2019

QUESTION BANK

S5 COMPUTER SCIENCE AND ENGINEERING

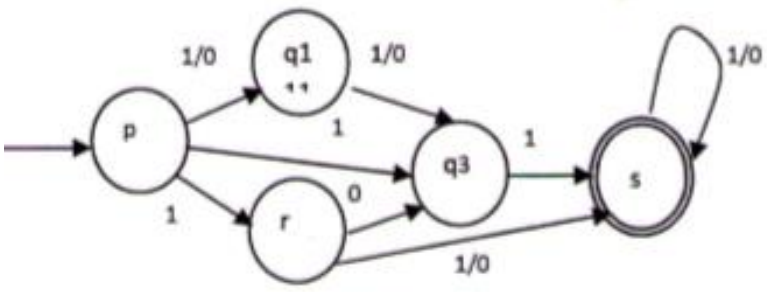
VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY TECHNICAL CAMPUS KILIMANOOR

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

INDEX

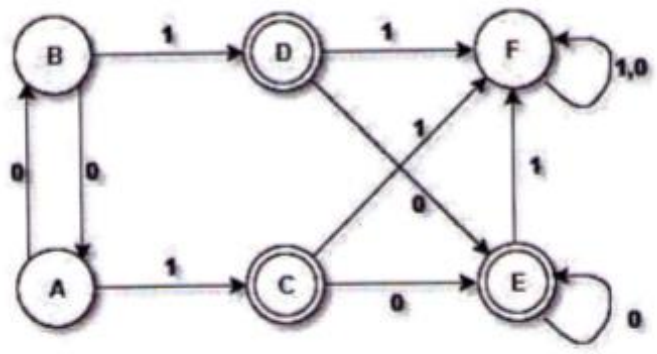
CS301 THEORY OF COMPUTATION

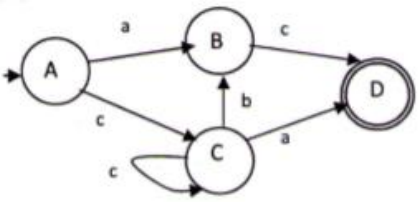
MODULE 1

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Define Non Deterministic Finite Automata? Compare its ability with Deterministic Finite Automata in accepting languages	3	DEC 17
2	Write the notations for the language accepted by DFA, NFA, e-NFA	3	DEC 17
3	Design a Finite state automata which accepts all strings over {0,1} with odd number of 1's and even number of 0's	5	DEC 17
4	Show the changes needed to convert the above designed automata to accept even number of 1's and odd number of 0's	4	DEC 17
5	Design a non-deterministic automata (with ε move)for the regular language that consist of all strings with at least two consecutive zeroes. Assume ∑={0,1}	3	APR 18
6	List some of the applications of automata theory	3	APR 18
7	Prove the equivalence of non-deterministic finite automata and deterministic finite automata	9	APR 18
8	Compare the transition functions of NFA and DFA	3	DEC 18
9	Explain in English language the language accepted by the DFA in above Question	3	DEC 18
10	Convert the NFA to DFA 	4.5	DEC 18

11	Prove the equivalence of NFA and e-NFA	4.5	DEC 18
12	Draw a six state DFA which can be minimized to a three state DFA where set of input symbols is {a, b, c}. Draw both the DFAs. Assume whatever is required	4.5	DEC 18

MODULE 2

Sl. No	**Questions**	**Marks**	**KTU/KU Month/Year**
1	Define Two-way finite automata	3	DEC 17
2	Construct Regular grammar for the regular expression : L= (a+ b)*(aa + bb)(a + b)*	5	DEC 17
3	List the closure properties of Regular sets	4	DEC 17
4	State Myhill-Nerode theorem. Minimize the following DFA by table method using Myhill-Nerode theorem describing the steps in detail 	9	DEC 17
5	Construct a regular expression for the language that consist of all strings ending with 00 .Assume ∑={0,1}	3	APR 18
6	Define regular grammar with suitable example	3	APR 18
7	Prove the equivalence of non deterministic finite automata with regular expression	9	APR 18
8	Construct a non-deterministic automata with **ε** moves for regular expression (0+1)*1	4	APR 18
9	Compare and contrast Mealy and Moore Machines (Justify with	5	APR 18

	Diagrams)		
10	What is the regular expression for the DFA  		APR 18
11	Can we use finite state automata to evaluate 1's complement of a binary number? Design a machine to perform the same	3	DEC 18
12	What is a Moore machine? How is it different from mealy machine	3	DEC 18
13	Prove the equivalence of regular expression and Finite state automata	4.5	DEC 18
14	What is Myhill Nerode Theorem?	4.5	DEC 18

MODULE 3

Sl. No	Questions	Marks	KTU/KU Month/Year
1	What do you mean by useless symbol in a grammar? Show the elimination of useless s;mbqls with an example	3	DEC 17
2	Define CFG for the following languages over the alphabets {a,b} i. L: { $a^{m+m}b^{m}c^{n}$n,m>0) ii. L contains all odd length strings only iii. L: { $0^{n}1^{n}2^{n}$, n>0 }	9	DEC 17
3	Prove that the following languages are not regular i. L - {0^{i2} such that i ≥1} is not regular ii. L = {a^{p} such that p is a prime number	9	DEC 17
4	Construct Context Free grammar for L={wcw^{R} | w in (a+b)*}, reverse of w is dented as w^{R}	3	APR 18
5	List conditions for symbols to become useful symbols in context free grammar	3	APR 18
6	Do the following	9	APR 18

	a. Derive any two representative strings with minimum length4 from the given context Free Grammar G=({S,A,B},{a,b},P,S) S →bA | aB A→bAA |aS |a B→aBB | bS | b b. Draw the derivation tree corresponding to string **aabbab** with respect to aforementioned grammar		
7	What is a derivation tree?	3	DEC 18
8	Is the grammar { E→E+E | E-E | id} ambiguous? Why	3	DEC 18
9	Construct the CFG for the union of the languages 0^n1^n and a^nb^n for n>0	4.5	DEC 18
10	Convert the grammar {S→AaCb | ABa, A→bAa | a, B →BaB |b, C→c} to Chomsky normal form	4.5	DEC 18

MODULE 4

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Which Normal Form representation of CFG will you prefer in converting CFG to NPDA? Why	3	DEC 17
2	Explain the different methods by which a PDA accepts a language	3	DEC 17
3	Can we construct a Deterministic PDA for the language ww^R. Justify your answer. Otherwise how can we modify this language to make it accepted by DPDA	9	DEC 17
4	Design a Push Down Automata for the language L= { a^nb^{2n} | n>0) Trace your PDA with n=3	9	DEC 17
5	List the conditions for Push Down Automata to qualify as deterministic Push Down Automata	3	APR 18
6	Do the following a. Construct Push Down Automata with empty stack as final condition for Context Free Language. L={ wcw^R |w in (a+b)*}	9	APR 18

	reverse of w is dented as w^R b. Describe all Instantaneous description from Initial ID (start state, **abcba**,initial stak symbol)|- to final ID(state,ε,ε) with respect to constructed push down automata		
7	Prove the equivalence of Push down automata and Context Free Grammar	9	APR 18
8	What is the difference between NPDA and DPDA	3	DEC 18
9	Is the language ww^R where w is string of zeroes and ones, accepted by DPDA? Why	3	DEC 18
10	Construct the PDA for the language $(0^n1^n)^*$	4.5	DEC 18
11	Give the formal definition of an NPDA	3	DEC 18
12	Show that NPDA and CFG are equivalent	6	DEC 18

