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18ELN14/24

## First/Second Semester B.E. Degree Examination, June/July 2019 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. What is semiconductor diode? Explain the different equivalent circuits of diode. (06 Marks)
- b. Explain the working of photodiode. (05 Marks)
- c. With a neat circuit diagram and waveforms, explain the working of full wave bridge rectifier. Also derive  $V_{dc}$  and  $V_{rms}$  values for full wave rectifier. (09 Marks)

OR

- 2 a. A full wave rectifier uses 2 diodes having internal resistance of  $20\Omega$  each. The transformer rms secondary voltage from centre to each end is 50V. Find  $I_m$ ,  $I_{dc}$ ,  $I_{rms}$  and  $V_{dc}$  if the load is  $980\Omega$  (06 Marks)
- b. Explain the functional block diagram of 78xx series voltage regulator. (06 Marks)
- c. Explain how Zener diode can be used as a voltage regulator. Give detail mathematical analysis. (08 Marks)

### Module-2

- 3 a. With a neat circuit diagram explain the working of CMOS inverter. (06 Marks)
- b. For a N-channel JFET if  $I_{DSS} = 8mA$  and  $V_p = +5V$ , calculate  $I_D$  at  $V_{as} = -3V$  and  $V_{as}$  at  $I_D = 3mA$ . (05 Marks)
- c. Explain the construction, working and characteristics of N- channel JFET. (09 Marks)

OR

- 4 a. Explain the working of SCR using two transistor model. (06 Marks)
- b. What is commutation in SCR? Explain two types of commutation. (05 Marks)
- c. Explain the construction, working and characteristics of enhancement type MOSFET. (09 Marks)

### Module-3

- 5 a. What is Op – AMP? List the characteristics of ideal Op – Amp. (06 Marks)
- b. Explain how Op – Amp can be used as i) Integrator ii) Voltage Follower. (08 Marks)
- c. Find the output of the Op – Amp circuit shown in Fig Q5(c) below

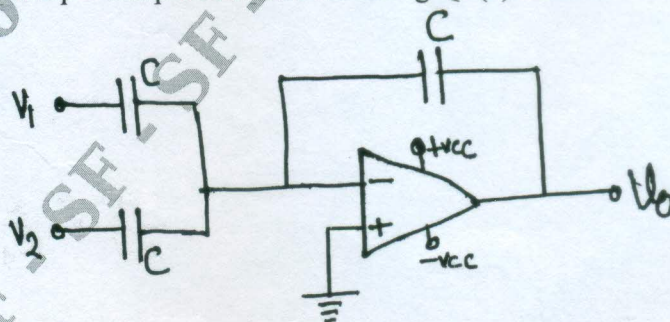


Fig Q5(c)

(06 Marks)



OR

- 6 a. Explain the following terms with respect to Op – Amp  
i) CMRR ii) Slew Rate iii) Output offset voltage iv) Supply voltage Rejection Ratio. (08 Marks)
- b. Design on Op – Amp circuit to obtain output expression as  $V_0 = -[V_1 + 3V_2 + 5V_3]$ . (06 Marks)
- c. Explain how Op – Amp can be used as differentiator. (06 Marks)

**Module-4**

- 7 a. What is feedback amplifier? What are the properties of negative feedback amplifier? (06 Marks)
- b. Explain how transistor can be used as an amplifier. (06 Marks)
- c. With a neat circuit diagram and waveforms, explain the working of 555 timers as an oscillator. (08 Marks)

OR

- 8 a. Draw the block diagram of voltage series negative feedback amplifier and derive the expression for its voltage gain. (06 Marks)
- b. Design a RC phase shift oscillator for a frequency of 1KHz. Draw the circuit diagram with designed values. (06 Marks)
- c. With a neat circuit diagram, explain the working of Wein Bridge oscillator. (08 Marks)

**Module-5**

- 9 a. Perform the following :  
i) Convert  $(925.75)_{10}$  to base – 2 and base –16  
ii) Subtract from  $(11011.11)_2$  from  $(10101.11)_2$  using 2's compliment method. (06 Marks)
- b. With a block diagram explain the working of 3-bit asynchronous counter. (06 Marks)
- c. What is multiplexer? Implement 8:1 multiplexer using basic gates. (08 Marks)

OR

- 10 a. Simplify  $S = A \oplus B \oplus C$  and realize using basic gates. (05 Marks)
- b. What is flip-flop? Explain the operation of master slave JK flip flop. (06 Marks)
- c. Implement full adder using two half adders. (04 Marks)
- d. With a block diagram, explain the working of basic communication system. (05 Marks)

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