CBCS SCHEME

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

15ELN15/25

First/Second Semester B.E. Degree Examination, Aug./Sept.2020
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. What is diode? Explain the various parameters of diode in brief. **(06 Marks)**

b. Draw the center tap full wave rectifier circuit and explain its operation. **(05 Marks)**

c. Explain how zener diode can be used as a voltage regulator. **(05 Marks)**

OR

2 a. Establish the relationship between α and β. **(04 Marks)**

b. Explain about common emitter characteristics with diagram. **(08 Marks)**

c. Calculate α_{dc} and β_{dc} for the transistor if I_C is measured as 1 mA and I_B is 25 μA. Also determine the new base current to give I_C = 5 mA. **(04 Marks)**

Module-2

3 a. Discuss the selection of operating point related to DC load line. **(04 Marks)**

b. Explain about voltage divider bias circuit with diagram. **(06 Marks)**

c. Calculate the minimum and maximum values of I_C and V_{CE} for the base bias when $h_{FE(min)}$ = 50 and $h_{FE(max)}$ = 60. For circuit V_{CC} = 12V, R_C = 2 kΩ and R_B = 150 k (Assume silicon transistor). **(06 Marks)**

OR

4 a. What is Op–Amp? Write the characteristics of ideal Op–Amp. **(06 Marks)**

b. Explain the Op–Amp integrator circuit with equation. **(06 Marks)**

c. An inverting amplifier has R_1 = 20 kΩ, R_f = 100 kΩ. Find the O/P voltage, I/P resistance and I/P current for an I/P voltage of 1V. **(04 Marks)**

Module-3

5 a. Perform the following operations :

i) $(110.1101)_2 = (?)_{10}$ → Binary to Decimal

ii) $(47.8125)_{10} = (?)_2$ → Decimal to Binary

iii) $(31C.DE)_{16} = (?)_{10}$ → Hexadecimal to Decimal

iv) $(11010.101)_2 = (?)_{16}$ → Binary to Hexadecimal. **(08 Marks)**

b. State and prove Demorgan's theorem with two variables. **(04 Marks)**

c. Construct a circuit for the expression X = AB + CD using :

i) Only NAND gates

ii) Only NOR gates. **(04 Marks)**

OR

6 a. Prove and implement by using basic gates :

i) $A + \overline{A}B = A + B$

ii) $(A + B)(A + C) = A + BC$. **(04 Marks)**

b. Explain half adder circuit by using only NAND gates along with expression. **(06 Marks)**

c. Explain the basic laws of Boolean algebra. **(06 Marks)**

Module-4

7 a. What is Flip–Flop? List out the applications of Flip–Flop. (04 Marks)
b. Explain about working of clocked SR Flip–Flop along with truth table. (08 Marks)
c. Mention the features of 8051. (04 Marks)

OR

8 a. Explain the architecture of 8051 with neat diagram. (08 Marks)
b. Briefly explain about SR latch with NAND gate structure. (06 Marks)
c. Mention the application of Micro controller. (02 Marks)

Module-5

9 a. Compare between FM and AM. (06 Marks)
b. Define transducer. Explain about piezoelectric transducer and resistive transducer. (06 Marks)
c. If FM is represented by $V = 10 \sin (8 \times 10^8 + 4 \sin 1000t)$. Calculate :
i) Carrier frequency (f_c)
ii) Modulating frequency (f_m). (04 Marks)

OR

10 a. What is LVDT? Explain with diagram. (06 Marks)
b. Explain elements of communication system along with block diagram. (06 Marks)
c. List out the difference between active and passive transducer. (04 Marks)

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