MODULE 5

Sl. No	Questions	Marks	KTU/KU Month/Year
1	State pumping Lemma for context free language	5	APR 18
2	State and prove pumping lemma for context Free Languages	10	DEC 17
3	State pumping lemma for CFL. Mention one application of Pumping lemma	5	DEC 18
4	Consider L: {ww | w € {0, 1}}. Prove L is not a CFL.	5	DEC 18
5	Define formally Turing machine Model	5	APR 18
6	How does a Turing machine differ from PDA and FSA?	5	DEC 17
7	What is the instantaneous description for a Turing machine? Explain with an example	5	DEC 17
8	Do the following a. Design Turing machine to accept language L= $\{0^n1^n \mid n>0\}$ b. Describe all instantaneous descriptions (ID) from initial ID $\mathbf{q_001}$ to Final ID with respect to constructed TM. Assume $\mathbf{q_0}$ as start	6 4	APR 18

	state		
9	Construct a Turing machine that recognizes the language L= $\{a^n b^n c^n \mid n>0\}$	10	DEC 17
10	Do the following a. Design Turing machine to compute addition of two numbers. Assume unary notation for number representation b. Describe all instantaneous descriptions (ID) from initial ID: $\mathbf{q_0}$010 to Final ID: 00 with respect to constructed Turing Machine (assume $\mathbf{q_0}$ as initial state.)	6 4	APR 18
11	Design a Turing machine that determines whether the binary input string is of odd parity or not	5	DEC 18
12	Design a Turing machine that accepts $\mathbf{a^n b^m}$ where n>0 and m>0	5	DEC 18
13	a. What is a context sensitive grammar (CSG). Design a CSG to accept language Y= $\{0^n 1^n 2^n \mid n>0\}$ b. Define Linear Bound Automata	6 4	DEC 17

MODULE 6

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Write a note on Recursive Enumerable Languages	5	DEC 17
2	Discuss about Universal Turing Machines? Explain the significance of universal Turing machine	5	DEC 18/ APR 18
3	Explain Chomsky hierarchy and corresponding type0, type1, type2 and type 3 formalism	5	DEC 18
4	Let L = {x | x ϵ (a + b + c)* and $\|x\|_a=\|x\|_b = \|x\|_c$ }. What class of language does L belong? Why? What modification will you suggest in the Grammar to accept this language	4	DEC 18
5	Discuss the undecidable problems About Turing Machines	10	DEC 18
6	Show that normal single tape Turing machine can perform computations performed by multi-tape Turing machine (informal	5	DEC 18

	explanation is sufficient).		
7	What is nondeterministic Turing Machine?	5	DEC 18
8	How does the Universal Turing machine simulate other Turing machines	5	DEC 18
9	Compare and contrast recursive and recursively enumerable languages	5	APR 18
10	Prove that union of two recursive languages is recursive	5	APR 18
11	Explain the significance of halting problem.	5	APR 18
12	Explain why Halting problem is unsolvable problem	5	DEC 18
13	Explain general notations for productions of each formal language from Chomsky hierarchy		APR 18
14	What is a recursive language? Give an example	5	DEC 18
15	Prove that complement of a recursive language is recursive	5	APR 18

CS303 SYSTEM SOFTWARE

MODULE 1

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Explain the instruction format and addressing modes of SIC. What are the various addressing modes supported by SIC/XE	3	DEC 17 DEC 18
2	Explain program relocation with an example	3	DEC 17
3	Write a sequence of instructions for SIC/XE to divide BETA by GAMMA and to store Quotient in ALPHA and remainder in DELTA	3	DEC 17
4	What are assembler directives? List any five assembler directives in SIC machine	4	DEC 17, APR 18, MAY 19
5	Write notes on the architecture of SIC/XE	4	DEC 17, APR 18
6	Let Numbers be an array of 100 words. Write a sequence of instructions for SIC to set all 100 elements of the array to 1	5	DEC 17
7	Write notes on SIC machine architecture. Compare the features of standard SIC and SIC/XE architecture	3 9	APR 18 MAY 19
8	Write a subroutine for SIC/XE that will read a record into a buffer. The record may be any length from 1 to 100 bytes. The end of record is marked with "null" character (ASCII code 00). The subroutine should place the length of record into a variable named LENGTH. Use immediate addressing and register –to –register instructions to make the process efficient as possible.	4	APR 18
9	Write a sequence of instructions for SIC to set ALPHA = BETA*9 + GAMMA	3	DEC 18
10	List out the various used in SIC along with their purpose	3	DEC 18
11	Distinguish between Application software and system software.	3	DEC 18
12	What are the functions of operating systems	3	DEC 18,

			MAY 19
13	Let A, B and C are array of 10 words each. Write a SIC/XE program to add the corresponding elements of A & B and store the result in C.	6	DEC 18

MODULE 2

Sl. No	Questions	Marks	KTU/KU Month/Year
1	What is meant by forward reference? How is it resolved by two pass assembler.	3	DEC 18, MAY 19
2	Describe data structures used in the two pass SIC assembler program	3	DEC 17
3	Give algorithm for pass 1 of a two pass SIC assembler	5	DEC 17
4	With suitable examples, how the different instruction formats and addressing modes of SIC/XE are handled during assembling	5	DEC 17
5	Describe the format of object program generated by the two-pass SIC assembler algorithm	5	DEC 17
6	Explain the format of the object program generated by a two pass SIC assembler ,highlighting the content of each record type	3	MAY 19
7	Explain the data structures used and their purposes in a two- pass assembler	3	MAY 19
8	With the aid of an explain the second pass of a two pass algorithm	6	DEC 18
9	Explain the working of any one type of one pass Assembler	6	DEC 18
10	Explain the syntax of records in the Object Program file	3	APR 18

MODULE 3

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Write notes on multi pass assembler with example	5	APR 18, DEC 17

2	Distinguish between program blocks and control section How the assembler handles multiple program blocks	9	DEC 18
3	Write notes on MASM assemblers	3	DEC 17
4	Explain the concept of single pass assembler with a suitable example	5	DEC 17
5	What are control section of a program block? What are the advantages of using them? Explain with proper example the purpose of EXTREF and EXTDEF assembler directives	4	DEC 17, DEC 18
6	Distinguish between Program blocks and control section. How does the assembler handle multiple program blocks?	7	DEC 18
7	List out the basic functions of assemblers with proper examples	4	APR 18
8	Explain two passes of assembler algorithm with proper example	9	APR 18
9	What is literal? How is it handled by assembler?	3	APR 18
10	Explain how external references are handled by assembler	5	APR 18
11	With the help of an example explain how to find target address during assembling in each case	6	DEC 18

MODULE 4

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Give algorithm for an absolute loader	3	DEC 17, APR 18, MAY 19
2	Write notes on Dynamic linking. Explain with example	4	APR 18, MAY 19
3	Differentiate between linkage loaders and linkage editors	3	DEC 18
4	Describe the data structures used for linking loading algorithm. Give algorithm for pass1 of the linking loader	5	DEC 17
5	Write notes on machine independent loader features	4	DEC 17
6	Explain the concept of program relocation with an example	4	MAY 19

7	Write the algorithm for Pass 2 of a Linking loader	6	MAY 19
8	List and explain different machine independent features of loader. Explain the working of one type of one pass Assembler	9	DEC 18
9	Explain the algorithm of pass1 of a linking loader	6	APR 18
10	What is the use of bitmask in program relocation	3	DEC 18
11	Given an idle computer with no programs in memory, how do we get things started?	3	DEC 18
12	Explain the concept of Automatic library search	3	May 19

