Department of Electronics & Communication Engineering

MID QUESTION BANK

Course Title	**LDICA**			
Course Code				
Regulation	**R15**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	1	-	4
Course Coordinator	**J.Narendar,**		**D Srinu**	
Team of Instructors				

Course Objectives:
This course aims at:

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.

Group-A: Short Answer Questions

S. No.	QUESTION	BLOOMS TAXONAMY	COs	POs
	UNIT-I			
1	Mention the advantages of integrated circuits.	Remember	1	A
2	Define an operational amplifier.	Remember	1	A
3	Mention the characteristics of an ideal op-amp.	Analyze	1	A
4	Define input offset voltage	Remember	1	A
5	What are the applications of current sources?	Analyze	1	B
6	Define sensitivity of an op-amp.	Remember	1	B
9	What is slew rate? Discuss the methods of improving slew rate.	Understand	1,2	C
10	What is the gain of non inverting op-amp	Remember	1	A
11	Define Integrated Circuit	Analyze	1,2	C
12	Explain the operation of a Schmitt trigger circuit.	Understand	1	B
13	Why do we use R_{comp} resistor?	Understand	1	C
14	Define thermal drift?	Analyze	2	F
15	Draw the circuit of lossy integrator showing initial conditions?	Analyze	1	A
16	Explain why integrators are preferred over differentiators	Analyze	2	D
17	What is the function of voltage regulator?	Understand	1	D
18	What voltage options are available in 78xx and 79xx voltage regulators?	Understand	1	B
19	Sketch the inverting and non inverting comparators using op-amp.	Understand	1	A
20	What is the gain of inverting op-amp	Analyze	1	A
	UNIT-II			
1	Why active filters are preferred?	Remember	1	A
2	What is meant by cut off frequency of a high pass filter	Understand	2	C
3	What is frequency scaling	Understand	2	B
4	What are the applications of 555 ic	Understand	2	C
5	List the applications of 555 timer in monostable mode of operation	Understand	1	F
6	Define 555 IC?	Remember	1	A
7	List the basic blocks of IC 555 timer?	Remember	2	D
8	Define VCO.	Remember	1	D
9	What does mean by PLL?	Remember	1	B
10	List the applications of 565 PLL	Understand	2	A
11	Define lock range in PLL.	Apply	1	A
12	Define capture range in PLL.	Understand	1	A
13	Define pull-in time in PLL.	Apply	1	C
14	Draw a circuit to for converting a square wave into a series of positive pulses	Understand	1	B
15	What is the difference between triangular and sawtooth wave.	Remember	1	C
16	Define an electronic filter.	Remember	2	D
17	Define pass band and stop band of a filter.	Understand	2	A
18	What is notch frequency	Understand	1	D
19	Define Quality factor	Remember	2	D
20	What is the relation between Quality factor and bandwidth	Remember	1	B
	Unit III			

