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14ELN15/25

First/Second Semester B.E. Degree Examination, Feb./Mar. 2022

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 the terms: (i) forward voltage drop (ii) Reverse saturation current of a diode. (02 Marks)
- b. Explain the forward and reverse characteristics of a silicon diode. (06 Marks)
- c. If α for transistor is 0.99, the base current is 100 μ A, estimate the collector current value. (04 Marks)
- d. With the help of neat figure and with relevant waveforms, explain the working principle of full wave bridge rectifier circuit. (08 Marks)

OR

- 2 a. Explain the working principle of loaded regulator. (05 Marks)
- b. Explain positive shunt clipper circuit. (05 Marks)
- c. Draw the common base configuration circuit and explain the output characteristics of common base configuration. (06 Marks)
- d. Construct the piecewise linear characteristic for a silicon diode which has a 0.25 Ω dynamic resistance and a 200 mA maximum forward current. (04 Marks)

Module - 2

- 3 a. Draw the base bias circuit and explain the operation and analysis of base bias circuit. (06 Marks)
- b. Explain how Op Amp can be used as an integrator. (06 Marks)
- c. Find the output of the following Op Amp circuits shown in Fig. Q3 (c). (08 Marks)

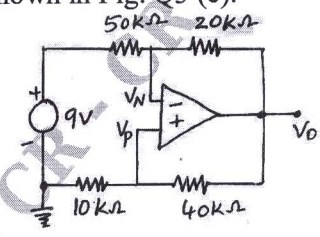
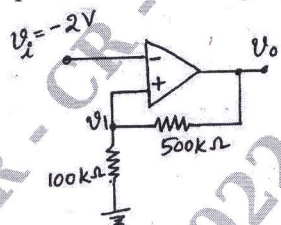


Fig. Q3 (c)

OR

- 4 a. Define CMRR, slew rate of an Op Amp. (04 Marks)
- b. What is an inverting amplifier? Derive the equation of voltage gain of an inverting amplifier using OpAmp. (08 Marks)
- c. For the voltage divider bias circuit shown in Fig.Q4 (c), determine the emitter voltage, collector voltage and collector to emitter voltage by using approximate circuit analysis. (08 Marks)

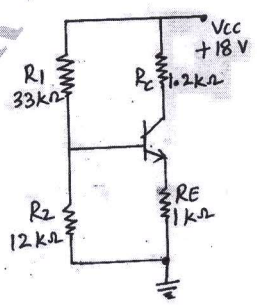


Fig. Q4 (c)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module – 3

- 5 a. State and prove De Morgan's theorem with two variables. (04 Marks)
 b. Briefly explain switching and logic levels. (06 Marks)
 c. Realize NOT, AND and OR gates using only NAND gates. (06 Marks)
 d. Simplify the given expression, $y = AB + AC + BD + CD$ and implement it using logic gates. (04 Marks)

OR

- 6 a. Perform the following conversions:
 (i) $(29.3749)_{10} = (?)_2 = (?)_8$
 (ii) $(843)_{10} = (?)_{16} = (?)_2$ (06 Marks)
 b. Define full adder. Write the truth table, logic expression and logic circuit of full adder. (06 Marks)
 c. Perform subtraction using 2's complement method.
 (i) $(63)_{10} - (25)_{10}$
 (ii) $(11.101)_2 - (10.11)_2$ (08 Marks)

Module – 4

- 7 a. Write the truth table, logic circuit and explain the working principle of clocked RS flip flop. (07 Marks)
 b. With the help of neat figure, explain the architecture of 8051 microcontroller. (09 Marks)
 c. Write a note on thermistor. (04 Marks)

OR

- 8 a. Write the differences between microprocessor and microcontroller. (04 Marks)
 b. Explain the working principle of LVDT. (06 Marks)
 c. With the help of neat figure explain the architecture of 8085 microprocessor. (10 Marks)

Module – 5

- 9 a. Briefly explain the elements of the communication system. (04 Marks)
 b. Define AM. Derive the expression for the amplitude modulated wave. (10 Marks)
 c. Write a note on telephone systems. (06 Marks)

OR

- 10 a. Explain the block diagram of optical fibre communication system. (07 Marks)
 b. Write the applications of optical fibre communication. (04 Marks)
 c. Define frequency modulation. Write the frequency modulated waveform. (04 Marks)
 d. Give the comparison between AM and FM. (05 Marks)