MODULE 5

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Explain the concept of macro definition and expansion with the help of an example	5	DEC 17
2	Give algorithm for one pass macro processor and explain the process. Describe the data structures used in one pass macro processor	10	DEC 17 DEC 18
3	How are unique labels generated in macro expansion? Explain conditional macro expansion with an example	10	DEC 17, APRIL2018
4	Explain recursive macro expansion with an example	5	DEC 17, APR 18
5	Explain macro processor algorithm	10	APR 18
6	What are the different data structures used in the implementation of the macro processor algorithm? Give examples.	5	APR 18
7	Differentiate between keyword and positional macro parameters	3	DEC 18
8	Is it possible to include labels in the body of macro definition? Justify your answer. Write short note on concatenation of macro parameters within a character string	10	DEC 18
9	A code segment need to be repeatedly used in various parts of	10	MAY 19

	assembly language program and fast execution is also needed. Would you use a macro or a subroutine ?Justify your answer with the help of examples. List and explain the different design options available for macro-processors		
10	Certain macro processor feature are independent of the machine architecture .Give the details of such machine independent macro-processor features	10	MAY 19

MODULE 6

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Describe any two commonly used debugging methods	5	DEC 17
2	Give general design of a device driver	5	DEC 17
3	Write notes on debugging functions and capabilities of an interactive debugging system. Differentiate between character and block devices	10	DEC 17, APR 18, DEC 18
4	Explain the structure of text editors with the help of example and diagram	5	DEC 17, MAY 19
5	Explain various text editors .Write notes on the user interface of a text editor	5	DEC 17, APR 18
6	What is a debugger ?Explain the different debugging methods in detail	10	APR 18
7	What is a device driver? What are the major design issues of a device driver?	5	DEC 18
8	Draw the structure of a typical text editor and describe the functions of each block. List out the main four tasks associated with the documented editing process.	10	DEC 18
9	List out the criteria that should be met by the user interface of an efficient debugging system	4	DEC 18
10	A new device is plugged into the system. Which is the appropriate	10	MAY 19

	system software needed for the proper working of the new hardware? Give its functionalities and general architecture		
11	Write down the situations where debugging by induction ,deduction and backtracking are used, explaining each process	10	MAY 19

CS305 MICROPROCESSORS AND MICROCONTROLLERS

MODULE 1

Sl. No	Questions	Marks	KTU/KU Month/Year
1	List the registers used in 8086 microprocessor.	3	DEC 17
2	Describe the functions of INTR, READY and HOLD signals.	3	DEC 17
3	Draw and explain the internal block diagram of 8086.	9	DEC17
4	Give architectural and signal difference between 8086	4	DEC17
5	What are the flag bits available in flag register of 8086?	3	APR. 18
6	With the help of timing diagram shows the transition of control signals involved in the I/O read operation of 8086 in minimum mode.	3	APR. 18
7	Explain the physical and logical memory organization of 8086?	9	APR. 18
8	How does the 8086 processor access a word from an odd memory location? Howmany memory cycles does it take?	3	DEC18
9	Find the physical address of the destination operands referred in the following instructions, if DS=0223H, DI=0CCCH and SI=1234H a) MOV [DI], AL b) MOV [SI][56H], BL	3	DEC18
10	Draw the Memory Read timing diagram of 8086 in Minimum mode. Describe the status of the relevant signals during each clock period.	9	DEC18

MODULE 2

Sl.No	Questions	Marks	KTU/KU Month/Year
1	State the significance of assembler directives in an assembly language program with suitable examples.	3	DEC17
2	Compare Macro and Subroutine.	3	DEC17

3	What are the different addressing modes supported by 8086.Explain with examples.	9	DEC17 DEC18
4	Write a program to find the largest number from an unordered array of 8-bit numbers.	5	DEC17
5	With the help of an example state the differences in the functioning aspects of the instructions SHR and SAR of 8086.	3	APR. 18
6	Describe any three addressing modes used in 8086.	3	APR. 18
7	Write an 8086assembly language program to check whether a string is palindrome or not. Assume that the string and its length are stored at known memory locations.	9	APR. 18
8	Write 8086 assembly language program to find the count of even and odd numbers from a set of 10 sixteen bit numbers stored in location staring from a known address. Store the results in two different locations.	9	DEC 18
9	What is the difference in the execution of an 8086 intersegment and intrasegment CALL instruction?	3	DEC18
10	Define the functions of the following 8086 assembler directives: a) ASSUME b) EQU c) OFFSET	3	DEC18

MODULE 3

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Describe interrupt cycle of 8086/8088 with neat diagram.	3	DEC17
2	Give description about maskable and non maskable interrupt.	3	DEC17
3	Interface two 4K*8 EPROMS and two 4K*8 RAM chip with 8086.Select suitable address maps.	6	DEC17
4	Give a brief description about Interrupt Service Routine.	3	DEC17
5	What are the disadvantages of polling scheme over interrupt scheme?	3	APR.18
6	What is an Interrupt Vector Table (IVT)? Provide a diagrammatic representation of the IVT of 8086.	3	APR.18

7	With the help of a diagram explain the different blocks of 8259 Programmable Interrupt Controller.	9	APR.18
8	What are the five dedicated interrupts of 8086?	5	APR.18
9	Write the condition(s) which cause 8086 to perform a Type 1, Type 2 and Type 3 interrupts.	3	DEC18
10	Discuss 8086 interrupt acknowledgement cycle	3	DEC18
11	Draw the architectural block diagram of 8259 Programmable Interrupt Controller and explain the role of each functional part.	9	DEC18
12	What do you mean by Interrupt Vector Table (IVT)? The starting address for a type 7 interrupt-service procedure is 1112:1314. Show where and in what order this address should be placed in the 8086 IVT.	5	DEC18

MODULE 4

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Mention the salient features of basic I/O mode operation of 8255.	3	DEC17
2	Compare I/O mapped and memory mapped interfacings.	3	DEC17
3	Draw the internal architecture of 8299 and explain.	9	DEC17
4	Describe different modes of operation of peripheral ICs:8255 and 8259.	6	DEC17
5	What is DMA? State the sequence of operations performed by DMA controller in DMA transfer operation.	3	APR.18
6	What are the different operational modes of 8279.	9	APR.18
7	List any four features of 8257 DMA controller.	4	APR.18
8	Write notes on scanned keyboard with 2-key lock out of 8279 keyboard/display controller.	3	DEC18
9	Describe the control word format of 8255 PPI.	4	DEC18
10	Design an interface with an 8086 CPU and two chips of 16*8 EPROM and two chips of 32*8 ROM. Select the starting address of EPROM suitably. The RAM address must start at 00000H	9	DEC18

MODULE 5

Sl. No	Questions	Marks	KTU/KU Month/Year
1	What are the different types of micro controllers?	5	DEC17
2	What factors are needed to be considered for selecting a microcontroller?	5	DEC17
3	Give brief description of memory and I/O addressing of 8051.	10	DEC17
4	With the help of a block diagram describe the different components of 8051.	10	APR.18
5	Consider four LEDs connected to the lower 4 bits of Port P0 of 8051 microcontroller. Assume that the LEDs will glow if the corresponding bit is 1. Write an 8051 program which makes the group of LEDs to function as 4-bit Ring Counter. The program should iterate to display the Ring Counter sequence five times continuously and then exit. (Hint: 4bit Ring Counter sequence is 1000, 0100,0010 and 0001.	10	APR.18
6	What are the different addressing modes supported by 8051?	5	DEC17
7	What is a microcontroller? Distinguish between a microcontroller and a microprocessor	5	APR.18
8	How the 8051 differentiate between internal and external program memory?	1	DEC18
9	Discuss the selection criteria of a typical microcontroller	4	DEC18
11	Discuss the structure of internal data memory (RAM) of 8051.	5	DEC18
12	What is the size of 8051 Stack Pointer (SP)? Discuss the operation of 8051stack.	4	DEC18

