

# CBCS SCHEME

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## First/Second Semester B.E. Degree Examination, Dec.2023/Jan.2024 Basic Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- Explain the operation of PN – junction diode under forward and reverse biased condition. (06 Marks)
  - Explain how Zener diode can be used as a voltage regulator. (06 Marks)
  - Write short notes on light emitting diode and photo coupler. (08 Marks)

OR

- With a neat circuit diagram and waveform explain the working of a centre tapped full wave rectifier. (08 Marks)
  - Explain the operation of 7805 fixed IC regulator. (06 Marks)
  - Determine the range of  $V_i$  in which the zener diode of Fig.Q2(C) conducts.

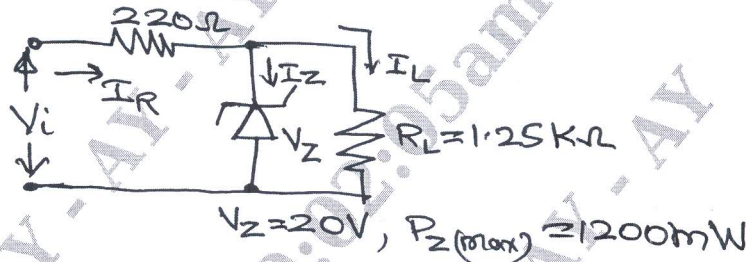


Fig.Q2(c)

(06 Marks)

### Module-2

- Explain the construction and operation of JFET with necessary diagram. (08 Marks)
  - What is SCR? Explain the working of two transistor model of SCR. (08 Marks)
  - A certain JFET has an  $I_{GSS}$  of  $-2nA$  for  $V_{GS} = -20V$ . Determine the input resistance. (04 Marks)

OR

- Draw and explain the V – I characteristics of Silicon controlled rectifier. (05 Marks)
  - Explain the construction and working of N-channel enhancement type MOSFT. (08 Marks)
  - With a neat circuit diagram, explain the working of CMOS inverter. (07 Marks)

### Module-3

- List the ideal characteristics of operational amplifier. (04 Marks)
  - Draw three input inverting summer circuit and derive an expression for its output voltage. (08 Marks)
  - With a neat circuit diagram of an inverting operational amplifier, derive an expression for its voltage gain. (08 Marks)

OR

- 6 a. With a neat circuit diagram explain how an operational amplifier can be used as a differentiator. (06 Marks)
- b. A non inverting operational amplifier has input resistance  $10\text{K}\Omega$  and feedback resistance  $60\text{K}\Omega$  with load resistance  $47\text{K}\Omega$ . Draw the circuit and calculate output voltage, voltage gain and load current when input voltage is  $1.5\text{Volts}$ . (08 Marks)
- c. Find the output  $V_0$  of the following op-amplifier circuit Fig.Q6(c).  $R_1 = 20\text{K}\Omega$ ,  $R_F = 100\text{K}\Omega$ .

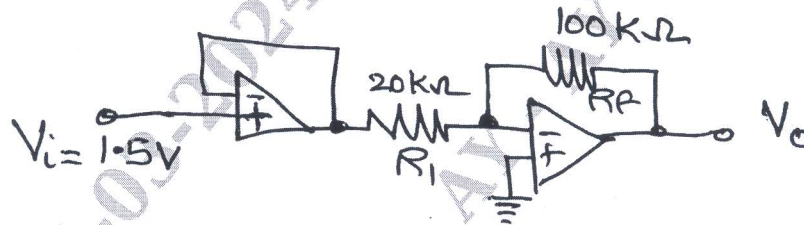


Fig.Q6(c)

(06 Marks)

Module-4

- 7 a. What is an amplifier? Explain the operation of transistor amplifier circuit. (08 Marks)
- b. Define feedback amplifier. Draw and explain the operation of a voltage series feedback amplifier with an expression for its voltage gain. (12 Marks)

OR

- 8 a. Explain the Barkhausen's Criterion of Oscillator. (06 Marks)
- b. Explain the operation of a RC phase shift Oscillator. (06 Marks)
- c. Explain the working of a Astable Oscillator construction using IC – 555 timer. (08 Marks)

Module-5

- 9 a. Convert the following :  
 i)  $FA27D_{16} = ( ? )_{10}$   
 ii)  $57345_{10} = ( ? )_{16}$ . (06 Marks)
- b. Simplify and realize the expressing using basic gates :  
 $(B + \bar{C})(\bar{B} + C) + \bar{\bar{A}} + B + \bar{C}$ . (08 Marks)
- c. What is a flip-flop? Explain the master slave JK flip-flop operation. (06 Marks)

OR

- 10 a. With a neat circuit diagram and truth table, explain the full Adder circuit. (06 Marks)
- b. With a neat block diagram, explain the operating principle of the GSM system. (08 Marks)
- c. What is Multiplexer? Explain the working of  $8 : 1$  multiplexer. (06 Marks)

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