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First/Second Semester B.E. Degree Examination, Dec.2017/Jan.2018

Basic Electronics

Max. Marks: 80 Time: 3 hrs.

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

Explain the V-I characteristics of p-n junction diode. 1

- The input voltage applied to the primary of a 4:1 step down transformer of a full wave centre tap rectifier is 230 V, 50 Hz is the load resistance is 600 Ω and forward resistance is 20 Ω . Determine the following for circuit shown in Fig.Q1(b).
 - i) de power output
 - ii) Rectification efficiency
 - iii) PIV

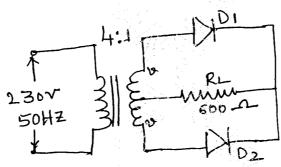


Fig.Q1(b)

(06 Marks)

Explain CB configuration of BJT with characteristics.

(05 Marks)

OR

- Derive an expression for ripple factor and output de voltage of a full wave rectifier. 2
 - (06 Marks)
 - Explain how a zener diode can be used as a voltage regulator.

- (05 Marks)
- Obtain the relationship between α and β . Calculate the value of I_C , I_E for a transistor that has
 - α = 0.98 and I_B = 100 $\mu A.$

Module-2

- What is DC load line? Explain collector to base biased method with necessary equation. 3

 - Define the following terms with respect to op-amp: (i) Slew rate, (ii) CMRR, (iii) PSRR. (05 Marks)
 - Design an op-amp circuit that will produce an output equal to $-(4V_1 + V_2 + 0.1V_3)$. c.

(86 Marks)

OR

- With circuit diagram, explain the operation of voltage divider bias circuit with necessary a. (05 Marks) equations. (05 Marks)
 - Derive the expression of 3-i/p summing amplifier. Draw the circuit of inverting op-amp. Derive the expression for the voltage gain. b.

Module-3

- 5 Perform the following:
 - i) Convert $(725.25) = (?)_{10} = (?)_2$
 - ii) Subtract using 2's complement $(4-9)_{10}$
 - iii) $(1101010101)_2 = (?)_8 = (?)_{16}$

(06 Marks)

State and prove Demorgan's theorem.

(05 Marks)

Simplify the expression and realize using basic gates $\overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}\overline{C}$

(05 Marks)

OR

- 6 Convert:
 - i) $(172.625)_{10} = (?)_{16} = (?)_2$
 - ii) $(BDCE)_{16} = (?)_2 = (?)_8$

iii) $(10111101.0110)_2 = (\infty)_{10} = (?)_{16}$

(06 Marks)

- b. Simplify and realize the Boolean expression using two inputs NAND gates only $(A + \overline{B} + C)(\overline{A} + B + C)$. (05 Marks)
- c. Realize the full adder circuit for sum and carry using basic gates, explain the same with truth (05 Marks)

Module-4

Explain the operation of NAND and NOR latch with symbol, circuit and truth tube.

(08 Marks)

With neat block diagram, describe the architecture of 8051 microcontroller.

(08 Marks)

OR

- 8 What is flip-flop? Explain clocked R-S flip-flop with diagram and truth table. (08 Marks)
 - Explain the working principle of microcontroller based stepper motor control system.

(08 Marks)

Module-5

- What are the basic elements of communication system? Explain with neat block diagram. 9
 - Distinguish between Amplitude Modulation (AM) and Frequency Modulation (FM).

(04 Marks)

Explain the construction and the principle of operation of LVDT.

(06 Marks)

OR

With relevant waveforms, explain amplitude modulation. 10

(06 Marks)

- What is a transducer? Mention four important parameters of an electrical transducer.
- Write short notes on:

(04 Marks)

- - i) Piezo electric transducer
 - ii) Photo electric transducer.

(06 Marks)