MODULE 6

Sl. No	Questions	Marks	KTU/KU Month/Year

1	Draw internal architecture of 8051 with brief description.	10	DEC17
2	Draw internal architecture of 8254/8253 with brief description.	10	DEC17
3	Write a 8051 based assembly language program to find the product of two 2*2 matrices.	10	DEC17
4	Describe the architecture and functionalities of 8253 interval timer.	10	APR.18
5	Describe the program status word (PSW) of 8051.	3	DEC18
6	What are the five different categories of 8051 instruction set? Explain each category with appropriate examples	10	APR.18
7	What are the five different interrupts in 8051?	5	APR.18
8	Write an 8051 program to find the sum of digits of an 8bit unsigned decimal number.	5	APR.18
9	What is the difference between LCALL and ACALL instructions?	2	DEC18
10	Write an 8051 assembly language program to find the largest of ten numbers stored in RAM location 47H onwards. Output the result in port1.	6	DEC18
11	Is “DIV A, R1” a valid instruction? Justify your answer.	2	DEC18
12	How many interrupts have been provided in 8051? Explain the necessary conditions which cause these interrupts to be generated. Also arrange them in decreasing order of priority	7	DEC18

CS307 DATA COMMUNICATION

MODULE 1

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Write any four issues encountered in the design of communication systems	3	KU
2	What do you mean by Nyquist bandwidth and Shannon capacity formula	3	KU
3	Define the terms - Direct Link, Point-to- point link, full duplex mode, half duplex mode	3	DEC 17
4	Define simplex, half duplex and full duplex transmission mode. Give one example for each.	3	DEC 17, APR 18
5	List and explain different factors which determine the performance of communication in a network?	3	DEC 17, APR 18
6	List various impairments and explain how they affect information carrying capacity of a communication link?	4	, DEC 17
7	Define Channel Capacity. What key factors affect highest data rate for noiseless channel and noisy channel?	4	APR 18
8	Signal to Noise Ratio is often given in decibels. Assume SNR db=36 and the channel bandwidth is 2Mhz. Calculate theoretical channel capacity?	5	APR 18
9	What is the channel capacity for a teleprinter channel with a 300-Hz bandwidth and a signal-to-noise ratio of 3 dB, where the noise is white thermal noise?	3	DEC 18
10	What is Bandwidth? A periodic signal has a Bandwidth of 20 Hz. The Highest frequency is 60 Hz. What is the lowest Frequency? Draw the Spectrum if the signal contains all frequencies of same amplitude.	3	DEC 18
11	Differentiate attenuation and Delay Distortion.	3	DEC 18

12	What is the thermal noise level of a channel with a bandwidth of 10 KHz carrying 1000 Watts of power operating at 50^{o}C?	5	DEC 18

MODULE 2

Sl. No	Questions	Marks	/KU Month/Year
1	Briefly describe terrestrial microwave	4	DEC 18
2	Briefly explain NRZ-L and NRZ-I schemes for digital to digital encoding	4	DEC 17
3	What do you mean by bipolar AMI schemes for encoding ? What are its merits and demerits?	4	DEC 17
4	Write physical and transmission characteristics of Optical Fibre Cable guided transmission media.	3	DEC 17
5	What are the advantages of microwave transmission over radio wave transmission?	3	DEC 17
6	Explain the wireless propagation techniques	15	DEC 17
7	How does cross talk occurs in twisted pair cables? Give the purpose of CAT5e,CAT6,CAT7 twisted pair cables.	5	DEC 17
8	Show that doubling the distance between transmission antenna and receiving antenna attenuates the power received by 6dB.	4	DEC 17
9	Mention the purpose of cladding in Optical Fibres?	3	DEC 18
10	For a parabolic reflective antenna operating at 12 GHz with a diameter of 2 ,Calculate the effective area and the antenna gain	3	DEC 18
11	Briefly discuss Line of Sight Propagation.	3	DEC 18
12	Assume that a TV picture is to be transmitted over a channel with 4.5 MHz Bandwidth and a 35 dB SNR Ratio. Find the capacity of the channel.	5	DEC 18
13	Explain the following terms: i) Direct broadcast satellite (DBS) ii) Isotropic antenna	7	DEC 18

MODULE 3

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Give the significance of delta modulation over pulse code modulation during the process of transforming analog data in to digital signal.	3	DEC 17
2	Show the equivalent analog sine-wave pattern of the bit string 00110101 using amplitude shift keying, frequency shift keying and phase shift keying	3	DEC 17
3	For the bit stream 11000110010, sketch the wave form for each of the code of NRZ-I.NRZ-L, Bipolar-AMI, Pseudoternary, Manchester, Differential Manchester.	5	DEC 17
4	Explain the modulation technique used in Asymmetric Digital Subscriber Line(ADSL) and cable modems	4	DEC 17
5	With suitable example explain the working principle of Code division multiplexing for CDMA technology.	5	DEC 17
6	Describe the scrambling technique B8ZS	5	DEC 17
7	State Sampling theorem. With help of suitable diagrams, explain the process of transforming analog data in to digital signal using Pulse Code Modulation technique.	5	DEC 17
8	Indicate some significant differences between broadcast radio and microwave.	3	DEC 17
9	Find the Bandwidth for a signal transmitting at 12 Mbps for QPSK. The value of d=0.	3	DEC 18
10	Encode the given bit stream using NRZ-I. 100010001111	5	DEC 18
11	What is polar NRZ line encoding? What are its variations?	5	DEC 18
12	Differentiate amplitude modulation and frequency modulation	8	DEC 18

MODULE 4

Sl. No	Questions	Marks	KTU/KU Month/Year
1	What type of multiplexing is preferred in optical fiber communication? Justify your answer	3	DEC 17, APR 18
2	What do you meant by single bit error and burst error	3	APR 18
3	Explain time domain and frequency domain concept of a signal in a communication system	5	DEC 17
4	How Time division Multiplexing (TDM) handle disparity in the input data rate, if data rate of all input lines are not same?	5	DEC 17
5	Explain major types of noise occur during data transmission, which causes errors.	5	DEC 17
6	What are the advantages of using multiplexing in data communication?	5	DEC 17
7	How does a synchronized time division multiplexer stay synchronized with de-multiplexer on receiving end?	3	DEC 17
8	Explain the frame format of Synchronous Optical Network (SONET) for the version SDH.	4	DEC 17
9	With suitable examples explain sliding window error control mechanism in data communication.	5	DEC 18
10	What is CDMA? Explain.	5	KU
11	Explain Space Division Multiplexing.	5	DEC 17
12	Differentiate between Synchronous TDM and Statistical TDM. Why is a statistical time division multiplexer more efficient than a synchronous time division multiplexer?	5	DEC 17
13	With a neat Sketch discuss the various steps involved in PCM	5	DEC 17
14	Given the bit pattern 101110001. Encode the stream using BFSK and QPSK.	5	DEC 18

