CBCS Scheme

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15ELN15/25

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

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. Explain the V-I characteristics of p-n junction diode. **(05 Marks)**

b. 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) dc power output
ii) Rectification efficiency
iii) PIV

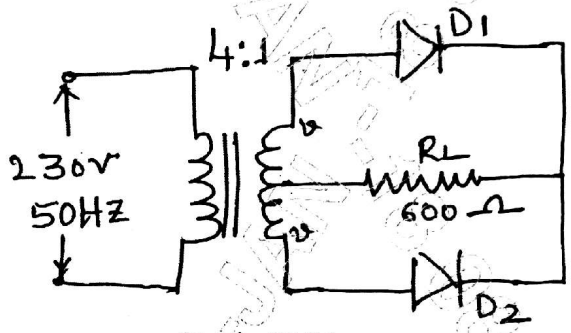

Fig.Q1(b) **(06 Marks)**

c. Explain CB configuration of BJT with characteristics. **(05 Marks)**

OR

2 a. Derive an expression for ripple factor and output dc voltage of a full wave rectifier. **(06 Marks)**

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

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

Module-2

3 a. What is DC load line? Explain collector to base biased method with necessary equation. **(05 Marks)**

b. Define the following terms with respect to op-amp: (i) Slew rate, (ii) CMRR, (iii) PSRR. **(05 Marks)**

c. Design an op-amp circuit that will produce an output equal to $-(4V_1 + V_2 + 0.1V_3)$. **(06 Marks)**

OR

4 a. With circuit diagram, explain the operation of voltage divider bias circuit with necessary equations. **(06 Marks)**

b. Derive the expression of 3-i/p summing amplifier. **(05 Marks)**

c. Draw the circuit of inverting op-amp. Derive the expression for the voltage gain. **(05 Marks)**

Module-3

5 a. Perform the following:
i) Convert $(725.25) = (\ ?\ )_{10} = (\ ?\ )_2$
ii) Subtract using 2's complement $(4 - 9)_{10}$
iii) $(11010.101)_2 = (\ ?\ )_8 = (\ ?\ )_{16}$ **(06 Marks)**

b. State and prove Demorgan's theorem. **(05 Marks)**

c. Simplify the expression and realize using basic gates $\overline{A}\,\overline{B}\,\overline{C} + \overline{A}B\overline{C} + A\overline{B}\,\overline{C} + A\overline{B}\,\overline{C}$. **(05 Marks)**

OR

6 a. 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 table. **(05 Marks)**

Module-4

7 a. Explain the operation of NAND and NOR latch with symbol, circuit and truth tube. **(08 Marks)**

b. With neat block diagram, describe the architecture of 8051 microcontroller. **(08 Marks)**

OR

8 a. What is flip-flop? Explain clocked R-S flip-flop with diagram and truth table. **(08 Marks)**

b. Explain the working principle of microcontroller based stepper motor control system. **(08 Marks)**

Module-5

9 a. What are the basic elements of communication system? Explain with neat block diagram. **(06 Marks)**

b. Distinguish between Amplitude Modulation (AM) and Frequency Modulation (FM). **(04 Marks)**

c. Explain the construction and the principle of operation of LVDT. **(06 Marks)**

OR

10 a. With relevant waveforms, explain amplitude modulation. **(06 Marks)**

b. What is a transducer? Mention four important parameters of an electrical transducer. **(04 Marks)**

c. Write short notes on:
i) Piezo electric transducer
ii) Photo electric transducer. **(06 Marks)**

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