CBCS SCHEME

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15ELN15/25

# First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019
## 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. Draw and explain the V-I characteristics of a Silicon diode. **(05 Marks)**

b. Find the value of the series resistance '$R_S$' required to drive a forward current of 1.25mA through a germanium diode from a 4.5V barrtery. Write the circuit diagram showing all the values. **(04 Marks)**

c. With circuit diagram, explain the operation of center-tapped full wave rectifier. Draw input and output waveforms. **(07 Marks)**

**OR**

2 a. Design the Zener regulator for the following specifications. Output voltage = 5V, load current = 20mA, Zener voltage $P_{Z(min)}$ = 500 mW and input voltage = 12V± 3V. **(05 Marks)**

b. Draw CE circuit and sketch the input and output characteristics also explain the operating regions by indicating them on the characteristics curve. **(08 Marks)**

c. Calculate the values of $I_C$ and $I_E$ for a BJT with $\alpha = 0.97$ and $I_B = 50\ \mu A$. Also determine the value of $\beta_{dc}$. **(03 Marks)**

### Module-2

3 a. Determine the operating point for a Silicon transistor biased by base bias method, for $\beta = 100$, $R_C = 2.5k\Omega$, $R_B = 500k\Omega$ and $V_{CC} = 20V$. Also draw the DC load line. **(06 Marks)**

b. With a net circuit diagram. Explain the voltage divider bias circuit. **(07 Marks)**

c. Compare base bias and voltage divider bias circuits. **(03 Marks)**

**OR**



4 a. List the characteristics of an ideal op-amp. **(05 Marks)**

b. A non-inverting amplifier has input resistance of 10kΩ and feedback resistance of 60 kΩ? With a load resistance of 47kΩ. Draw the circuit and calculate the output voltage, voltage gain, load current, when the input voltage is 1.5V. **(06 Marks)**

c. Derive the expression for 3–input summing amplifier. **(05 Marks)**

## Module-3

5 a. Compare analog and digital signal. **(04 Marks)**

b. Convert :

i) $(1AD.EO)_{16} = (?)_{10} = (?)_8$

ii) $(1101101)_2 = (?)_{10}$

iii) $(69)_{10} = (?)_2$ **(05 Marks)**

c. Perform the subtraction :

i) $(10010)_2$ and $(1101)$ using 1's complement method

ii) $(10010)_2$ and $(01101)_2$ using 2's complement method. **(07 Marks)**

**OR**

6 a. State and prove DC – Morgan's theorems for 4 variables. **(08 Marks)**

b. Simplify the following expression and realize using basic gates :

$Y = A(\overline{ABC} + A\overline{BC})$. **(04 Marks)**

c. Realize half adder using only NAND gate. **(04 Marks)**

## Module-4

7 a. Define flip-flop. Give the difference between a later and flip-flop. **(04 Marks)**

b. Explain the working of a NOR gate later. **(06 Marks)**

c. With diagram and truth table explain clocked RS –flip-flop. **(06 Marks)**

**OR**

8 a. List the important features of 8051 microcontroller. **(03 Marks)**

b. Explain the architecture of 8051 microcontroller. **(07 Marks)**

c. With block diagram, explain the micro-controller based stepper motor control system. **(06 Marks)**

## Module-5

9 a. With a neat block diagram, explain the elements of communication system. **(06 Marks)**

b. A carrier of 1MHz, with 400W of its power is amplitude modulated with a sinusoidal signal of 2500Hz. The depth of modulation is 75%. Calculate the sideband frequencies, the band width, the power in the side bands and the total power in the modulated wave. **(05 Marks)**

c. Give the comparison between AM and FM. **(05 Marks)**



**OR**

10 a. What is a Transducer? Distinguish between active and passive transducer. **(05 Marks)**

b. A termistor has a material constant 'β' of 2000/° K. If its resistance is 100 kΩ at 300°k temperature, what will be the resistance at 500°k? **(04 Marks)**

c. Explain the construction and the principle of operation of LVDT. Also list the advantages of LVDT. **(07 Marks)**

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