CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐   **17ELN15/25**

First/Second Semester B.E. Degree Examination, July/August 2021
Basic Electronics

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. With a neat sketch of VI characteristics of PN Junction Diode. Explain forward and reverse characteristics of it. **(06 Marks)**
   b. Discuss the working of full wave rectifier with necessary waveforms with the utilization of two diodes. **(07 Marks)**
   c. Consider an bridge rectifier with capacitor filter input 230V, 50Hz. Find the output DC output voltage if an filter of 1000 µF is used, calculate the ripple factor and the DC output voltage with filter by considering load resistance of 100Ω. **(07 Marks)**

2 a. Explain briefly the CB configuration of PNP transistor with its input and output characteristics. **(08 Marks)**
   b. Explain Avalanche Breakdown and Zener Breakdown. **(06 Marks)**
   c. Derive the relationship between CB mode DC current gain and CE mode DC current gain. **(06 Marks)**

3 a. Explain the working of collector to basic bias and voltage divider bias circuit. **(08 Marks)**
   b. Draw the DC load line and determine the operating point for the transistor circuit having $\beta = 50$, $R_C = 1K\Omega$, $R_B = 100k\Omega$ and $V_{CC} = 5V$. **(06 Marks)**
   c. Define stability factor for transistor bias circuit and thermal stability of Bias circuit. **(06 Marks)**

4 a. List the ideal and typical characteristics of OP-AMP. **(08 Marks)**
   b. With relevant equations and circuit diagram, describe OP-AMP as Adder and Integrator. **(08 Marks)**
   c. Explain the need for an OP-AMP. **(04 Marks)**

5 a. State and prove De-Morgan's theorems. **(06 Marks)**
   b. Using respective truth–tables, show the implementation of not gate, and gate, OR-Gate and NOR gate using only Nand gate. **(08 Marks)**
   c. Perform the following :

   i) $(ABCD)_{16} = (\ )_{10} = (\ )_8 = (\ )_2$

   ii) $(24742)_8 = (\ )_{10} = (\ )_{16} = (\ )_2$. **(06 Marks)**

6 a. Design and implement half adder using only Nand gates. **(08 Marks)**

b. Compute the following :
   i)   CDEF, 5DB + 49E6.F74
   ii) 101011 – 100110 using 1's complement
   iii) $(342.56)_{10} = (\quad)_{16} = (\quad)_8.$ **(06 Marks)**

c. Simplify the following equation and realize using logic gates :
   i) $X = \overline{A}BC + A\overline{B}C + ABC$
   ii) $Z = \overline{AB}C + \overline{A}B\overline{C} + A\overline{BC}.$ **(06 Marks)**

7 a. List out the features of 8051 Micro controller. **(10 Marks)**

b. With the block-diagram explain microcontroller based stepper motor control system. **(10 Marks)**

8 a. Explain the operation of clocked RS flip-flop with its waveforms. **(10 Marks)**

b. Explain the operation of NoR gate latch. **(05 Marks)**

c. Explain the operation of RS flip-flop. **(05 Marks)**

9 a. With neat waveforms. Derive the expression for Amplitude Modulation(AM). **(10 Marks)**

b. With suitable block-diagram, explain basic communication system. **(05 Marks)**

c. Give the comparison of AM and FM. **(05 Marks)**

10 a. Briefly describe the basic requirements of an transducer. **(07 Marks)**

b. Explain construction of linear variable differential transformer (LVDT) with its advantages and limitations. **(08 Marks)**

c. An AC LVDT has following data, Input = 6.3V, output = 5.2V range ±0.5 in, determine output voltage Vs core position for a core movement going from +0.45 in to –0.30 in and also output voltage when core is –0.25 in from center. **(05 Marks)**

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