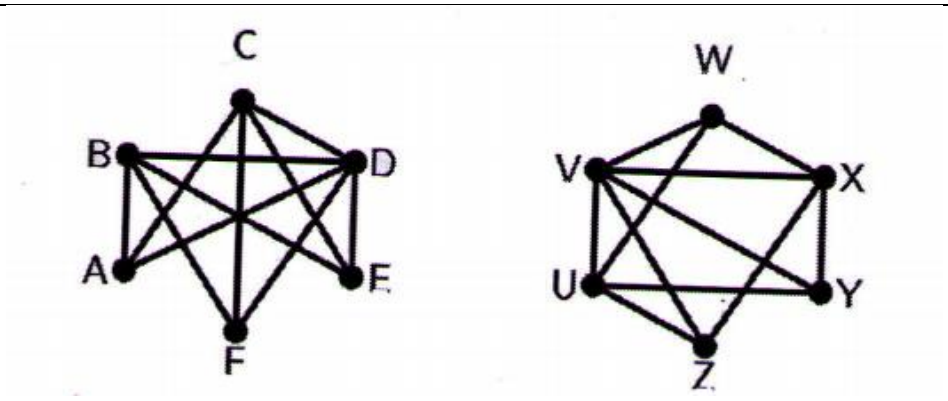
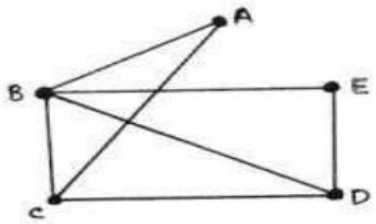
15	Explain frequency division multiplexing. How is interference avoided by using FDM?	5	DEC 18
MODULE 5			
Sl. No	**Questions**	**Marks**	**KTU/KU Month/Year**
1	For a parabolic reflective antenna with a diameter of 2m, operating at 12 GHz. Calculate the antenna gain? Given effective area= 56π.	5	DEC 17
2	Explain with suitable diagram, how asynchronous and synchronous connections are used in data communication.	5	DEC 17
3	Why would you expect a CRC to detect more errors than a parity bit?	5	DEC 17
4	For P=110011 and M=11100011, Find CRC.	5	DEC 17
5	What are the different architectural components in public communication network? Explain its working principle.	5	DEC 18
6	Given the dataword 1001001111 and the devisor 10111,show the generation of the CRC codeword at the sender site using binary division.	5	DEC 18
7	Calculate the hamming pairwise distance among following codewords; i) 00000,10101,01010 ii) 000000,010101,101010,110110	5	DEC 17
8	Explain the analog modulation techniques briefly.	5	DEC 17
9	Discuss Synchronous Optical NETwork (SONET).	5	DEC 17
10	In a CRC error-detecting scheme, choose divisor polynomial P: x 4 + x + l. Encode the bits 10010011011	7	DEC 18
11	Why would you expect a CRC to detect more errors than a parity bit?	3	DEC 18
12	What is meant by Hamming distance?	3	DEC 17
13	Derive a Hamming code for single bit error correction (For a data of length 7 Bit)	7	July 18
MODULE 6			
Sl.	**Questions**	**Mar**	**KTU/KU**

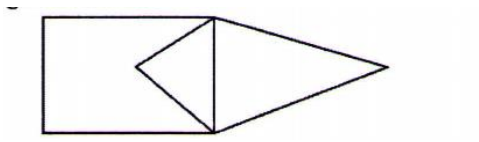
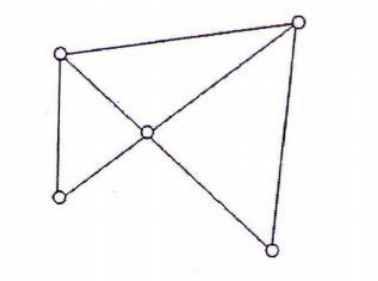
No		ks	Month/Year
1	Briefly explain packet switching	3	KU
2	How does spread spectrum eliminates narrow band interferences? Explain Direct Sequence Spread Spectrum(DSSS) technique.	5	DEC 17
3	Give any two reasons why baseband signal cannot be directly transmitted in a wireless system? How Frequency Hopping Spread Spectrum(FHSS) spread the baseband signal for transmission.	5	DEC 17
4	Explain the datagram approach for packet switching network. What is the significance of packet size in packet switching network?	5	DEC 17
5	List four major components of packet switch and write their function	5	DEC 17
6	With suitable example illustrate working of virtual circuit approach for packet switching	5	DEC 17
7	Discuss synchronous transmission. How is synchronization provided for synchronous transmission? What is a major disadvantage of asynchronous transmission?	10	DEC 18
8	Explain the difference between datagram and virtual circuit operation	7	DEC 18
9	What is the significance of packet size in a packet-switching network?	3	DEC 17
10	What are the advantages of packet switching compared to circuit switching.	7	DEC 17
11	What is meant by setup phase in circuit switching?	3	DEC 17
12	Explain the following terms: i) DSSS ii) FHSS	10	DEC 18

CS309 GRAPH THEORY AND COMBINATORICS

MODULE 1

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Consider a graph G with 4 vertices: vl, v2, v3 and v4 and the degrees of vertices are 3, 5, 2 and 1 respectively. Is it possible to construct such a graph G? If not,why?	3	DEC 17
2	Draw a disconnected simple graph Gl with 10 vertices and 4 components and also calculate the maximum number of edges possible in Gl.	3	DEC 17
3	What are the basic conditions to be satisfied for two graphs to be isomorphic? Are the two graphs below isomorphic? Explain with valid reasons. 	6	DEC 17
4	Write any two applications of graphs with sufficient explanation .	3	DEC 17
5	Prove that the number of vertices of odd degree in a graph is always even.	3	DEC 18
6	Show that in a simple graph with n vertices, the maximum number of edges is n(n-l)/2 and the maximum degree of any vertex is n-1.	3	DEC 18
7	Define isomorphism between graphs? Are the two graphs below isomorphic? Justify	5	DEC 18

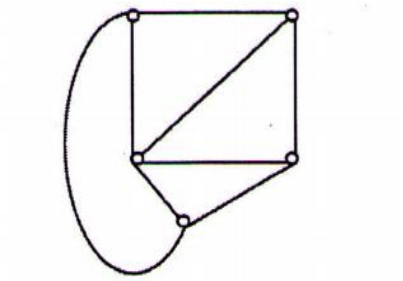
			
8	Prove that in a simple with n vertices and K components can have at most (n-k)(n-k+1)/2 edges.	3	Model Question
9	Prove that if a connected graph G is decomposed into two subgraphs gl and g2 there must be at least one vertex common between gl and g2.	3	DEC 18
10	Write a note on Konigsberg Bridge Problem	3	Model Question
11	A graph has exactly 10 vertices, 4 vertices of degree 3, 4 vertices of degree 2 and 2 isolated vertices. How many edges the graph have?	3	Model Question
12	19 students in a nursery school play a game each day, where they hold hands to form a circle. For how many days can they do this, with no students holding hands with the same playmates more than once? Substantiate your answer with graph theoretic concepts.	4	Model Question
13	Differentiate walk , path and circuit.	3	Model Question
14	Using the graph classify each sequence as a walk, a path or a circuit 1. E→C→D→E 2. A→C→D→E→B→A 3. B→D→E→B→C 4. A→B→C→D→B→A 	4.5	Model Question
MODULE 2			

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Consider the graph G given below:  Define Euler graph. Is G an Euler? If yes, write an Euler line from G	3	DEC 17
2	What is the necessary and sufficient condition for a graph to be Euler? And also prove it .	5	DEC 17
3	Define Hamiltonian circuits and paths with examples. Find out the number of edge-disjoint Hamiltonian circuits possible in a complete graph with five vertices.	5	DEC 17
4	State Travelling-Salesman Problem and how TSP solution is related with Hamiltonian Circuits?	5	Model Question
5	State Dirac's theorem for hamiltoniancity and why it is not a necessary condition for a simple graph to have a Hamiltonian circuit.	4	DEC 17
6	Differentiate between symmetric and asymmetric digraphs with examples and draw a complete symmetric digaph of four vertices.	4	Model Question
7	Differentiate between complete symmetric and complete asymmetric graph with an example each.	4	Model Question
8	State Dirac's Theorem and check its applicability in the following graph, G . 	3	DEC 17
9	Consider a complete graph G with l1 vertices. a) Find the maximum number of edges possible in G. b) Find the number of edge-disjoint Hamiltonian circuits in G	4	DEC 18

10	A connected graph G is a Euler graph if and only if it can be decomposed into circuits.	6	DEC 18
11	The total number of different, not edge disjoint, Hamiltonian circuits in a complete graph of n vertices is (n-1)!/2. Prove.	6	Model Question

