

First/Second Semester B.E. Degree Examination, Dec.2024/Jan.2025

Basic Electronics

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. With a circuit diagram and waveform, explain the working of center tap full wave rectifier. Show that the efficiency of full wave rectifier = 81%. (08 Marks)
- b. For the circuit shown in Fig. Q1 (b), find the currents and voltages in the circuit for  $R_L = 450 \Omega$ . Assume  $V_2 = 10V$ . (08 Marks)

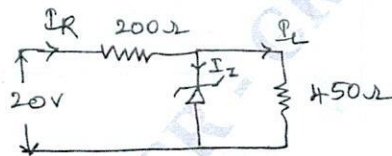


Fig. Q1 (b)

- c. Explain the working of photo diode. (04 Marks)

OR

- 2 a. Explain the VI characteristics of PN junction diode (both forward and reverse). (08 Marks)
- b. A half wave rectifier uses a diode whose internal resistance is  $30 \Omega$  to supply power to  $1.1 K\Omega$  load from  $110 V$  (rms) source of supply. Calculate (i) DC load voltage (ii) DC load current (iii) Percentage regulation (06 Marks)
- c. Explain the working of Light emitting diode. (06 Marks)

Module-2

- 3 a. With a neat diagram, explain the construction and characteristics of n-channel JFET. (10 Marks)
- b. With a neat diagram, explain the operation and characteristics of enhancement type n-channel MOSFET. (10 Marks)

OR

- 4 a. Explain the VI characteristics of SCR. (10 Marks)
- b. Compare BJT and FET. (05 Marks)
- c. Define Latching ( $I_L$ ) and Holding current ( $I_H$ ) with respect to SCR. (05 Marks)

Module-3

- 5 a. Write ideal characteristics of op-amp. (08 Marks)
- b. Derive the output voltage for the following : (i) Differentiator (ii) Voltage follower (08 Marks)
- c. Fig. Q5 (c) shows circuit of Summing amplifier. Determine the value of output voltage for this circuit. (04 Marks)

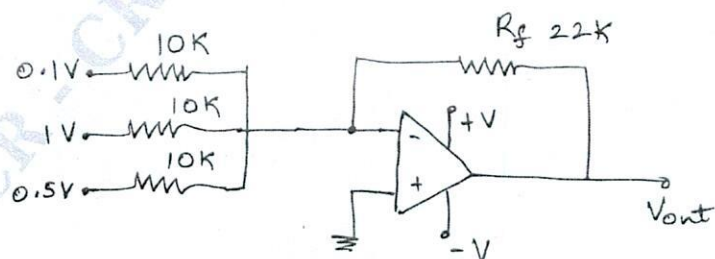


Fig. Q5 (c)

1 of 2

OR

- 6 a. Explain the following terms related to opamp (i) CMRR (ii) Gain bandwidth product. (04 Marks)
- b. For a circuit shown in Fig. 6 (b), determine the output voltage  $V_{O1}$  and  $V_{O2}$ . Write function of each op amp. (06 Marks)

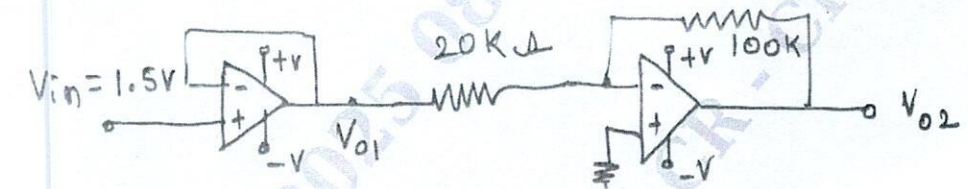


Fig. Q6 (b)

- c. Derive the output voltages of inverting amplifier and integrator. (10 Marks)

Module-4

- 7 a. Explain the operation of BJT as amplifier. (06 Marks)
- b. Explain Barkhausen's criteria for sustained oscillations. (06 Marks)
- c. Explain the working of Astable multivibrator constructed using IC-555 timer. (08 Marks)

OR

- 8 a. Define feedback amplifier. Mention the ways of connecting the feedback signal. (06 Marks)
- b. Explain the operation of transistor switch circuit to switch ON/OFF an LED. (06 Marks)
- c. Define an oscillator. With necessary equations, explain the working of Wein Bridge Oscillator. (08 Marks)

Module-5

- 9 a. Perform the following : (i) Convert  $(398)_{10} = (?)_b = (?)_8 = (?)_{16}$  (ii) Subtract  $(1111)_2 - (1100)_2$  using 1's complement. (05 Marks)
- b. Realize basic gates using NAND gate. (05 Marks)
- c. Explain the working of 4 : 1 multiplexer. (05 Marks)
- d. With a block diagram, explain communication system. (05 Marks)

OR

- 10 a. Design full adder using three variables and implement it using two half adders. (08 Marks)
- b. Simplify the following Boolean expression and implement using basic gates : (i)  $y = a(b+c) + ab + c(a+b)$  (ii)  $y = (\overline{A+B+C})(A+B+C)$  (06 Marks)
- c. With the help of logic diagram and truth table explain the working of clocked SR flip flop. (06 Marks)

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