Hall Ticket Number:

Code No. : 12626 N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

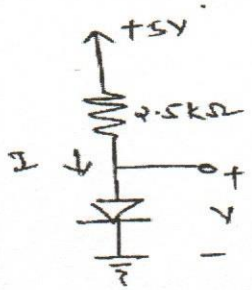
B.E. (I.T.) II-Semester Main & Backlog Examinations, August-2023

Basic Electronics

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
1.	Determine the current I and the voltage V in the circuit shown below: 	2	1	1	1
2.	Define the term ripple factor in rectifiers.	2	1	1	1
3.	Give the collector current equation for a Common base transistor.	2	1	2	1
4.	The common base dc current gain of a transistor is 0.967. If the emitter current is 10mA what is the value of the base current?	2	1	2	1
5.	Give the structure of a CMOS logic circuit.	2	1	3	1
6.	Define the terms fan -in and fan out.	2	1	3	1
7.	List the important characteristics of negative feedback.	2	1	4	1
8.	State the Barkhausen's criteria of oscillations.	2	1	4	1
9.	List the ideal characteristics of an Operational Amplifier.	2	2	5	1
10.	Define the term Common mode rejection ratio in an Opamp.	2	2	5	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	With a neat circuit diagram and by plotting the current signals explain operation of a Bridge rectifier.	4	2	1	1
b)	A full wave bridge rectifier with 120V rms sinusoidal input has a load resistance of 1K ohm. If ideal Si diodes are used what is the dc voltage available at the load. Also determine the PIV rating of each diode.	4	3	1	2

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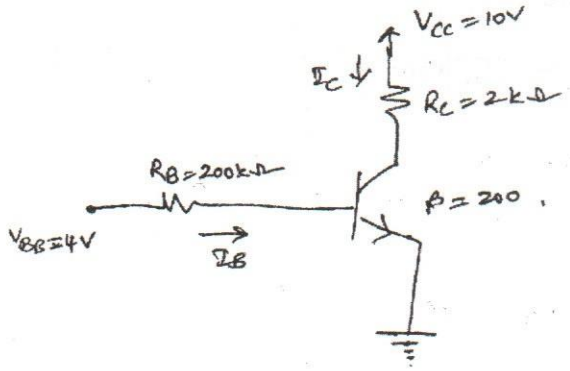
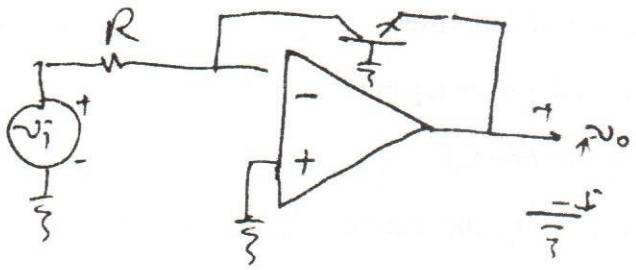
12.	a)	With a neat circuit diagram and analysis explain how a BJT can be used as an switch.	4	3	2	2
	b)	Determine the base, collector, emitter currents and V_{CE} for the common Emitter circuit shown below: Assume V_{BE}=0.7V. 	4	3	2	1
13.	a)	Draw a neat circuit diagram of a NOR gate using CMOS technology and explain its operation with a truth table indicating the ON/OFF conditions of the transistors used in the circuit.	4	3	3	2
	b)	Explain the different types of digital IC technologies and list the important features of each of them.	4	2	3	1
14.	a)	With neat block diagram explain the Voltage Series negative feedback amplifiers and analyze the effect of negative feedback on input and output impedance for the Voltage series topology.	4	3	4	1
	b)	With a neat circuit diagram explain the operation of RC phase shift Oscillator and derive the frequency of oscillation for the circuit.	4	2	4	1
15.	a)	For the circuit shown below, determine the output voltage 	4	3	5	2
	b)	Draw the circuit of an difference amplifier using an Op Amp and derive an expression for its output voltage.	4	2	5	1

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16. a)	Draw the circuit diagram of a three input logic AND gate constructed using diodes. Illustrate its operation using a truth table indicating the corresponding output voltage value and output logic values for different combinations of inputs applied to the circuit.	4	3	1	2
b)	With a neat circuit diagram explain how do you determine the input and output characteristics of a BJT in common Base configuration.	4	2	2	1
17.	Answer any ***two*** of the following:				
a)	Draw and explain the Voltage transfer characteristics CMOS inverted gate.	4	2	3	1
b)	With neat block diagram explain the concept of positive feedback and negative feedback. Also derive an expression for gain with feedback in both the cases.	4	2	4	1
c)	With neat circuit diagram, derive an expression for the output voltage of a simple inverting adder circuit constructed using an operational amplifier.	4	3	5	2

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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