CBCS SCHEME

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

15ELN15/25

First/Second Semester B.E. Degree Examination, Feb./Mar. 2022
Basic Electronics

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Draw and explain V-I characteristics of a Diode. **(05 Marks)**

b. With a neat circuit diagram and waveforms, explain the working of Half-wave rectifier with capacitor filter. **(05 Marks)**

c. Draw the Common – Emitter (CE) circuit and sketch the input and output characteristics and explain the different regions of options of NPN transistor. **(06 Marks)**

OR

2 a. Explain Zener diode voltage regulator with and without load. **(08 Marks)**

b. For the circuit shown in Fig Q2(b), find : i) the output voltage ii) the voltage drop across series resistance iii) the current through the zerner diode.

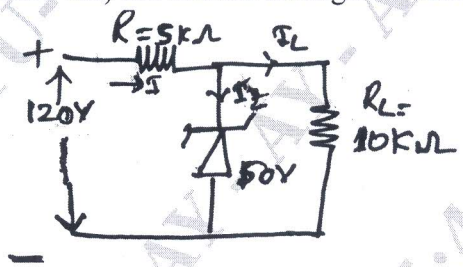

Fig Q2(b)

Given : input voltage : 120V
$R = 5K\Omega$, $R_L = 10K\Omega$

I_L = load current
I_z = zener current
I = Total current.

(08 Marks)

Module-2

3 a. What is a DC-load line and explain with respect to NPN transistor. **(04 Marks)**

b. Explain voltage – divider bias method with neat circuit and analysis. **(08 Marks)**

c. Explain the practical characteristics of an opamp? **(04 Marks)**

OR

4 a. Explain 3-input inverting summing amplifier and also derive the output voltage equation. **(08 Marks)**

b. For the bias circuit shown in Fig Q4(b), find : i) I_{BQ} and I_{CQ} ii) V_{CEQ} iii) V_B, V_C iv) V_{BC}.

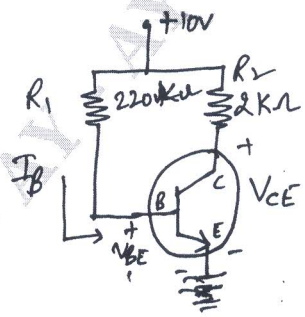

Fig Q4(b)

Given : $V_{BE} = 0.7V$
$\beta = 60$
$R_1 = 220K\Omega = R_B$
$R_2 = 2K\Omega = R_C$

(08 Marks)

Module-3

5 a. Convert the following :
(i) $(3A.2F)_{16} = (\quad)_{10} = (\quad)_2$
(ii) $(0.BF85)_{16} = (\quad)_2 = (\quad)_8$ **(06 Marks)**

b. Perform the following using 1's and 2's compliment techniques.
(i) $(22)_{10} - (7)_{10}$ (ii) $(112)_{10} - (65)_{10}$ **(06 Marks)**

c. State and prove De-Morgan's theorem using suitable truth table. **(04 Marks)**

OR

6 a. Design and Realize the Half – adder using NAND gates. **(06 Marks)**

b. Simplify the following expressions :
(i) $Y = \overline{(A+B)}\ (\overline{A}+\overline{C})\ (\overline{B}+C)$
(ii) $Y = ABC + A\overline{B}C + AB\overline{C} + \overline{A}BC$ **(08 Marks)**

c. Draw Universal symbols of Basic and Universal gates. **(02 Marks)**

Module-4

7 a. Differentiate latch and Flip-Flop. **(02 Marks)**

b. Explain the operation of NAND – latch with symbol, circuit and truth table. **(06 Marks)**

c. Explain the architecture of 8051 microcontroller. **(08 Marks)**

OR

8 a. Explain clocked RS-Flip-flop with symbol, circuit and truth table. **(08 Marks)**

b. With neat block diagram, explain the working and operation of 8051 microcontroller based stepper motor. **(08 Marks)**

Module-5

9 a. What is Modulation? Why we need it? **(04 Marks)**

b. Differentiate AM and FM. **(04 Marks)**

c. Explain the working principle and operation of LVDT with suitable diagram. **(08 Marks)**

OR

10 a. Explain Frequency Modulation (FM) with help of neat waveforms. **(06 Marks)**

b. Prove that $P_{total} = \left[\left(1+\frac{m_a^2}{2}\right)P_C\right]$

Where P_C = average carrier power
m_a = modulation index **(08 Marks)**

c. What are the applications of Thermistors. **(02 Marks)**

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