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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