First/Second Semester B.E. Degree Examination, June/July 2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- a. Draw forward and reverse V- I, characteristics of Si and Ge diodes and make any two comparison between Si and Ge diodes. (04 Marks)
 - b. With a neat circuit diagram, input and output waveforms, explain the working of an Half wave diode rectifier. (06 Marks)
 - c. A full-wave rectifier supplies a load of 1000Ω . The ac voltage applied to it is 200-0-200 V(rms). Calculate i) I_{De} ii) I_{rms} iii) efficiency (η), Assume $R_f = 0\Omega$. (06 Marks)

OR

- 2 a. Define ' α ' and ' β ' of a transistor amplifier and derive the relation between α and β .

 (04 Marks)
 - b. With a neat circuit diagram, input and output waveforms, explain the operation of a Full wave two diode rectifier. (06 Marks)
 - c. Draw an output characteristics of CE-transistor amplifier, mark different regions of working on it, explain each region of working. (06 Marks)

Module-2

- 3 a. With a neat sketch and equations, explain what is dc load line and bias point in a CE base bias amplifier. (04 Marks)
 - b. Explain with neat circuit diagram and equations, voltage divider bias amplifier. (06 Marks)
 - c. Design bas-bias transistor circuit, using 'Si' transistor having ' β ' value of 100, V_{CC} is 10V, and dc bias conditions are to be $V_{cc} = 5v$ and $I_c = 5mA$. (06 Marks)

OR

- 4 a. Define CMRR and slew rate and write any four ideal characteristics for op-amp. (04 Marks)
 - b. With a neat circuit diagram, derive an equation for op-amp application as
 - i) Inverting amplifier
- ii) Non-inverting amplifier
- iii) Inverting 2-input summer
- iv) Subtractor
- v) Integrator vi) Differentiator. (12 Marks)

Module-3

5 a. Convert $(1101010)_2 = ()_{10}$ and $(65)_{10} = ()_2$

(04 Marks)

b. Convert $(ABCD)_{16} = ()_8$ and $(16000)_8 = ()_{16}$

- (04 Marks)
- c. Write the truth table, design equations and circuit diagram of an Half adder using logic gates. (08 Marks)

OR

6 a. State and prove De Morgan's Theorem for 3-variables.

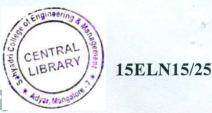
(04 Marks)

b. Realize AND, OR and EX-OR gates using NAND gates.

- (06 Marks)
- c. Perform the following subtraction using 1's and 2's complement, (10111001)₂ (1011)₂.

(06 Marks)





Module-4

- 7 a. Compare flip-flop and Latch. (02 Marks)
 - b. With circuit diagram and truth table explain the working of a NAND gate latch. (07 Marks)

c. Explain the operation of clocked RS-flip flop, with circuit diagram and truth table. (07 Marks)

- 8 a. Explain with circuit diagram and truth table working of NOR gate latch. (06 Marks)
 - b. Draw the architecture of 8051 microcontroller, explain the function of each block used in it.
 (10 Marks)

Module-5

- 9 a. Draw the block diagram of communication system, explain the functions of each block used in it.

 (05 Marks)
 - b. Define amplitude modulation and derive equation of amplitude modulated double side band wave.

 (05 Marks)
 - c. A carrier of 2MHz has 1kW of its power amplitude modulated with a sinusoidal signal of 2KHz, the depth of modulation is 60%. Calculate the side band frequencies, signal band width, power in side bands, and total power of modulated wave. (06 Marks)

OR

- 10 a. Distinguish between active and passive transducers. (02 Marks)
 - b. Bring out any four differences between amplitude modulation and frequency modulation.

(04 Marks)

c. Explain with neat diagram working of LVDT.