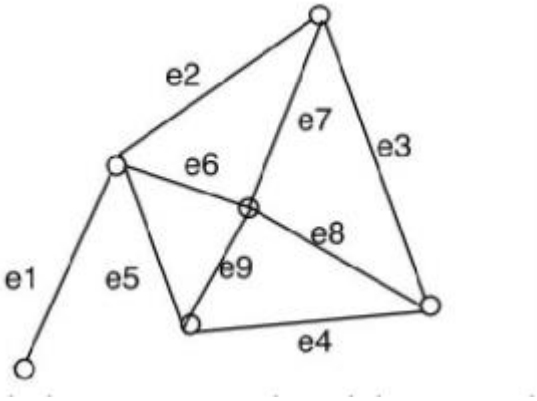
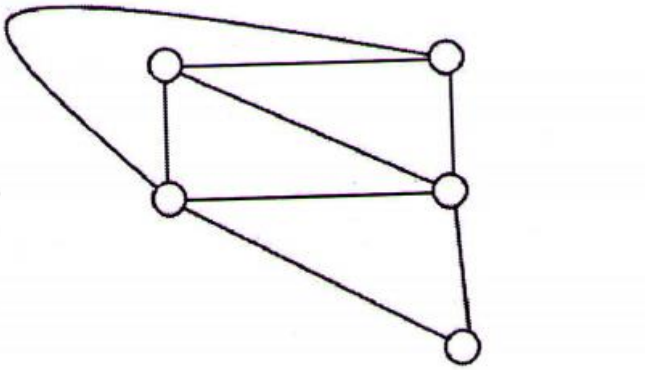
MODULE 3

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Find the number of possible labeled trees that can be constructed with 50 vertices.	2	DEC 18
2	Consider a binary tree with four weighted pendent vertices. Let their weights be 0.5, 0.12, 0.13 and 0.11. Construct a binary tree with minimum weighted path length.	3	DEC 18
3	Define spanning tree. Show that the edges forming a spanning tree in a planar graph G correspond to the edges forming a set of chords in the dual G*.	5	DEC 18
4	Draw the flow chart of spanning tree algorithm and also clearly mark the five conditions to be tested in connection with the spanning tree construction in the flowchart.	6	DEC 18
5	Prove that all trees will have either one or more centers.	3	Model Question
6	What is eccentricity of a node? How it is used in finding the center of a graph? Explain with examples.	3	Model Question
7	Show that a connected graph of n vertices and n edges has n-1 tree branches and e-n+1 chords.	5	Model Question
8	Find the number of edges and vertices of a graph G if its rank and nullity are 6 and 8 respectively. Define rank and nullity of a graph G.	6	Model Question
9	Define rooted binary tree with an example. Draw all trees of n labeled vertices for n=3 and n=4.	5	Model Question

10	Prove that a tree with n vertices has n-1 edges.	5	Model Question
11	Prove that the distance between vertices of a connected graph is a metric.	5	Model Question
12	Write an algorithm for finding the shortest spanning tree (Kruskal algorithm)	6	Model Question
13	List down any two properties of trees and also prove the theorem: A graph is a tree if and only if it is a minimally connected.	6	Model Question
14	Let G= (V,E) be a connected graph, and let T:=(V, S) be a spanning tree of G. Let e = (a, b) be an edge of G not in T. Prove that, for any edge f on the path from a to b in T, (V, (Su{e}) -{f}) is another spanning fee for G.	4	DEC 17
15	Define spanning trees. Consider the graph G given below and obtain any three spanning trees from G. Calculate the number of distinct spanning trees possible from a complete graph with n vertices. 	5	DEC 17

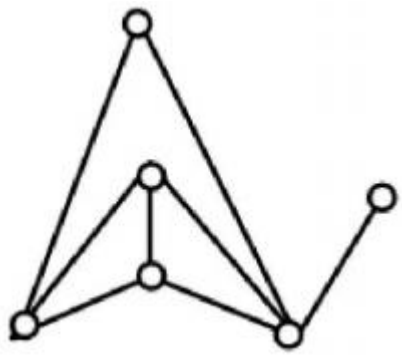
MODULE 4

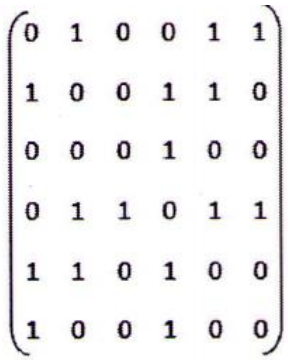
Sl. No	Questions	Marks	KTU/KU Month/Year
1	Prove the statement: Every cut-set in a connected graph G must also contain at least one branch of every spanning tree of G	3	DEC 17
2	List down the properties stating the relationship between the edges of graph G and its dual G	3	DEC 17
3	Define cut set. Find any four sets from graph G given below and also	5	DEC 17

	find the edge connectivity of G. 		
4	Draw two Kuratowski's graphs and also prove that Kuratowask's first graph is non planar using appropriate inequality.	4	DEC 17
5	Draw a geometric dual (G*) of G given and also write about the relationship between a planar graph G and its dual G* 	6	DEC 18
6	Prove the statement "Every circuit has an even number of edges in common with any cut-set".	4	DEC 18
7	Define edge connectivity and vertex connectivity.	3	Model Question
8	Show that a vertex v in a connected graph G is a cut vertex iff there exist two vertices x and y in such that every path between x and y passes through v.	5	Model Question
9	State and prove Cayley's theorem.	9	Model Question
10	Prove that : A graph has a dual if and only if it is planar.	7	Model Question

11	Prove that: The complete graph of five vertices is nonplanar.	6	Model Question
12	Write a short note on Connectivity and separability.	5	Model Question

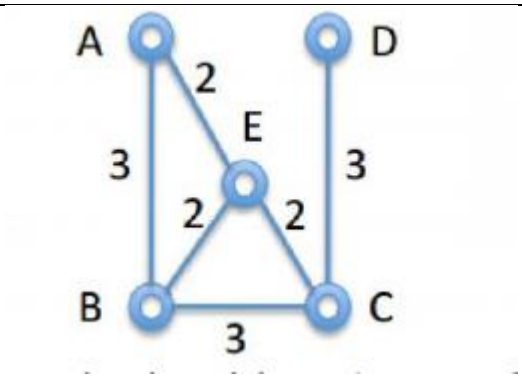
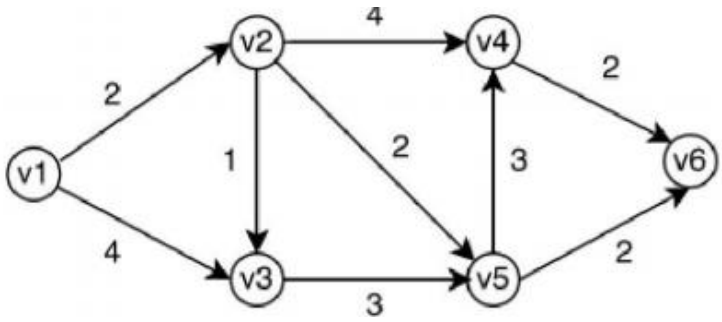
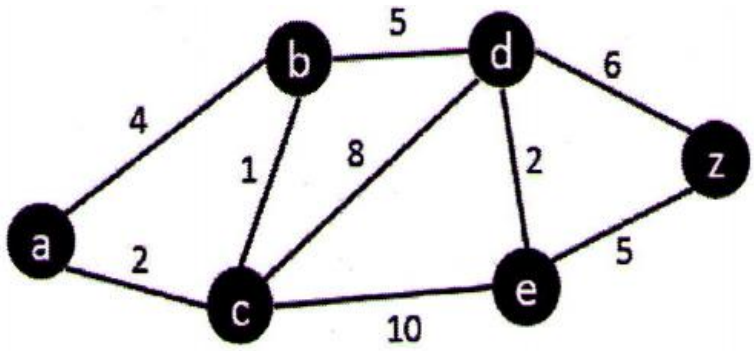
MODULE 5