1	Define data converters?	Remember	3	A
2	Indicate types of data converters.	Remember	3	A
3	Name the different DAC techniques.	Remember	3	C
4	Define weighted resistor type DAC.	Understand	3	B
5	Sketch the 3 bit R-2R Ladder DAC.	Understand	3	C
6	Sketch the 2 bit weighted resistor type DAC.	Understand	4	A
7	Sketch the 3 bit weighted resistor type DAC.	Understand	5	A
8	Sketch the 4 bit weighted resistor type DAC.	Understand	3	D
9	Define R-2R Ladder DAC.	Understand	3	D
10	Sketch the 2 bit R-2R Ladder DAC.	Understand	4	B
11	Sketch the 3 bit R-2R Ladder DAC.	Understand	3	A
12	Sketch the 4 bit R-2R Ladder DAC.	Remember	5	A
13	Define inverted R-2R DAC.	Understand	5	A
14	Sketch the 2 bit inverted R-2R DAC.	Understand	4	C
15	Sketch the 3 bit inverted R-2R DAC.	Understand	4	B
16	Sketch the 4 bit inverted R-2R DAC.	Understand	4	C
17	Write the need of data converters.	Understand	3	A
18	Give applications of data converters.	Understand	5	A
19	Give the drawbacks of weighted resistor type DAC.	Understand	4	D
20	Give the advantages of weighted resistor type DAC.	Understand	5	D
21	Calculate basic step of 9 bit DAC is 10.3 mV. If 000000000 represents 0V,	Apply	3	B
22	what output produced if the input is 101101111?	Analyze	4	A
23	Calculate the values of the full scale output for an 8 bit DAC for the 0 to 10V range.	Analyze	5	A
24	Calculate the values of the LSB output for an 8 bit DAC for the 0 to 10V range.	Analyze	3	A
25	Calculate the values of the MSB output for an 8 bit DAC for the 0 to 10V range	Analyze	4	B
26	What output voltage would be produced by monolithic DAC whose output range is 0 to 10V and whose input binary is 10?	Analyze	3	A
27	How many levels are possible in a two bit DAC what is its resolution if the output range is 0 to 3V.	Apply	5	A
28	Calculate the values of the LSB output for an 16 bit DAC for the 0 to 10V range.	Analyze	4	C
29	Calculate the values of the MSB output for an 16 bit DAC for the 0 to 10V range	Analyze	4	A
30	Define Resolution	Understand	5	B
UNIT-IV				
1.	What is negative triggering and positive Triggering	Analyze	10	A
2.	Design CMOS transistor circuit for 2-input AND gate.	Understand	4	C
3.	Explain power delay product ?	Remember	4	B
4.	Which of the parameters decide the fan-out and how?	Understand	4	C
5.	Explain Noise margin?	Understand	4	D
6.	Explain the term Voltage levels for logic '1' & logic '0' with reference to TTL gate?	Understand	4	A
7.	Explain the DC Noise margin with reference to TTL gate?	Understand	4	D
8.	Explain how PROM, EPROM and EEPROM technologies differ from each other.	Remember	4	D
9.	What is the differences between Combinational Circuit and Sequential Circuit	Remember	4	B
10.	Write the examples of Combinational Circuits.	Remember	4	A
11	Difference between Half adder and full adder	Analyze	10	A

12	Explain about decoder and Encoder	Understand	4	A
13	Specify the number of inputs and output for Mux and Demux	Remember	4	C
14	What are the ERROR DETECTING AND Correcting codes	Understand	4	B
15	Convert the binary code 101010101010 into Gray code.	Understand	4	C
16	What is Binary coded Decimal	Understand	4	C
17	What is an Ic Interfacing	Understand	4	A
18	List 74xx series ICs	Remember	4	D
19	Draw the CMOS NOR Gate	Remember	4	D
20	Draw the CMOD NAND gate	Remember	4	B
UNIT-V				
1.	Define static RAM	Understand	5	A
2.	Define dynamic RAM	Understand	5	A
3.	Classify types of ROMs	Understand	5	C
4.	Applications of ROMS	Remember	5	B
5.	What is the difference between latch& Flip-Flop, Explain with logic diagram?	Remember	5	C
6.	Explain any one application of SR latch.	Understand	5	B
7.	What is race around condition? how it is avoided?	Remember	5	A
8.	How synchronous counters differ from asynchronous counters?	Understand	5	D
9.	List counter applications.	Understand	5	D
10.	State various applications of counters.	Remember	5	B
11	Difference between Asynchronous clock and Synchronous Clock	Analyze	1	A
12	Draw the truth table of SR and JK	Understand	1	A
13	Draw the Excitation Table of SR and JK	Remember	1	A
14	Give the Excitation Table of D and T Flip Flop	Evaluate	1	C
15	What is meant of Edge Triggering	Evaluate	1	B
16	Types Of Shift Registers.	Evaluate	1	C
17	Specify the operations done on Shift Registers	Evaluate	2	A
18	Explain the decade counter	Remember	1	A
19	Draw the Logic diagram for Conversion of D-SR	Analyze	5	D
20	Define Counter	Remember	1	D

