

CBCS Scheme

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15ELN15/25

First/Second Semester B.E. Degree Examination, June/July 2017

Basic Electronics

Time: 3 hrs.

Max. Marks: 80

*Note: Answer FIVE full questions, choosing one full question from each module.*Module-1

- 1 a. Explain briefly the PN junction diode characteristics. (06 Marks)
 b. Explain Zener diode voltage regulator circuit with no load and with load. (06 Marks)
 c. Derive the relationship between α and β . Calculate the value of I_c for a transistor that has $\alpha = 0.98$ and $I_b = 200 \mu A$. (04 Marks)

OR

- 2 a. Explain briefly the common emitter circuit and sketch the input and output characteristics. Also explain operating regions by indicating them on characteristics curve. (06 Marks)
 b. With a neat circuit diagram and waveforms, explain the working of a half-wave rectifier. (06 Marks)
 c. Explain briefly capacitor filter circuit. (04 Marks)

Module-2

- 3 a. What is a DC load line? Explain the voltage divider bias circuit. (08 Marks)
 b. Mention and explain the characteristics of ideal operational amplifier. (04 Marks)
 c. Derive the expression of integrator with circuit diagram. (04 Marks)

OR

- 4 a. With neat circuit and necessary equations, explain the voltage follower. (06 Marks)
 b. Explain the base bias circuit. (04 Marks)
 c. Explain briefly inverting and non-inverting operational amplifiers. (06 Marks)

Module-3

- 5 a. State and prove De-Morgan's theorem with truth table. (06 Marks)
 b. Explain the basic gates AND, OR and NOT gates with truth tables. (06 Marks)
 c. Explain the half-adder circuit. (04 Marks)

OR

- 6 a. Explain the full-adder circuit. (06 Marks)
 b. Simplify the given Boolean equation $Y = (A + \bar{B})(CD + E)$ and realize using NAND gates only. (04 Marks)
 c. Convert the following:
 i) $(49.5)_{10} = (\quad ? \quad)_{16}$
 ii) $(1062.403)_8 = (\quad ? \quad)_{10}$
 iii) $(642.71)_8 = (\quad ? \quad)_2$ (06 Marks)

Module-4

- 7 a. What is R-S flip-flop? Explain its circuit diagram, logic symbol and truth table. (08 Marks)
 b. Explain the architecture of 8051 microcontroller in detail. (08 Marks)

OR

- 8 a. Explain the gated R-S flip-flop and clocked R-S flip-flop. (08 Marks)
b. With the help of block diagram, explain the micro-controller based stepper motor control system. (08 Marks)

Module-5

- 9 a. Explain the construction of LVDT and its operation. (06 Marks)
b. Explain the frequency modulation with neat waveforms. (06 Marks)
c. Explain with diagram the AM detection (demodulation). (04 Marks)

OR

- 10 a. Explain the piezoelectric transducer and photoelectric transducer. (06 Marks)
b. Explain with block diagram elements of communication system. (06 Marks)
c. Compare AM and FM modulation. (04 Marks)

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