



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad – 500 043

COMPUTER SCIENCE AND ENGINEERING

ASSIGNMENT

Course Name	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Course Code	A30504
Class	II B. Tech I Semester
Branch	Computer Science and Engineering
Year	2016 – 2017
Course Faculty	Mr. Y Subba Rayudu, Assistant Professor, Ms. E Uma shankari, Assistant Professor

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	Questions	Blooms Taxonomy Level	Course Outcome
UNIT – I			
1	a) Illustrate conditional proposition with a suitable example. b) Define logical equivalence? Articulate with an example	Understand	2
2	Define tautology? Examine whether $[(p \rightarrow q) \rightarrow r] \rightarrow [(p \rightarrow q) \rightarrow (p \rightarrow r)]$ is a tautology or not ?	Apply	1
3	Illustrate the converse, inverse and contra positive of the following the propositions: i) $P \rightarrow (Q \rightarrow R)$ ii) $(P \wedge (P \rightarrow Q)) \rightarrow Q$	Apply	1
4	Recall automatic theorem proving and Show that $S \vee R$ is a tautologically implied by $(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow s)$.	Knowledge	2
5	Show that $R \vee S$ is valid conclusion from the premises: $C \vee D, (C \vee D) \rightarrow \sim H, \sim H \rightarrow (A \wedge \sim B), (A \wedge \sim B) \rightarrow R \vee S$	Apply	1
6	Show that i) $\sim (P \uparrow Q) \leftrightarrow \sim P \downarrow \sim Q$ ii) $\sim (P \downarrow Q) \leftrightarrow \sim P \uparrow \sim Q$ without using truth table ?	Apply	2
7	Express $p \rightarrow (\sim p \rightarrow q)$ i) in terms of ' \uparrow ' only ii) in terms of ' \downarrow ' only ?	Apply	2

S. No	Questions	Blooms Taxonomy Level	Course Outcome
8	Identify the proposition $(p \wedge q) \sim (p \vee q)$ is a contradiction.	Knowledge	2
9	Explain and Symbolize the following statements: i. all men are good ii. no men are good iii. some men are good iv. some men are not good	Understand	1
10	Interpret the disjunctive normal form of the formula: $P \leftrightarrow Q$?	Understand	1
11	Calculate the value of: $P \leftrightarrow Q$ in terms of $\{\sim, \vee\}$ only ?	Apply	1
12	Illustrate the free and bound variables. With an examples?	Apply	1
13	Show that if 'm' is an even integer then $m+7$ is an odd integer?	Understand	1
14	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
15	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	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 $(P(A), \subseteq)$ 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 $A \cup B = \{1, 2, 4, 5, 7, 8, 9\}$.	Apply	4
7	Solve that, let A be a given finite set and $p(\theta)$ its power set. Let \subseteq be the inclusion relation on the elements $p(\theta)$ draw the hasse diagram of $(p(A), \subseteq)$ 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) $f(x) = 10/5\sqrt{7-3x}$ 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
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	Remember	8
6	b) Find the number of ways of selecting 9 committees with 7 persons?	Remember	8
7	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
8	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

ASSIGNMENT – II

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
UNIT – III			
1	Find the no of ways forming a 4 letter word from the word MIXTURE in which at least one letter is repeated?	Remember	10
2	How many ways we can distribute 12 identical pencils to 4 children such that every children get at least one pencil?	Remember	11
3	Find the co-efficient of x,y,z^2 in the expansion of $(2x-y-z)^4$ using multinomial theorem ?	Remember	11
4	Find the co-efficient of $a^2b^3c^3d^5$ in the expansion of $(a+2b-3c+2d+5)^{16}$?	Remember	10
5	Show that inclusion-exclusion principle? $n(T_1 \cup T_2) = n(T_1) + n(T_2) - n(T_1 \cap T_2)$?	Remember	11
6	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
7	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
7	Find the co-efficient fo x^5 of $(1-2x)^{-7}$?	Remember	12
9	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
10	Solve the recurrence relation $a_n = a_{n-1} + n^3$, $n \geq 1$ where $a_0 = 5$ by using substitution method?	Understand	12
11	Solve the recurrence relation $a_n = a_{n-1} + 3n^2 + 3n + 1$, $n \geq 1$ where $a_0 = 5$ by using substitution method ?	Apply	12

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
12	Solve the recurrence relation $a_{n+1}=8a_n, n \geq 0$ where $a_0=4$	apply	12
13	solve the recurrence relation $a_n-7a_{n-1}+10a_{n-2}=0, n \geq 2, a_0=10, a_1=41$	apply	15
14	Solve the recurrence relation $a_n-9a_{n-1}+26a_{n-2}+24a_{n-3}=0, n \geq 3, a_0=0, a_1=1, a_2=10$	apply	14
15	Solve the recurrence relation $a_n=3a_{n-1}+2n, a_1=3$	apply	15
16	Solve the recurrence relation $a_n-3a_{n-1}=n, n \geq 1, a_0=1$ by using generating function?	apply	14
17	Solve the recurrence relation $a_{n+1}-a_n=3^n, n \geq 0, a_0=1$ by using generating function?	apply	14
18	Solve the recurrence relation $a_{n+2}-2a_{n+1}+a_n=2^n, n \geq 0, a_0=1, a_1=2$ using generating function ?	apply	14
UNIT - V			
1	Define graph? Explain i) matrix representation ii) incidence matrix iii) linked list representation of graph	Remember	12
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 the terms 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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