

1	a)	Explain the challenges that management faces in the new era of managing people and organization.	(7)
	b)	What is the relevance of corporate social responsibility in the present day scenario?	(3)
2	a)	Innovation leads organizations in market competition. What roles do management has in keeping innovation based competitiveness of an organization?	(5)
	b)	Explain how the systems approach of management is different from classical management.	(5)
3	a)	It is considered that F. W. Taylors has contributed significantly to the scientific management. Discuss the major contributions that F. W. Taylor made to Scientific Management.	(7)
	b)	Give a more relevant definition for modern management and discuss.	(3)
4	a)	How does the global environment influence the local management of organizations?	(5)
	b)	Define the features of McGregor's Theory of management.	(5)

PART B

Answer any three full questions, each carries 10 marks.

5	a)	Give an account of importance of planning	(5)
	b)	Write notes on departmentation. How does it help the organizations?	(5)
6	a)	Differentiate between objectives and policies	(3)
	b)	Explain the steps involved in planning by considering a new project implementation.	(7)

7	a)	Management by Objectives is a different way of getting things done in a systematic way. How does it ensure the employee cooperation?	(5)
	b)	What are the different levels of management and how the authorities change?	(5)
8	a)	Demonstrate the levels of planning with a simple example.	(3)
	b)	Differentiate between decision making under uncertainty and certainty with suitable examples.	(7)

PART C

Answer any four full questions, each carries 10 marks.

9	a)	Explain the uses of a Manager inventory chart.	(5)
	b)	Discuss the basic management control processes with reference to suitable examples	(5)
10	a)	Give an account of organizational culture and role of employees in its development.	(5)
	b)	What is job design? Why is it important?	(5)
11	a)	Explain and differentiate selection and recruitment.	(5)
	b)	Bring about the differences between Transactional and Transformational styles of leadership.	(5)
12	a)	When do the need for decentralization and recentralisation of authorities arise? Discuss with examples.	(5)
	b)	Explain trait approach to leadership.	(5)
13	a)	Explain Delegation of authority in detail.	(5)
	b)	Define different dimensions of leadership and make a comparison between them.	(5)
14	a)	What techniques and instruments do help in selection processes?	(5)
	b)	Discuss the requirements for an effective management control technique.	(5)

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Course code	Course Name	L-T-P - Credits	Year of Introduction
HS300	Principles of Management	3-0-0-3	2016

Prerequisite : Nil

Course Objectives

- To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context;
- To understand and apply a variety of management and organisational theories in practice;
- To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace;
- To be able to critically reflect on ethical theories and social responsibility ideologies to create sustainable organisations.

Syllabus

Definition, roles and functions of a manager, management and its science and art perspectives, management challenges and the concepts like, competitive advantage, entrepreneurship and innovation. Early contributors and their contributions to the field of management. Corporate Social Responsibility. Planning, Organizing, Staffing and HRD functions, Leading and Controlling. Decision making under certainty, uncertainty and risk, creative process and innovation involved in decision making.

Expected outcome.

A student who has undergone this course would be able to

i. manage people and organisations
ii. critically analyse and evaluate management theories and practices
iii. plan and make decisions for organisations
iv. do staffing and related HRD functions

Text Book:

Harold Koontz and Heinz Weihrich, *Essentials of Management*, McGraw Hill Companies, 10th Edition.

References:

1. Daft, *New era Management*, 11th Edition, Cengage Learning
2. Griffin, *Management Principles and Applications*, 10th Edition, Cengage Learning
3. Heinz Weirich, Mark V Cannice and Harold Koontz, *Management: a Global, Innovative and Entrepreneurial Perspective*, McGraw Hill Education, 14th Edition
4. Peter F Drucker, *The Practice of Management*, McGraw Hill, New York
5. Robbins and Coulter, *Management*, 13th Edition, 2016, Pearson Education

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Introduction to Management: definitions, managerial roles and functions; Science or Art perspectives- External environment-global, innovative and entrepreneurial perspectives of Management (3 Hrs.)– Managing people and organizations in the context of New Era- Managing for competitive advantage - the Challenges of Management (3 Hrs.)	6	15%

II	**Early Contributions and Ethics in Management**: Scientific Management- contributions of Taylor, Gilbreths, Human Relations approach-contributions of Mayo, McGregor's Theory, Ouchi's Theory Z (3 Hrs.) Systems Approach, the Contingency Approach, the Mckinsey 7-S Framework Corporate Social responsibility- Managerial Ethics. (3 Hrs)	6	15%
FIRST INTERNAL EXAMINATION			
III	**Planning:** Nature and importance of planning, -types of plans (3 Hrs.)- Steps in planning, Levels of planning - The Planning Process. – MBO (3 Hrs.).	6	15%
IV	**Organising for decision making:** Nature of organizing, organization levels and span of control in management Organisational design and structure –departmentation, line and staff concepts (3 Hrs.) Limitations of decision making- Evaluation and selecting from alternatives- programmed and non programmed decisions - decision under certainty, uncertainty and risk-creative process and innovation (3 Hrs.)	6	15%
SECOND INTERNAL EXAMINATION			
V	**Staffing and related HRD Functions:** definition, Empowerment, staff – delegation, decentralization and recentralisation of authority – Effective Organizing and culture-responsive organizations –Global and entrepreneurial organizing (3 Hrs.) Manager inventory chart-matching person with the job-system approach to selection (3 Hrs.) Job design-skills and personal characteristics needed in managers-selection process, techniques and instruments (3 Hrs.)	9	20%
VI	**Leading and Controlling:** Leading Vs Managing – Trait approach and Contingency approaches to leadership - Dimensions of Leadership (3 Hrs.) - Leadership Behavior and styles – Transactional and Transformational Leadership (3 Hrs.) Basic control process- control as a feedback system – Feed Forward Control – Requirements for effective control – control techniques – Overall controls and preventive controls – Global controlling (3 Hrs.)	9	20%
END SEMESTER EXAM			

Question Paper Pattern

Max. marks: 100, Time: 3 hours .

The question paper shall consist of three parts

Part A: 4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)
Part B : 4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)
Part C: 6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.