INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

Dundigal, Hyderabad - 500 043

INFORMATION TECHNOLOGY

ASSIGNMENT

Course Name	**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**
Course Code	**A30504**
Class	II B. Tech I Semester
Branch	Information Technology
Year	2015 – 2016
Course Faculty	Mrs. B pravallika, Assistant Professor, IT

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

ASSIGNMENT - I

S. No	Question	Blooms Taxonomy Level	Course Outcome
	ASSIGNMENT-I UNIT-I		
1	a) **Illustrate** conditional proposition with a suitable example. b) What is logical equivalence? Articulate with an example	Understand	2
2	a) **Define** tautology? Examine whether $[(p \to q) \to r] \to [(p \to q) \to (p \to r)]$ is a tautology or not ? b) **Illustrate** the converse, inverse and contra positive of the following the propositions: i. $P \to (Q \to R)$ ii. $(P \wedge (P \to Q)) \to Q$	Apply	1
3	**Recall** automatic theorem proving and Show that S v R is a tautologically implied by $(p \vee q) \wedge (p \to r) \wedge (q \to s)$.	Knowledge	2
4	**Show** that RVS is valid conclusion from the premises: $CVD, (CvD) \to \sim H, \sim H \to (A^\wedge \sim B), (A^\wedge \sim B) \to RVS$	Apply	1
5	**Show** that	Apply	2

S. No	Question	Blooms Taxonomy Level	Course Outcome
	i) ~ (P↑Q)↔~P↓~Q ii) ~(P↓Q)↔~P↑~Q without using truth table ? **Express** p->(~p->q) i)in terms of '↑' only ii)in terms of '↓' only ?		
6	a) **Identify** the proposition (p ^ q) ~ (p v q) is a contradiction. b) **Explain** and Symbolize the following statements: i. all men are good ii. no men are good some men are good iv. some men are not good	Knowledge Understand	2
7	a) **Interpret** the disjunctive normal form of the formula: P↔Q? b) **Calculate** the value of: P↔Q in terms of {~,v} only ?	Understand Apply	1
8	**Illustrate** the free and bound variables. With an examples?	Apply	1

9	a) **Show** that if 'm' is an even integer then m+7 is an odd integer?
	 b) **Express** each of the following in symbolic form
	     i) all monkeys have tails
	 ii) no monkey have tail
	     iii) some monkey have tails
	 iv) some monkey have no tails
		Understand	1

10	**Define** tautology? Show that [(p $\rightarrow$ q) $\rightarrow$ r] $\rightarrow$ [(p $\rightarrow$ q) $\rightarrow$ (p $\rightarrow$ r)] is a tautology or not?	Apply	2
UNIT – II			
1	a) **Explain** a relation? Explain the properties of relations. b) List the operations on relations	Understand Knowledge	3
2	Examine the transitive closure of relation R= {(a, a) (a, b) (a, d) (b, a) (c, b) (a, c) (d, b) (d, c) (d, d) } by using warshal algorithm ?	Knowledge	5
3	Construct the hasse diagram for the divisibility relation i) A={3,6,12,36,72} ii) A={1,2,3,5,6,10,15,30}	Apply	4
4	**Define** lattice? if A is finite set and P(A) us Power set then prove that (P(A),<=) is a lattice for i) A={a } ii)A={a,b}	Knowledge	4
5	**Describe** bounded lattice and distributive lattice **and** partial order relations?	Understand	3
6	**Calculate** the sets A & B given that A – B = { 1,2,4 } B – A = {7, 8 } and A U B = { 1,2,4,5,7,8,9}.	Apply	4
7	**Solve** that, let A be a given finite set and p(θ) its power set. Let <= be the inclusion relation on the elements p(θ) draw the hasse diagram of (p(A),<=) i)A={a} ii)B={a,b} iii)C={a,b,c} iv)D={a,b,c,d}	Apply	5
8	**Construct** the hasse diagram represented with positive divisors of 36?	Apply	5
9	**Define** function and find the inverse of the function i) f(x)=10/5√7-3x ii) 4.e$^{(6x+2)}$	Knowledge	4
10	**Illustrate** with an example of each a) onto function b) one to one function c) bijective function d) constant function	Apply	3
UNIT – III			
1	**Define** sum rule and product rule?	Remember	6

