

**RAMAKRISHNA MISSION VIDYAMANDIRA**  
(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2018-21]

B.A./B.Sc. FIRST SEMESTER (July – December) 2018

Mid-Semester Examination, September 2018

Date : 25/09/2018

Time : 12 noon -1 pm

**ELECTRONICS (General)**

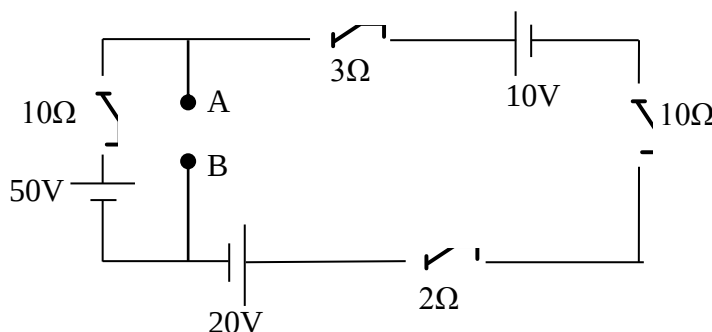
Paper: I

Full Marks : 25

Answer **any five** questions:

(5 × 5)

1. a) Compare metal, insulator and semiconductor based on energy band theory.  
b) Define hole. Give example of two dopants which can produce hole. 3+1+1
2. a) What do you mean by recombination of electrons and holes?  
b) Consider a semiconductor with energy band gap 1.2 eV. Find the wavelength of the emitted radiation due to recombination of electrons and holes. 2+3
3. a) Draw and explain the energy band diagram of an *n*-type semiconductor. Clearly mention the position of donor level.  
b) Why does the electrical conductivity of a pure semiconductor increase with a rise of temperature? 2+3
4. a) Explain how the space-charge region is created in a pn diode.  
b) Define and compare static and dynamic resistance of a pn diode in its various regions of operation of current-voltage characteristics. 2+3
5. a) Define DC value of load current, ripple factor and rectification efficiency. Compare these parameters for a halfwave and a fullwave rectifier.  
b) What do you mean by filters? Draw L and  $\Pi$ -type LC filters. 3+2
6. a) Draw the doping concentration profile of a pnp transistor.  
b) Draw and explain the output characteristics of a BJT operated in CB mode. 1+4
7. a) State and explain superposition theorem.  
b) Find the short-circuit current between terminals A and B in the following circuit, using superposition theorem: 2+3



8. a) KVL is equivalent to conservation of energy – explain.  
 b) Find the equivalent star network of the given network:

2+3

