

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No. : 15459 N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.C.E.) V-Semester Main & Backlog Examinations, Jan./Feb.-2024

Integrated Circuits and Applications

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PSO
1.	Describe the concept of the "slew rate" for an op-amp. How does it affect the op-amp's performance in AC applications?	2	1	1	1	1
2.	Develop a sample and hold circuit using op-amp and mention its role in analog-to-digital conversion.	2	2	1	1	1
3.	What is the relationship between order of a filter and roll off rate?	2	1	2	2	1
4.	Compare Active and Passive Filters	2	2	2	2	1
5.	Write applications of fixed IC regulators.	2	2	3	1	1
6.	Define accuracy and resolution with respect to data converters and give its importance.	2	1	3	1	1
7.	Mention the considerations and challenges, while interfacing TTL with CMOS and vice versa.	2	1	4	1	1
8.	State the advantages and disadvantages of tristate outputs in logic families	2	1	4	1	1
9.	Write IC numbers of magnitude comparator ,counters and BCD to 7-segment decoder.	2	1	5	1	1
10.	List applications of IC 7495	2	1	5	1	1
Part-B (5 × 8 = 40 Marks)						
11. a)	Determine the voltage at point A and B for the circuit shown in figure below for $V_1 = 5V$ and $V_2 = 5.1$ Assume $+V_{CC} = -V_{EE} = 15V$	4	3	1	2	1
b)	Discuss the DC and AC characteristics of op-amps. Why is it important to consider both in circuit analysis?	4	1	1	1	1
12. a)	Design a 1 st order low pass filter with a cut off frequency of 2 kHz and with a pass band gain of 2.	4	3	2	3	1

Contd... 2

b)	Provide the functional diagram of a 555 timer. Explain its Monostable operations. Give examples of applications.	4	2	3	2	1
13. a)	Draw and explain the block diagram of a Flash type ADC which converts the analog data into 3 bit digital data .	4	2	3	2	1
b)	Explain the principle of operation of a R-2R ladder type DAC	4	2	3	2	1
14. a)	Draw and Compare the internal schematic of a Totem pole TTL NAND gate and open Drain TTL NAND gate and explain its operation	4	3	4	2	1
b)	Compare TTL and CMOS Logic in terms of their operational characteristics, advantages, and applications.	4	3	4	2	1
15. a)	Develop a BCD Adder using IC's 7483 and logic gates	4	3	5	3	1
b)	Compare and contrast synchronous and asynchronous counters using the 74163 and 7490 ICs. Discuss their applications and operational differences.	4	3	5	2	1
16. a)	Draw the Instrumentation amplifier and explain its operation in detail	4	2	2	2	1
b)	Draw the block diagram of Astable operations using IC 555 and derive the expression for time period of square wave.	4	3	3	2	1
17.	Answer any <i>two</i> of the following:					
a)	Design a 5V regulator using IC723 with maximum output current of 50mA	4	3	3	3	1
b)	Perform a detailed analysis of the working principles of a standard TTL NAND gate. Discuss its characteristics.	4	2	4	2	1
c)	Develop an application using 74151 and 74138 IC's.	4	4	5	2	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	22.5%
ii)	Blooms Taxonomy Level – 2	32.5%
iii)	Blooms Taxonomy Level – 3 & 4	45%
