

DEPT. OF ELECTRONICS & COMMUNICATION ENGINEERING
B. Tech. I-Mid Question Bank (R22 Regulation)

Academic Year: 2024-2025

Semester: V

Subject Name: Linear & Digital IC Applications [22EC503PC]

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PART-A

MID-I Questions					
Q. No.	Questions	Marks	BL	CO	Unit. No
1	Define CMRR.	2M	L1	CO1	I
2	How a voltage follower may be used as Buffer for impedance matching.	2M	L2	CO1	I
3	Draw pin diagram and equivalent circuit of op-amp IC 741.	2M	L2	CO1	I
4	Write the features and pin diagram of IC 723.	2M	L1	CO1	I
5	Draw the comparator circuit using IC 741 Op-Amp.	2M	L2	CO1	I
6	Define input offset voltage.	2M	L1	CO1	I
7	Define Duty Cycle.	2M	L1	CO2	
8	Draw the circuit diagram of first order Butterworth filter HPF.	2M	L1	CO2	II
9	Define All pass filter.	2M	L2	CO2	II
10	How to generate a square wave using Op-Amp.	2M	L1	CO2	II
11	List the applications of PLL.	2M	L2	CO2	II
12	Calculate the value of Capacitor C, if R=100 kΩ and the time delay T=100 ms, provided IC 555 time is in monostable mode.	2M	L4	CO2	II
13	What is the primary function of a data converter in electronic systems?	2M	L1	CO3	III
14	What is the main disadvantage of a weighted resistor DAC?	2M	L3	CO3	III
15	How does the R-2R ladder DAC improve upon the weighted resistor DAC?	2M	L4	CO3	III
MID-II Questions					
16	Calculate the output voltage for a 3-bit inverted R-2R DAC with a reference voltage of 5V and a digital input of 101.	2M	L5	CO3	III
17	Explain the basic working principle of a Digital-to-Analog Converter (DAC).	2M	L2	CO3	III
18	What is the role of the successive approximation register (SAR) in a successive approximation ADC?	2M	L5	CO3	III
19	Which of the parameters decide the fan-out and how?	2M	L2	CO4	IV
20	Explain the use of Package.	2M	L1	CO4	IV
21	What is combinational logic?	2M	L1	CO4	IV
22	What is a multiplexer?	2M	L2	CO4	IV
23	Write a short note on priority encoder.	2M	L1	CO4	IV
24	Design CMOS transistor circuit for 2-input AND gate.	2M	L2	CO4	IV

25	Write the applications of shift registers.	2M	L3	CO5	v
26	Differentiate Static and Dynamic RAMs.	2M	L2	CO5	v
27	Draw the block diagram of 3-bit ring counter	2M	L2	CO5	v
28	What is meant by state diagram?	2M	L1	CO5	v
29	Write the specifications of counter IC's	2M	L1	CO5	v
30	What is Race around condition? How is it avoided?	2M	L1	CO5	v

PART- B

MID-I Questions					
Q.No.	Questions	Marks	BL	CO	Unit. No
1	Discuss about DC characteristics given in below list. a. Input Bias Current b. Input Offset Current c. Input Offset Voltage d. Thermal Drift	4M	L4	CO1	I
2	With necessary Circuit diagrams explain about the following modes of Op-Amp operations and derive their gain expressions. i. Inverting Mode ii. Non-Inverting Mode	4M	L5	CO1	I
3	With necessary Circuit diagrams explain about the following modes of Op-Amp operations and derive their gain expressions. i. Differential Amplifier ii. Schmitt Trigger	4M	L5	CO1	I
4	Draw the circuit diagram and explain the working principle of Instrumentation Amplifier.	4M	L4	CO1	I
5	Design a basic voltage level detector using an op-amp as a comparator. Explain its working.	4M	L6	CO1	I
6	With a neat Pin diagram, explain about 78xx series regulator	4M	L4	CO1	I
7	Explain about Integrator and differentiator circuit with necessary derivations. List ideal and practical op-amp characteristics	8M	L4	CO1	I
8	i. Provide a brief not on the given AC characteristics of op-amp a. Frequency Response b. Slew Rate ii. Briefly Explain the different types of voltage regulators	8M	L4	CO1	I
9	i. Draw and explain the various functional blocks of an operational amplifier IC? ii. Explain about the virtual ground concept	8M	L2	CO1	I
10	Explain Saw-tooth and Triangular wave generator with necessary output waveforms.	4M	L6	CO2	II
11	Explain the operation of first order low pass butter worth filter? Derive the expression for filter gain & draw the frequency response curve?	4M	L2	CO2	II
12	Explain the operation of first order high pass butter worth filter? Derive the expression for filter gain & draw the frequency response curve?	4M	L2	CO2	II
13	Explain the Pin Diagram of IC555. Explain the operation of monostable multivibrator using IC 555 timer and derive the expression for pulse width. List the applications.	4M	L2	CO2	II

