

**B.TECH SEM - III (2007 COURSE) (ELECTRONICS) : WINTER -
2017**

SUBJECT: ELECTRONIC DEVICES AND CIRCUITS

Day: Monday
Date: 22/01/2018

Time: 10.00 AM TO 01.00 PM
Max. Marks: 80

W-2017-2374

N.B:

- 1) **Q.1 and Q.5 are COMPULSORY.** Out of remaining attempt **ANY TWO** questions from each section.
- 2) Answer to both the sections should be written in the **SEPARATE** answer book.
- 3) Figures to the right indicate **FULL** marks.
- 4) Assume suitable data if necessary.
- 5) Draw neat and labeled diagrams **WHEREVER** necessary.
- 6) Use of non-programmable calculator is allowed.

SECTION-I

- Q.1** a) Why is color coding used in resistors? Explain its significance. (05)
- b) Explain diffusion phenomenon in diodes. (05)
- c) Explain voltage doubler. (04)
- Q.2** a) What is capacitance? Explain types of capacitors depending on dielectric material. (07)
- b) Classify the inductors and explain briefly. (06)
- Q.3** a) Derive an expression for potential difference between two concentrations of continuously graded P-type semiconductor bar. (07)
- b) A sample of germanium is doped to the extent of 10^{14} donor atoms per cubic cm and 7×10^{13} acceptor atoms per cubic cm. At the room temp the resistivity of pure germanium is $60 \Omega\text{-cm}$. If the electric field across the sample is 2V/cm , find the total density.
Given: Mobility of electrons = $3800 \text{ cm}^2/\text{V-s}$.
Mobility of holes = $1800 \text{ cm}^2/\text{V-s}$. (06)
- Q.4** a) Draw the full wave rectifier circuit with filter and derive the following expressions: (07)
- i) RMS value of current.
 - ii) Ripple factor.
 - iii) Rectification efficiency.
- b) A half wave rectifier circuit supplies 100mA d.c. to 250Ω load. Find the dc output voltage, PIV rating of a diode and the rms voltage for the transformer supplying the rectifier. (06)

P.T.O.

SECTION-II

- Q.5** a) What is thermal runaway? How can it be avoided? (05)
- b) State the properties of laminates used in PCBs. (05)
- c) Compare LED and photodiode. (04)
- Q.6** a) Explain the input and output characteristics of BJT in CE configuration. (07)
- b) Design voltage divider bias network using a supply of 24V, $\beta = 110$ and $I_{CQ} = 4\text{mA}$, $V_{CEQ} = 8\text{V}$. Choose $V_E = V_{CC}/8$. (06)
- Q.7** a) Explain the fabrication process of single sided PCB. (07)
- b) Discuss PCB design rules. (06)
- Q.8** a) Explain the theory and working of LED. List its advantages and disadvantages. (07)
- b) Write note on photovoltaic cell. (06)