CBCS SCHEME

USN | | | | | | | | | |

17ELN15/25

First/Second Semester B.E. Degree Examination, July/August 2022
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 V-I characteristics of p-n junction diode. **(08 Marks)**

b. With neat circuit diagram and waveform explain the working of full wave bridge rectifier. **(08 Marks)**

c. Derive the relationship between α and β. Also calculate the α value and β value of a transistor. If $I_\beta = 100\mu A$ and $I_C = 2mA$. **(04 Marks)**

OR

2 a. With a neat diagram, explain the Input-Output characteristics of a transistor in common base configuration. **(08 Marks)**

b. With neat circuit diagram and waveforms, explain the working of a half-wave rectifier. **(08 Marks)**

c. Explain briefly capacitor filter circuit. **(04 Marks)**

Module-2

3 a. Explain the characteristic of Ideal operational amplifier. **(06 Marks)**

b. What is DC load line? Explain with neat circuit the operation of voltage divider bias circuit. **(08 Marks)**

c. Derive the output expression of Op-Amp differentiator. **(06 Marks)**

OR

4 a. Calculate the output voltage of a three input inverting summing amplifier, given $R_1 = 200K\Omega$, $R_2 = 250K\Omega$, $R_3 = 500K\Omega$, $R_f = 1M\Omega$, $V_1 = -2V$, $V_2 = -1V$ and $V_3 = +3V$. **(06 Marks)**

b. For the circuit shown in Fig.Q.4(b) find the Q-point values and draw DC-load line, where $V_{BE} = 0.7V$ and $\beta = 50$. **(06 Marks)**

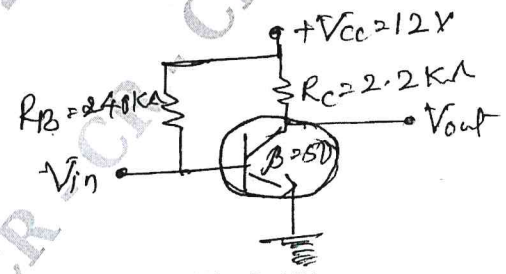

Fig.Q.4(b)

c. Explain briefly inverting and non-inverting operational amplifiers. **(08 Marks)**

Module-3

5 a. Convert:
   i) $(1101101)_2 = (?)_{10}$ and $(101.01)_2 = (?)_{10}$
   ii) $(48350)_{10} = (?)_{16} = (?)_8$
   iii) $(FA876)_{16} = (?)_8 = (?)_{10}$
   iv) $(237)_8 = (?)_{16} = (?)_{10}$. **(08 Marks)**

   b. Perform the subtraction:
   i) $(22 - 17)_{10}$ by using 1's complement.
   ii) $(11010)_2 - (10000)_2$ by using 2's complement. **(04 Marks)**

   c. State and prove De-Morgan's theorems. **(08 Marks)**

OR

6 a. Explain the full adder circuit with circuit diagram, truth table. **(05 Marks)**

   b. What are universal gates? Realize AND and OR gates using NAND gates. **(05 Marks)**

   c. Simplify: $y = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}\overline{C}D + A\overline{B}\overline{C}\overline{D} + A\overline{B}\overline{C}D$. **(05 Marks)**

   d. Draw and explain half adder circuit. **(05 Marks)**

Module-4

7 a. Explain the operation of NOR Latch with symbol, circuit diagram and truth table. **(06 Marks)**

   b. Explain with neat block diagram architecture of 8051 microcontroller. **(08 Marks)**

   c. Explain the working of clocked RS-flip flop using NAND-gates. **(06 Marks)**

OR

8 a. Write a note on NAND-gate latch. **(06 Marks)**

   b. With the help of block diagram, explain the microcontroller based stopper motor control system. **(08 Marks)**

   c. Explain R-S flip-flop with diagram and truth table. **(06 Marks)**

Module-5

9 a. With the help of block diagram, explain the communication system. **(06 Marks)**

   b. Define Modulation. Derive mathematical expression for amplitude modulation, draw waveforms. **(06 Marks)**

   c. Explain the construction and working principle of LVDT. **(08 Marks)**

OR

10 a. A carrier of 1MHz, with 400W of its power is amplitude modulated with a sinusoidal signal of 2500Hz. The depth of modulation is 75%. Calculate the side band frequency, Bandwidth, the power in the side bands and the total power in the modulated wave. **(06 Marks)**

   b. List the differences between Amplitude Modulation and frequency modulation. **(06 Marks)**

   d. Explain the piezoelectric transducer and photo electric transducer. **(08 Marks)**

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