Group-B: Long Answer Questions

S. No.	QUESTION	BLOOMS TAXONAMY	COs	Pos
	Unit I			
1	Explain the operation of a Schmitt trigger circuit using IC 741.	Understand	1	A
2	Explain practical integrator circuit using IC 741.	Analyze	1	C
3	Explain the internal structure of voltage regulator IC 723. Also draw a voltage Regulator circuit using IC 723andexplain its operation.	Analyze	2	B
4	Explain the following terms of an OP-AMP. Input Bias current 2. Input offset voltage 3. Input offset current	Remember	2	C
5	Derive the gain for non inverting op-amp	Remember	2	D
6	Explain non inverting comparator using op-amp.	Understand	3	A
7	Write a technical note on frequency response characteristics of differential amplifier. State the importance of frequency compensation.	Understand	2	D
8	What is t instrumentation amplifier? What are the required parameters of an instrumentation amplifier? Explain the working of instrumentation amplifier with neat circuit diagram.	Understand	1	D
9	Explain various DC and AC characteristics of an op.amp. Distinguish between ideal and practical characteristics.	Understand	1	B
10	With circuit and waveforms explain the application of OPAMP as Comparator	Remember	1	A
11	Design a Schmitt trigger for UTP =0.5v and LTP = -0.5V.assume necessary data.	Evaluate	3	A
12	Design a differentiator to differentiate an input signal that varies in Frequency from 10 Hz to about 1 KHz. If a sine wave of 1V peak at 1000 Hz is applied to this differentiator draw the output waveforms.	Evaluate	2	A
13	Determine the output voltage of the differential amplifier having input voltages V1=1mV and V2=2 mV. The amplifier has a differential gain of 5000 and CMRR 1000.	Remember	2	C
14	Draw the output waveform for a sine wave of 1vpeak at 100Hzapplied to the differentiator.	Evaluate	2	B
15	Draw the output waveform for a sine wave of 2v peak at 300Hzapplied to the differentiator.	Evaluate	2	C
16	Design an op-amp differentiator that will differentiate an Input signal with fmax = 100Hz	Remember	2	D
17	Design an op-amp differentiator that will differentiate an Input signal with fmax = 200Hz	Remember	2	A
18	Find R1 and Rf in the lossy integrator so that the peak gain is 20dB and the gain is 3db down from its peak when ω = 10,000 rad/sec. use a capacitance of 0.01micro farads.	Evaluate	2	D
19	Design a Schmitt trigger for UTP =2V and LTP = -2V.assume necessary Data	Evaluate	3	D
20	Design an op-amp differentiator that will differentiate an Input signal with fmax = 1000Hz	Analyze	2	B
	Unit II			
1	Design a second order low pass filter.	Evaluate	4	A
2	Draw the circuit of a 1st order low pass filter and derive its transfer function.	Analyze	4	A
3	Explain the functional block diagram of 555timer.	Evaluate	5	C
4	Explain working of PLL using appropriate block diagram.	Evaluate	6	B
5	Draw the block diagram of an Astable multivibrator using 555timer and derive an expression for its frequency of oscillation.	Evaluate	5	C
6	Explain triangular waveform generator using IC 741	Understand	5	B
7	Draw the block diagram of monostable multivibrator using 555timer and derive an expression for its frequency of oscillation.	Evaluate	5	A
8	Design second order high pass filter.	Evaluate	5	D

