CBCS SCHEME

USN | | | | | | | | | | |

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 = 10nA, 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} = 8mA, V_p = –4V. Determine I_D for V_{GS} = –1V and V_{GS} = –2V. **(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 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 = 10mv, R_f = 10KΩ 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 $R_1 = 6.8K\Omega$, $R_2 = 4.7K\Omega$, $C = 0.1\mu F$. 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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