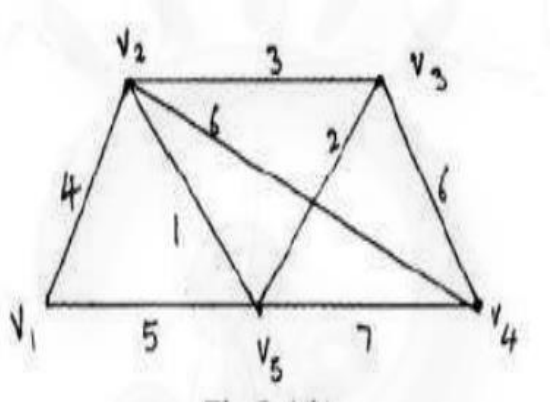
Sl. No	Questions	Marks	KTU/KU Month/Year
1	Derive the relationship between incidence matrix, fundamental circuit matrix and fundamental cut-set matrix representations of a graph.	10	Model Question
2	Write any two matrix representations of a graph.	10	Model Question
3 3	Prove that if B is a circuit matrix of a connected graph G with e edges and n vertices, rank of B=e-n+1	5	Model Question
4	List down any four properties of adjacency matrix.	4	DEC 18
5	Construct an adjacency matrix(x) for the following graph and also mention how the concept of edge sequences is described with $X^{3.}$ 	6	DEC 18
6	Define vertex connectivity and Edge connectivity.	4	Model Question
7	Two graphs Gl and G2 are isomorphic if and only if their incidence matrices A(Gl) and A(G2) differ only by permutation of rows and	6	DEC 17

	columns		
8	Let A and B be, respectively, the circuit matrix and incidence matrix of a self-loop-free graph G.Prove that A x B^T=0 (mod 2)	4	DEC 17
9	Explain circuit matrix and its properties.	5	Model Question
10	Let B and A be the circuit matrix and incidence matrix whose columns are arranged using the same order of edges. Show that every row of b is orthogonal to every row A.	5	Model Question
11	Write the properties of incidence matrix.	5	Model Question
12	Explain cut set matrix and path matrix.	5	Model Question
13	Define adjacency matrix and construct a graph from the following adjacency matrix: 	4	DEC 17

MODULE 6

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Draw the flow chart of minimum spanning tree algorithm.	7	DEC 17
2	Find MST from the graph given below by simply applying Kruskal's procedure.	3	DEC 17

			
3	Write the Dijkstra's shortest path algorithm. Apply this algorith to find the shortest path between v1 and v6. 	10	DEC 17
4	Write the Dijkstras Shortest Path Algorithm and apply this algorithm to find the shortest path between a and z. 	6	DEC 17
5	Write an algorithm to find the connectedness and components of a graph and analyse the complexity of the algorithm	10	Model Question
6	Explain Floyd warshall algorithm with suitable example.	10	Model Question
7	Using Prim's algorithm, find a minimal spanning tree for the following	10	Model Question

	weighted graph 		
8	Write an algorithm for the shortest path between all pairs of vertices	7	Model Question
9	Write an algorithm for Depth- first search on a graph	10	Model Question
10	Explain planarity with example.	5	Model Question
11	Explain cut-vertices and blocks bridges.	5	Model Question
12	Explain computer representation of a graph.	3	Model Question

CS361 SOFT COMPUTING

MODULE 1			
Sl. No	**Questions**	**Marks**	**KTU/KU Month/Year**
1	Explain different learning mechanisms used in Artificial Neural Networks with the help of necessary diagrams	3	DEC 17
2	With the help of example , state the role of bias in determining the net output of Artificial Neural Network.	3	DEC 17
3	Design a Hebb network to realize logical OR function	9	DEC 17
4	With graphical representations, explain the activation functions used in Artificial Neural Networks.	4	DEC 17
5	Compare feed forward and feedback networks	3	DEC 18
6	Why McCulloch-Pitts neuron widely used in logic functions?	3	DEC 18
7	Implement AND function using bipolar inputs and targets using Hebb rule method	9	DEC 18
8	Implement AND function using McCulloch-Pitts neuron (using binary data representation).	4	DEC 18
9	Differentiate Soft Computing and Hard Computing. Give any three applications of soft computing	4	
10	Explain supervised and unsupervised learning techniques.	3	
11	Implement ANDNOT function using McCulloch-Pitts neuron. (Take binary data)	7	May 19
13	With the help of an example explain Supervised, Unsupervised, Reinforcement learning	6	May 19

<table>
<tr><td>12</td><td>Design a Hebb net to implement OR function.
<table>
<tr><td>X1</td><td>X2</td><td>b</td><td>Y</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>1</td><td>-1</td><td>1</td><td>1</td></tr>
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MODULE 2

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Explain the concept of Widrow-Hoff rule	3	DEC 18
2	State the significance of error portion δ_k and δ_j in Back Propagation Network	3	DEC 18
3	Implement OR function using perceptron training algorithm with binary inputs and bipolar targets	9	DEC 18
4	Explain training algorithm used in adaptive linear neuron	5	DEC 18
5	State the concept of delta rule used in Adaptive Linear Neurons	3	DEC 17
6	Illustrate the different steps involved in the training algorithm of perceptrons.	3	DEC 17
7	How is the training algorithm performed in back propagation neural networks	5	DEC 17
8	Explain the five different neural network architectures	5	
9	Explain the architecture and training algorithm of Back Propagation network. Describe the various terminologies used in the algorithm	9	
10	Explain the difference between Adaline and Perceptron nets. (with network diagram)	3	
11	Give the Perceptron training algorithm for single output class.	3	May 19

12	Describe the sigmoidal activation function. List the drawbacks.	5	
13	Write the learning factors of Back Propogation network	3	May 19

MODULE 3

Sl.No	Questions	Marks	KTU/KU Month/Year
1	Distinguish between fuzzy and probability with example.	3	DEC 18
2	Explain any two methods of composition techniques on fuzzy relations with examples	3	DEC 18
3	Given two fuzzy sets A and B on a universe X = [0,1,2,3,4]. $A=\{\frac{0.1}{0}+\frac{0.4}{1}+\frac{1}{2}+\frac{0.3}{3}+\frac{0.2}{4}\}$ $B=\{\frac{0.2}{0}+\frac{0.5}{1}+\frac{1}{2}+\frac{0.4}{3}+\frac{0.1}{4}\}$ Find (a) $A \cup B$ (b) $A \cap B$ (c) $A \vee B$ (d) $A \acute{\cup} B$	5	
4	Why the excluded middle law does not get satisfied in fuzzy sets. Describe with an example	3	
5	Consider the two fuzzy sets. Perform the Cartesian product over these given fuzzy sets. $A=\{\frac{0.3}{x1}+\frac{0.7}{x2}+\frac{1}{x3}\}$ $B=\{\frac{0.4}{y1}+\frac{0.9}{y2}\}$	3	
6	Let U be the universe of military aircraft of interest as defines as below U = {a10,b52,c130,f2,f9}. Let $\tilde{A}$ and $\tilde{B}$ be the fuzzy set of fighter class aircraft. $\tilde{A}=\{\frac{0.3}{a10}+\frac{0.4}{b52}+\frac{0.2}{c130}+\frac{0.1}{f2}+\frac{1}{f9}\}$ $\tilde{B}=\{\frac{0.1}{a10}+\frac{0.2}{b52}+\frac{0.8}{c130}+\frac{0.7}{f2}+\frac{0}{f9}\}$ Find the following: a) $A \cup B$ (b) $A \cap B$ (c) $A\|B$ (d) $\overline{A \cup B}$	4	
7	Law of contradiction and law of excluded middle cannot be applied to fuzzy sets. Give proper justification to the statement	3	