S. No	Question	Blooms Taxonomy Level	Course Outcome
2	**Find** the no of ways we can select the counting rules from the class which having 6 boys and 5 girls	Remember	6
3	**Find** that if a person having 4 trousers and 3 shirts then find the no of ways of selecting a pair?	Remember	7
4	**Find** the solutions for following a) the person has four transport modems for a travelling from(hyd to Chennai) and three transport modems travelling from(Chennai to Bangalore) then find the no of ways of the person travelling from (hyd-banglore) via Chennai b) expand inclusion-exclusion principle?	Remember	7
5	a)**Find** number of ways of forming three digit number from 5 elements b) **Find** the number of ways of selecting 9 committees with 7 persons?	Remember	8
6	**Find** the number of ways of arranging 5 boys and 4 girls in a line and the line can start with boy and end with boy also?	Remember	9
7	**Find** the no of ways of forming committee of 5 persons from a group of 5 Indians 4 Russians such that three are at least 3 Indians int committee?	Remember	9
8	**Find** the co-efficient of $a^2b^3c^3d^3$ in the expansion of $(a+2b-3c+2d+5)^{16}$?	Remember	10
9	**Define** pigeon-hole principle? In a group of 13 children there must be least two children who were born in the same month?	Remember	10
10	a) **Find** that if 8 cars 26 passengers at least one car has 4 or more passengers? b) A library contains 30 books whose total no of pages are 2560 show that one of the book must have at least 86 pages?	Remember	10
	UNIT – IV		
1	**Find** the generating functions for the following sequences i)1,2,3,4 ii)1,-2,3,-4 iii)0,1,2,3 iv)0 ,1,-2,3,-4	Remember	13
2	**Find** the generating function for the following sequence i)$1^2,2^2,3^2$,---------- ii)$0^2, 1^2,2^2,3^2$,-----------	Remember	12
3	**Find** the generating function for the following sequence i)$1^3,2^3,3^3$,------------ii)$0^2, 1^3,2^3,3^3$,-------------	Remember	13
4	**Find** the generating function for the following sequence 1,1,0,1,1,1	Remember	13
5	**Find** the co-efficient of x^{12} of $x^3(1-2x)^{10}$?	Remember	12
6	**Find** the co-efficient fo x^5 of $(1-2x)^{-7}$?	Remember	12
7	**Find** the co-efficient of x^{27} of i)$(x^4+x^5+x^6…………)^5$ ii))$(x^4+2x^5+3x^6…………)^5$	Remember	13
8	**Solve** the recurrence relation $a_n=a_{n-1}+n^3$,n>=1 where a_0=5 by using substitution method?	Understand	12
9	**Solve** the recurrence relation $a_n=a_{n-1}+3n^2$ +3n+1 ,n>=1 where a_0=5 by using substitution method ?	Apply	12
10	**Solve** the recurrence relation $a_{n+1}=8a_n$,n>=0 where a_0=4	apply	12
	UNIT – V		
1	**Define** graph? Explain	Remember	12

S. No	Question	Blooms Taxonomy Level	Course Outcome
	i) matrix representation ii) incidence matrix iii) linked list representation of graph		
2	**Define** tree and spanning tree ?find all spanning trees of k$_4$	Remember	12
3	**Explain** Breadth first search algorithm with an example?	Understand	13
4	**Explain** depth first search algorithm with an example?	Understand	12
5	**Explain** Prim's algorithm with an example?	Understand	13
6	**Explain** Krushkal's algorithm With an example?	Understand	13
7	a) **Define** graph? And explain Eulerian graph? b) **Define** graph? And explain Euler path and Euler circuit?	Knowledge	13
8	a) **Explain** Hamiltonian graph? b) **Define** proper colouring? And define chromatic number?	Knowledge	13
9	a) **Define** isomorphism? And explain with an example? b) **Define** multigraph?	Knowledge	13
10	**Define** a) graph b) simple graph c) degree of vertex d) null graph e) isolated vertex f) pendent vertex g) self-loop h) order i) size j) regular graph k) complete graph	Knowledge	13

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