

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°C . Calculate diode current I_D for a forward bias of 0.6V . (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 differentials voltage gain of $1,00,000$ and $\text{CMRR} = 4,00,000$. 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)

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 $R_1 = 6.8\text{K}\Omega$, $R_2 = 4.7\text{K}\Omega$, $C = 0.1\mu\text{F}$. 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)
