

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2023

ROBOTICS AND AUTOMATION

(2020 SCHEME)

Course Code : 20RBT203

Course Name: Electronic Devices and Circuits

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. What is the role of the emitter bypass capacitor in a CE amplifier circuit?
2. Draw the circuit diagram of Zener diode voltage regulator.
3. Differentiate between FET and BJT.
4. Explain the small signal model of FET.
5. What is crossover distortion?
6. Which feedback is used in oscillators? Why?
7. Define CMRR and mention its significance.
8. What are the characteristics of an ideal operational amplifier?
9. What is the significance of slew rate in operational amplifier?
10. Explain the working of zero crossing detector circuit.

PART B

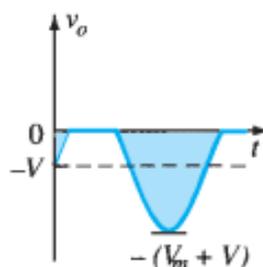
(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Using the h parameter model derive Voltage gain, Current gain, input impedance and out impedance of BJT in common emitter configuration. (9)
- b) Explain thermistor compensation technique for stabilization. (5)

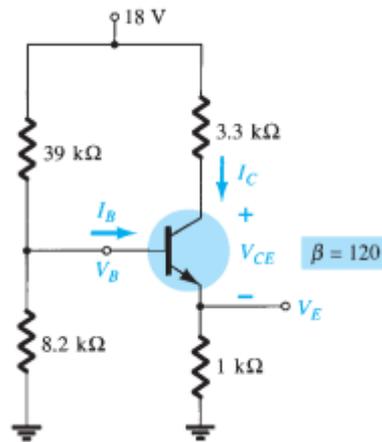
OR

12. a) Design a circuit to obtain the following output wave from a sine wave input with peak voltage V_m . Assume diode is ideal



(5)

- b) For the voltage divider bias network shown in the figure below determine operating point and voltage across emitter resistor V_E . (9)



MODULE II

13. a) State and prove Miller's theorem. (6)
 b) Using the small signal model of FET analyze common source amplifier circuit. (8)

OR

14. a) Explain the operation of N channel enhancement type MOSFET. (7)
 b) Calculate the upper cutoff frequency of common emitter amplifier using a hybrid pi model. (7)

MODULE III

15. a) Draw and explain the working of a class A power amplifier. (7)
 b) Explain the working of a RC coupling scheme, in multistage amplifiers. (7)

OR

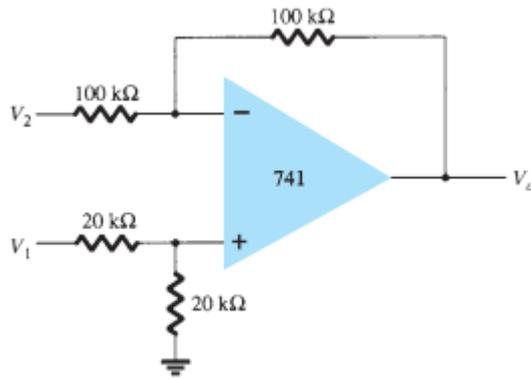
16. a) Show that in series-series feedback topology input and output impedances increases with negative feedback. (9)
 b) If an amplifier with gain of 1000 and feedback of $\beta=0.1$ has a gain change of 20% due to temperature, calculate the change in gain of the feedback amplifier. (5)

MODULE IV

17. a) Explain the working of a Wien bridge oscillator and derive its frequency of oscillation. (10)
 b) Design an inverting amplifier with gain of -10. (4)

OR

18. a) Determine the output voltage V_o of the given circuit. (5)



- b) Explain the working of Hartley oscillator with a neat diagram. (9)

MODULE V

19. a) Design an integrator circuit using operational amplifier for a signal frequency 1kHz. (7)
- b) Draw and explain the working of a PLL. (7)

OR

20. a) Explain the working of an astable multivibrator using timer IC 555. (10)
- b) What are the specification details of a voltage regulator circuit? (4)