9	Derive the expression for i) capture range in PLL ii) Lock in range in PLL.	Analyze	6	D
10	Draw the circuit of a 1st order band pass filter and derive its transfer function.	Analyze	4	B
11	Explain VCO operation in PLL.	Understand	6	A
12	Derive the frequency of oscillations in VCO.	Analyze	4	A
13	Draw the circuit of a all pass filter and derive its transfer function.	Analyze	6	A
14	Derive the voltage to frequency converter factor for VCO.	Analyze	6	A
15	Explain any two applications of Astable multivibrator using 555IC.	Analyze	5	C
16	Design an Astable Multivibrator using 555 Timer to produce 1Khz square wave form for duty cycle=0.50	Evaluate	5	B
17	Design and draw the wave forms of 1KHZ square waveform generator using555 Timer for duty cycle D=25% .	Analyze	5	C
18	Design a 555 based square wave generator to produce an asymmetrical square wave of 2 KHz. If Vcc=12V, draw the voltage curve across the timing capacitor and output waveform.	Evaluate	5	D
19	Draw the schematic diagram of an all pass filter and determine the phase shift φ between the input and output at f = 2kHz.	Analyze	5	A
20	Design and draw the wave forms of 1KHZ square waveform generator	Analyze	5	D
UNIT-III				
1.	Explain the working of a Weighted resistor D/A converter	Understand	8	B
2.	Explain successive approximation A/D converter	Understand	8	A
3.	Explain the working of a dual slope A/D converter	Analyze	8	A
4.	Explain the working of a Voltage to Time converter	Understand	8	A
5.	Explain the working of a counter type A/D converter and state it's important feature	Understand	8	C
6.	Explain the working of a Voltage to Frequency converter	Understand	8	B
7.	Explain the working of a Dual slope ADC	Analyze	8	C
8.	With neat diagram, explain the working principle of R-2R ladder type DAC	Analyze	7,8	C
9.	Explain the following application of operational amplifier. (1) peak detector (2) Functions of flash type A/D converter.	Understand	7,8	A
10.	With neat diagram,explain the workingprinciple of Weighted resistor DAC	Understand	7,8	D
11	Explain the working of a Weighted resistor D/A converter.	Evaluate	8	D
12	Explain successive approximation A/D converter.	Understand	8	B
13	Explain the working of a dual slope A/D converter	Remember	8	A
14	With neat diagram, explain the working principle of inverter R-2R ladderDAC	Understand	8	A
15	Explain the working of a counter type A/D converter and state it's important feature.	Understand	8	A
16	Write the specifications of DAC.	Understand	8	C
17	Write the specifications of ADC.	Analyze	8	B
18	With neat diagram, explain the working principle of R-2R ladder type DAC.	Analyze	7,8	C
19	Explain the operation of parallel comparator type ADC.	Understand	7,8	B
20	Design 4 bit weighted resistor DAC.	Understand	7,8	A
Unit IV				
1.	Design 4 bit weighted resistor DAC.	Apply	10	D
2.	List out different categories of characteristics in a TTL data sheet.	Analyze	1	B
3.	Write VHDL code for SR flip flop	Understand	10	A
4.	(a) Design CMOS transistor circuit for 2-input AND gate. Explain the circuit with the help of function table?	Remember	10	A
5.	(a) Design a three input NAND gate using and a transistor inverter?	Evaluate	10	A
6.	Design a CMOS NOR gate	Evaluate	1	C
7.	Design BCD-7 segment decoder	Evaluate	10	B
8.	Explain the necessity of two-dimensional decoding mechanism in memories.	Apply	1,2	C
9.	With the help of timing waveforms, explain read and write operations of SRAM.	Remember	10	B
10.	Draw MOS transistor memory cell in ROM and explain the operation.	Apply	1	A
11	Design a binary-Excess-3 code converter	Apply	10	D
12	Explain the operation of 3 to 8 decoder and 2-4 decoder using IC	Analyze	10	D
13	Design a 16:1 mux using 4x1 mux	Understand	10	B

14	Implement the foolowing function using MUX f=∑ m(1,2,3,4,5)	Remember	10	A
15	Realise the 32:5 decoder using 8:3 decoder	Evaluate	10	A
16	Expalin the error correcting and detecting codes	Evaluate	10	A
17	Design a full adder using two half adders	Evaluate	10	C
18	Construct a binary parallel adder.	Apply	10	B
19	Design a full subtractor	Remember	10	C
20	Design a binary to BCD code converter	Apply	10	C
	Unit V			
1.	How many ROM bits are required to build a 16-bit adder/subtractor with mode control, carry input, carry output and two's complement overflow out- put. Show the block schematic with all inputs and outputs.	Understand	9	D
2.	Draw the basic cell structure of Dynamic RAM. What is the necessity of refresh cycle? Explain the timing requirements of refresh operation.	Analyze	9	D
3.	Discuss in detail ROM access mechanism with the help of timing waveforms.	Analyze	9	B
4.	Draw the logic diagram of 74×163 binary counter and explain its operation.	Understand	10	A
5.	Design a modulo-100 counter using two 74×163 binary counters?	Apply	10	A
6.	Design a Modulo-12 ripple counter using 74×74?	Apply	10	A
7.	Discuss how PROM, EPROM, EEPROM technologies differ from each other?	Analyze	10	C
8.	Differentiate ripple counter and synchronous counter? Design a 4-bit counter in both modes and estimate the propagation delay.	Remember	10	B
9.	Design a modulo-88 counter using 74X163 Ics.	Understand	9	C
10	Determine the ROM size needed to realize the logic function performed by 74×153 and 74×139.	Apply	10	B
11	Realize the logic function performed by 74×381 with ROM.	Evaluate	9	A
12	Explain the internal structure of 64K×1 DRAM with the help of timing diagrams.	Apply	9	D
13	Explain the necessity of two-dimensional decoding mechanism in memories. Draw MOS transistor memory cell in ROM and explain the operation.	Apply	9	D
14	Convert SR flip flop into JK	Remember	10	B
15	Convert JK into T Flip Flop	Understand	9	A
16	Explain the ROM ,EPROM,EEPROM	Apply	9	A
17	Explain Parallel in serial out shift register	Evaluate	9	C
18	Explain Shift register types and its operation	Apply	9	C
19	Design a BCD counter	Apply	9	B
20	Design a MOD-10 synchronous counter	Apply	9	B