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14ELN15/25

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)

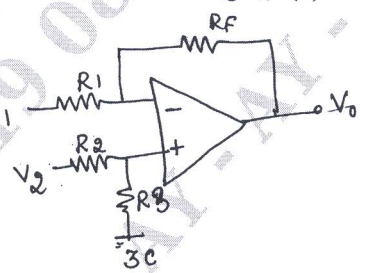

Fig Q3(c) **(05 Marks)**

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 $P_t = P_c\left(1+\frac{m^2}{2}\right)$ 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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