First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019
Basic Electronics

Time: 3 hrs.   Max. Marks:100

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

Module – 1

1
a. Define PN Junction. Draw and explain the VI characteristics of Si and Ge diodes. **(05 Marks)**
b. Derive an expression for ripple factor and dc o/p voltage of a half wave rectifier with C filter. **(07 Marks)**
c. Calculate the values of I_C, I_E and β_{dc} for a transistor with $\alpha_{dc} = 0.99$ and $I_B = 110\mu A$. **(03 Marks)**
d. With a neat circuit. Explain the working of clipping circuit. **(05 Marks)**

2
a. Explain the working of center tapped Full Wave Rectifier (FWR) and derive the expression for I_{dc}, I_{rms}, r **(06 Marks)**
b. Draw and explain the clamper circuit with suitable waveforms. **(05 Marks)**
c. Derive the relationship between α and β and draw the input and output characteristics of common collector configuration. **(04 Marks)**
d. Design a zener diode voltage regulator to meet the following requirements unregulated dc I/P voltage, $V_i = 13$ to $17V$, $I_L = 10mA$, $V_0 = 10V$, $I_{zmin} = 5mA$, $P_{zmax} = 500mW$. **(05 Marks)**

Module – 2

3
a. What are the ideal characteristics of opamp? **(05 Marks)**
b. Explain dc load line and Bias point with respect to common emitter configuration. **(05 Marks)**
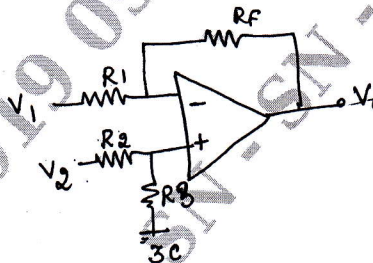c. Compute the output expression for V_o shown in Fig Q3(c)

Fig Q3(c)   **(05 Marks)**
d. Explain how opamp can be used an inverting amplifier. **(05 Marks)**

4
a. With waveform, explain how opamp can be used as differentiator and integrator. **(06 Marks)**
b. Explain the working of voltage divider bias circuit. **(07 Marks)**
c. Mention different region of operation of transistor. **(03 Marks)**
d. Explain the term with respect to opamp a) CMRR ii) Slew rate. **(04 Marks)**

Module – 3

5
a. Implement EXOR gate using basic gates. **(05 Marks)**
b. Explain basic boolean laws. **(05 Marks)**
c. Determine the value of base x if
i) $(225)_x = (341)_8$ ii) $(211)_x = (152)_8$ **(04 Marks)**
d. Subtract $(28)_{10} - (19)_{10}$ using both 1's and 2's complement methods. **(06 Marks)**

6 a. State Demorgan's theorem for 3 variables and prove. (05 Marks)

b. Design half adder circuit and realize using NAND gates. (05 Marks)

c. Simplify and realize the following Boolean equation using basic gates
$$Y = ABC + A\overline{B}C + AB\overline{C} + \overline{A}BC$$ (05 Marks)

d. $(110011)_2 - (11001)_2 = (?)_2$ using 2's complement method. (05 Marks)

Module – 4

7 a. Define Flip-flop. Explain the working of clocked RS FF with a suitable logic diagram and a truth table. (06 Marks)

b. Explain the functional diagram of 8085 microprocessor. (09 Marks)

c. Distinguish between active and passive transducers. (05 Marks)

8 a. With circuit. Explain the working of NAND gate Latch. (05 Marks)

b. List the differences between microprocessor and microcontroller. (05 Marks)

c. Explain the construction and working of Linear variable differential transducer. (05 Marks)

d. Write a note on Piezo electric transducer. (05 Marks)

Module – 5

9 a. What is modulation? Explain the need for modulation. (05 Marks)

b. With block diagram, explain the basic elements of communication system. (05 Marks)

c. Mention the applications of OFC. (04 Marks)

d. List the differences between AM and FM. (06 Marks)

10 a. Define amplitude modulation and prove that $P_t = P_c \left(1 + \dfrac{m^2}{2} \right)$ and write AM wave. (09 Marks)

b. Explain the block diagram of ISDN. (06 Marks)

c. The total power content of an AM signal is 2000W. Determine the power being transmitted at carrier frequency and at each of the side bands when percentage modulation is 100% (05 Marks)

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