

# CBCS SCHEME

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18ELN14/24

## First/Second Semester B.E. Degree Examination, Aug./Sept.2020 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. Explain the operation of PN – junction diode under forward and reverse bias condition. (08 Marks)
- b. Explain how zener diode can be used as voltage regulator. (06 Marks)
- c. A silicon diode has  $I_S = 10\text{nA}$ , operating at  $25^\circ\text{C}$ . Calculate diode current  $I_D$  for a forward bias of  $0.6\text{V}$ . (06 Marks)

OR

- 2 a. With neat circuit diagram, explain the operation of center tapped full wave rectifier. Draw input and output waveforms. (08 Marks)
- b. Explain photo diode and LED in brief. (06 Marks)
- c. Explain LM7805 fixed voltage regulator. (06 Marks)

### Module-2

- 3 a. Explain construction and operation of n–channel JFET. Draw transfer and drain characteristic. (08 Marks)
- b. Explain the operation of CMOS inverter. (06 Marks)
- c. A n–channel JFET has  $I_{DSS} = 8\text{mA}$ ,  $V_p = -4\text{V}$ . Determine  $I_D$  for  $V_{GS} = -1\text{V}$  and  $V_{GS} = -2\text{V}$ . (06 Marks)

OR

- 4 a. Explain construction and operation of n – channel depletion MOSFET. (08 Marks)
- b. Explain the operation of SCR using 2 – Transistor model. (06 Marks)
- c. Explain natural and forced commutation turn off methods of SCR. (06 Marks)

### Module-3

- 5 a. Define following terms with respect to OP –Amp : i) CMRR ii) Input offset voltage iii) Slew rate. Also mention op-amp ideal characteristics. (08 Marks)
- b. A certain op-amp has an open loop differential voltage gain of 1,00,000 and CMRR = 4,00,000. Determine common mode gain and express CMRR in decibels. (06 Marks)
- c. Explain op-amp as integrator. (06 Marks)

OR

- 6 a. With neat circuit, explain the operation of three input adder circuit. Derive expression for  $V_0$ . (08 Marks)
- b. A non inverting amplifier has closed loop gain of 25. If input voltage  $V_i = 10\text{mV}$ ,  $R_f = 10\text{K}\Omega$  determine the value of  $R_1$  and output voltage  $V_0$ . (06 Marks)
- c. Explain difference amplifier using op-amp. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank page.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

**Module-4**

- 7 a. With neat circuit, explain transistor as an amplifier. Derive expression for voltage gain. (08 Marks)
- b. Mention types of feedback amplifier. With block diagram, explain voltage series feedback amplifier. (06 Marks)
- c. A negative feedback amplifier has gain  $A = 1000$  and bandwidth of 200KHz. Calculate gain and bandwidth with feedback if feedback factor  $\beta = 20\%$ . (06 Marks)

**OR**

- 8 a. What is phase shift oscillator? Explain with circuit, RC phase shift oscillator. (08 Marks)
- b. Explain with circuit, Astable multivibrator using IC 555. (06 Marks)
- c. An Astable multivibrator circuit has  $R_1 = 6.8K\Omega$ ,  $R_2 = 4.7K\Omega$ ,  $C = 0.1\mu F$ . Calculate frequency of oscillation and duty cycle. (06 Marks)

**Module-5**

- 9 a. Convert :
- i)  $(2467.125)_{10} = (?)_2 = (?)_{16}$
- ii)  $(765.16)_8 = (?)_{10} = (?)_2$
- iii)  $(101111.101)_2 = (?)_8 = (?)_{10}$ . (08 Marks)
- b. Explain full adder using truth table and expression. Implement sum and carry expressions. (06 Marks)
- c. Implement half adder using NAND gates. (06 Marks)

**OR**

- 10 a. State and prove De-Morgan's theorems for two variables. (08 Marks)
- b. With the help of logic diagram and truth table, explain the working of clocked SR – flip flop. (06 Marks)
- c. Explain the basic block diagram of communication system. (06 Marks)

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