8	Given three universes X={x1,x2,x3}, Y={y1,y2,y3} and Z={z1,z2,z3}, the fuzzy sets A defined on X , fuzzy set B defined on Y and fuzzy set C defined on Z are given as $A=\{\frac{1}{x1}+\frac{0.4}{x2}+\frac{0.2}{x3}\}$ $B=\{\frac{1}{y1}+\frac{0.5}{y2}+\frac{0.25}{y3}\}$ $C=\{\frac{0.1}{z1}+\frac{0.3}{z2}+\frac{1}{z3}\}$ (a) Find $R=A\times B$ (b) Find $S=B\times C$ (c) Find RoS using max-min composition (d) Find RoS using max-product composition	9	
9	What are tolerance and equivalence relations? Given a relation R, check whether R is equivalent. Else transform the relation to an equivalence relation. $R=\begin{bmatrix}1&1&0&0&0\\1&1&0&0&1\\0&0&1&0&0\\0&0&0&1&0\\0&1&0&0&1\end{bmatrix}$	9	
10	Discuss the operations on crisp sets	3	
11	Whether a power set can be formed for a fuzzy set? Justify	3	
12	Represent the standard fuzzy set operations using Venn diagram	3	MAY 19
13	What is cardinality of a fuzzy set.Whether a power set can be formed for a fuzzy set.Justify your answer	4	MAY 19
14	The formation of algal solutions in surface water is strongly dependent on pH of water, temperature and oxygen content. T is a set of water temperatures from a lake given by, T = {50,55,60} and O is oxygen content values in water given by, O ={1,2,6}. The fuzzy sets are given by,	7	

	$T = \left\{ \frac{0.7}{50} + \frac{0.8}{55} + \frac{0.9}{60} \right\}$ $O = \left\{ \frac{0.1}{1} + \frac{0.6}{2} + \frac{0.8}{6} \right\}$ $I = \left\{ \frac{0.5}{50} + \frac{1}{55} + \frac{0.7}{60} \right\}$ Find, a) R = T x O b) S = I o R, using max-product composition.		
15	Given two fuzzy sets, $M_{\sim}$ and $N_{\sim}$, such that $M_{\sim} = \left\{ \frac{0}{x1} + \frac{0.8}{x2} + \frac{1}{x3} + \frac{0.8}{x4} + \frac{0}{x5} \right\}$ and $N_{\sim} = \left\{ \frac{0}{y1} + \frac{0.2}{y2} + \frac{0.7}{y3} + \frac{1}{y4} + \frac{0.7}{y5} + \frac{0.2}{y6} + \frac{0}{y7} \right\}$. Construct a relation $R_{\sim} = M_{\sim} \times N_{\sim}$.	4	DEC 17

MODULE 4

Sl. No	Questions	Marks	KTU/KU Month/Year
1	State the relevance of fuzzification . Explain different types.	3	
2	Using the intuition method develop fuzzy membership functions for the following shapes. (a) Trapezoid. (b) Gaussian function. (c) Isosceles triangle.	3	DEC 18
3	With the help of a figure, explain the features of fuzzy membership functions.	3	MAY 19
4	Using inference approach , find the membership values for each of the triangular shapes (I,R,IR,E,T) for a triangle with angles 55°, 45°, 80°.	4	DEC 18
5	What is meant by Lambda-Cuts for Fuzzy Sets?	3	
6	Explain different defuzzification methods?	9	MAY 19

7	Explain inference method used for membership value assignment?	4	
8	For a speed control of DC motor, the membership function of series resistance, armature current and speed are given as follows $R_{se} = \{\frac{0.4}{30} + \frac{0.6}{60} + \frac{1.0}{100} + \frac{0.1}{120}\}$ $I_a = \{\frac{0.2}{20} + \frac{0.3}{40} + \frac{0.6}{60} + \frac{0.8}{80} + \frac{1.0}{100} + \frac{0.2}{120}\}$ $N = \{\frac{0.35}{500} + \frac{0.67}{1000} + \frac{0.97}{1500} + \frac{0.25}{1800}\}$ Compute relation T for relating series resistance to motor speed ie R_{se} to N. Perform max-min composition.	5	
9	Consider the discrete fuzzy set defined on the universe **X= {a, b, c, d, e}** as $A = \{\frac{1}{a} + \frac{0.9}{b} + \frac{0.6}{c} + \frac{0.3}{d} + \frac{0}{e}\}$.Using Zadhe's notation , find the λ– cut sets for **λ=0.6,0.3,0⁺.**	5	DEC 18
10	Using inference method, find the membership values of the triangular shapes; isosceles (I), right angled (R), isosceles and right angled (IR), equilateral (E), and other triangles (T); for a triangle with angles 60, 55, and 65.	5	DEC 17
11	Consider the following fuzzy relation, $R_{\sim} = \begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0.1 & 0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}$ Show that the above relation is a tolerance relation.	4.5	DEC 17
12	Also, show that the λ-cut relation of the above relation results in a crisp tolerance relation.	4.5	DEC 17
13	Using the inference approach,obtain the membership values for the triangular shapes,(I,R,T) for a triangle with angles 40,60,80.	6	MAY 19

MODULE 5			
Sl.No	**Questions**	**Marks**	**KTU/KU Month/Year**
1	Define Fuzzy Propositions. Explain different fuzzy propositions.	10	DEC 18

2	Mention the general forms that exist for a linguistic variable	5	DEC 18
3	Differentiate between Mamdani FIS and Sugeno FIS	5	DEC 18/ MAY 19
4	Explain how can one perform the aggregation of fuzzy rules	4	DEC 17
5	With the help of neccessary block diagram,compareMamdani and Sugeno fuzzy inference systems	10	DEC 17
6	With the help of examples,explain the various fuzzy propositions	6	DEC 17
7	Explain the different methods for fuzzy approximate reasoning.	4	DEC 17
8	Formulate a problem that can derive inference through fuzzy system	4	
9	Explain two types of fuzzy inference systems with example.	4	
10	Write a note on Fuzzy Qualifiers	4	MAY 19
11	Describe two methods used for Aggregation of Fuzzy Rules	3	MAY 19
12	Explain the methods used for decomposing compound linguistic rules into simple canonical rules.	6	MAY 19
13	Explain the following terms: 1.Cooperative Neural Fuzzy system 2. General Neuro Fuzzy hybrid system	10	MAY 19

MODULE 6

Sl. No	Questions	Marks	KTU/KU Month/Year
1	Mention the stopping condition for genetic algorithm flow	5	DEC18 , MAY 19
2	Difference between uniform and three parent cross over	4	
3	Explain the characteristics and different classifications of a neuro-fuzzy hybrid system.	10	DEC 18
4	Explain different types of Encoding Techniques.	10	DEC 18
5	Compare genetic learning of rule bases and knowledge bases	4	

6	Illustrate the different steps in genetic neuro-hybrid systems with the help of a neat block diagram	6	DEC 17
7	With the help of examples,explain the various crossover techniques employed in genetic algorithms.	10	DEC 17
8	Distinguish between the process of tuning and learning in genetic – fuzzy rule based systems	4	DEC 17
9	Explain the different methods of encoding that are possible in genetic algorithm	6	DEC 17
10	Describe five types of crossover.	5	MAY 19
11	Explain Stochastic Universal Sampling with example	4	MAY 19
12	Explain the steps of genetic algorithm	4	MAY 19

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