

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

**- 2018**

**SUBJECT: ELECTRONIC DEVICES AND CIRCUITS**

Day : **Friday**

Date : **25/05/2018**

**S-2018-2579**

Time : **02.30 PM TO 05.30 PM**

Max. Marks: 80

**N. B. :**

- 1) **Q. No.1 and Q. No.5 are COMPULSORY.** Out of remaining attempt **ANY TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in the **SEPARATE** answer book.
- 4) Use of non-programmable electronic **CALCULATOR** is allowed.
- 5) Assume suitable data if necessary.

**SECTION-I**

- Q.1**
- a) Explain classification of materials based on band gap. (04)
  - b) Prove that the conductivity of a semiconductor is given by  $\sigma = q(p\mu_p + n\mu_n)$ . (05)
  - c) Write note on: Clipping circuits (05)
- Q.2**
- a) Classify the inductors and explain briefly stating application of each type. (07)
  - b) Explain different types of capacitors. (06)
- Q.3**
- a) For a silicon p-n junction. (07)
    - i) For what value of reverse voltage will its reverse current reach 90% of its saturation value at room temperature?
    - ii) What is the ratio of current for a forward bias of 0.2v to reserve current for the same magnitude of reverse bias.
  - b) Derive an expression for potential barrier in a step-graded p-n junction. (06)
- Q.4**
- a) Determine the ripple factor of an L-type choke input filter comprising of a 10H choke and 8 $\mu$ F capacitor used with a full wave rectifier. Compare the above result with a simple 8  $\mu$ F capacitor input filter with a load current of 50mA and also 150mA. Assuming dc output voltage to be 50v, neglect resistance of choke. Assume supply frequency 50Hz. (07)
  - b) Explain the operation of an L-section filter and show that the ripple voltage is independent of load current. (06)

**SECTION-II**

- Q.5**
- a) What is punch through effect? (05)
  - b) Describe the fabrication process of single sided PCB. (05)
  - c) List advantages, disadvantages and applications of LED. (04)
- Q.6**
- a) What is thermal runaway? Derive the condition to avoid thermal runaway using potential divider circuit. (07)
  - b) Design a fixed bias circuit using a silicon transistor having  $\beta$  equal to 100.  $V_{cc}$  is 10 V and DC bias conditions are to be  $V_{CE} = 5V$ ,  $I_C = 5$  mA. (06)
- Q.7**
- a) What is copper clad laminate? How copper clad laminates are are classified? Describe performance parameter of copper clad laminate. (07)
  - b) Explain the following terms in relation to PCB design and manufacturing (06)
    - i) Artwork
    - ii) plated through holes
    - iii) analog and digital ground
- Q8**
- a) Explain the operation of photovoltaic cell. (07)
  - b) Describe the operation of photoconductive cell. (06)

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