

USN

--	--	--	--	--	--	--	--	--	--

15ELN15

**First Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Basic Electronics**

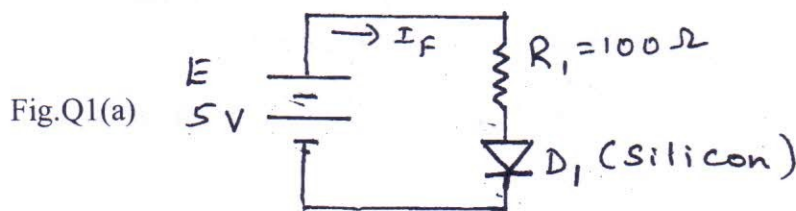
Time: 3 hrs.

Max. Marks: 80

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

**Module-1**

- 1 a. For the circuit shown in fig.Q1(a) draw the DC load line and locate Q - pt. (04 Marks)



- b. What is the need for capacitor filter? For a Half - Wave Rectifier, explain the operation of C - filter. (06 Marks)
- c. Considering npn transistor in common emitter configuration, explain how it acts as voltage amplifier. (06 Marks)

**OR**

- 2 a. Explain the working of a Bridge Full - Wave Rectifier, with a neat circuit diagram and waveforms. (06 Marks)
- b. Discuss the load and line regulation using zener diode with neat circuit diagram and appropriate expressions. (06 Marks)
- c. Calculate the values of  $I_C$  and  $I_E$  for a BJT with  $\alpha_{dc} = 0.97$  and  $I_B = 50 \mu A$ . Determine  $\beta_{dc}$ . (04 Marks)

**Module-2**

- 3 a. Precisely analyse the circuit of voltage divider bias and hence determine the  $V_C$  and  $V_{CE}$ . Mention the advantages of voltage divider bias. (10 Marks)
- b. Derive an equation for output voltage for a non - inverting Op - amp. Find the gain of amplifier if  $R_F = 10K\Omega$  and  $R_1 = 1K\Omega$ . (06 Marks)

**OR**

- 4 a. A base bias circuit with a 12V supply uses a transistor with  $h_{FE} = 70$ . Design the circuit so that  $I_C = 2mA$  and  $V_{CE} = 9V$  (Assume  $R_E = 0$ ). (06 Marks)
- b. Explain the working of Op - amp as integrator. (05 Marks)
- c. Derive the expression of 3 input summing amplifiers. (05 Marks)

**Module-3**

- 5 a. Convert the following : i)  $172.625_{(10)} = ( )_2$  ii)  $(ABCD.72)_{16} = ( )_8$   
 iii)  $(10111101.0101)_2 = ( )_{10}$ . (06 Marks)
- b. Perform the following operations using 1's and 2's complement technique  
 i)  $(56)_{10} - (79)_{10}$  ii)  $(23)_{10} - (18)_{10}$ . (06 Marks)
- c. State and prove de Morgan's theorem using truth table for 2 variables. (04 Marks)

- 6 a. Explain full adder circuit with truth table. Realise the circuit for sum and carry using basic gates. Also write the diagram showing FA using two half adders. (06 Marks)
- b. Simplify and realize the following expressions using only NAND and NOR.
- i)  $Y = (A + \overline{B})(B + C)(\overline{C} + \overline{B})$  ii)  $Y = AB + AC + BD + CD.$  (10 Marks)

#### Module-4

- 7 a. Explain the operation of NOR Latch with symbol, circuit and truth table. (06 Marks)
- b. With a neat block diagram, explain the architecture of 8051 microcontroller. (10 Marks)

OR

- 8 a. How is Flip – Flop different from a Latch? Explain the gated RS Flip – Flop with symbol, circuit and truth table. (08 Marks)
- b. Interface stepper motor to 8051 microcontroller with a neat block diagram. Explain its working principle. (08 Marks)

#### Module-5

- 9 a. Explain Amplitude Modulation with relevant waveforms. Derive the equation for instantaneous value of modulated signal in volts and define modulation index. (08 Marks)
- b. Define the term transducer. Mention any four characteristics a transducer should possess. (02 Marks)
- c. Briefly explain the working of thermistor. Mention its applications. (06 Marks)

OR

- 10 a. Explain the frequency modulation with necessary waveforms. Bring out the difference between AM and FM. (08 Marks)
- b. Explain construction and the principle of operation of LVDT. (08 Marks)

\* \* \* \* \*