14	From the given components values find the free running frequency control voltage $V_c = 10.9V$, $V_{cc} = 12V$, $R_1 = 4.7K\Omega$ and $C_1 = 1.1nF$.	4M	L6	CO2	II
15	Design an active high pass filter with cut-off frequency of 4KHz.	4M	L6	CO2	II
16	Explain the operation of monostable and Astable multivibrators using IC 555 timer and derive the expression for pulse width. List the applications.	8M	L2	CO2	II
17	What is the principle of operation of PLL and explain each block in detail. Derive the expression for Capture Range and Lock-in Range.	8M	L5	CO2	II
18	i. Briefly Characteristics of Band pass, Band reject and All Pass Filters ii. An Astable multivibrator has $R_A = 6.8 k\Omega$, $R_B = 3.3 k\Omega$ and $C = 0.1 \mu F$. Calculate (a) free running frequency and (b) duty cycle D.	8M	L4	CO2	II
19	Explain the operation of Weighted Resistor DAC with the help of circuit Diagram.	4M	L2	CO3	III
20	Explain the working principle of inverting and Non –Inverting R-2R ladder DAC with neat circuit diagram.	4M	L5	CO3	III
21	Explain about counter type ADC with neat block diagram.	4M	L2	CO3	III
MID-II Questions					
22	Explain the operation of parallel comparator type ADC.	4M	L4	CO3	III
23	Draw the block diagram and explain the operation of dual slope A to D converter. What are the advantages and disadvantages.	4M	L4	CO3	III
24	Draw and explain successive approximation type ADC with an example.	4M	L1	CO3	III
25	Explain the following terms with reference to CMOS logic. i. Logic Levels ii. Noise margin iii. Power supply rails iv. Propagation delay	4M	L3	CO4	IV
26	List the Specifications and Applications of TTL-74XX series IC.	4M	L3	CO4	IV
27	Draw a logic symbol of 8X1 multiplexer using 74 X 151 IC	4M	L3	CO4	IV
28	Design a 4 to 16 decoder using two 74×138 IC's.	4M	L6	CO4	IV
29	Explain magnitude comparator using 74LS85 IC.	4M	L3	CO4	IV
30	What do you mean by Carry propagation delay? Draw a logic symbol of 8 X 3 Priority Encoders using 74 X 148 IC.	4M	L6	CO4	IV
31	i. Design 5X32 bit decoder using 74 X 138 IC's & 74 X 139 IC's. ii. Give the design considerations of parity encoder and explain the operation with relevant circuit	8M	L6	CO4	IV
32	Draw and explain the block diagram of n-bit parallel binary adder/Subtractor. Design 4-bit Parallel Binary Adder using IC 74LS182.	8M	L6	CO4	IV
33	Find the state diagram and state table of a binary coded decimal to excess-3 decoder.	8M	L4	CO4	IV

34	Design a 4-bit bidirectional shift register with parallel load.	4M	L6	CO5	V
35	Draw the circuit diagram of a 4-bit ripple carry adder using 4 full adder circuit blocks.	4M	L2	CO5	V
36	Design a conversion circuit to convert a D flip-flop to J-K flip-flop.	4M	L6	CO5	V
37	Design and implement FIFO shift register using IC's.	4M	L6	CO5	V
38	Explain Decade Counter Using IC 7490.	4M	L6	CO5	V
39	What is meant by a transparent latch?	4M	L1	CO5	V
40	i. Design a conversion circuit to convert a D flip-flop to J-K flip-flop? ii. List the characteristics of CMOS40XX Series ICs	8M	L6	CO5	V
41	Write short notes on Ring Counter and Johnson counter	8M	L2	CO5	V
42	i. Draw the internal structure of synchronous SRAM and explain the read and write operation With the help of timing diagram. ii. Explain the differences between Static RAM and Dynamic RAM	8M	L4	CO5	V

