



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
UNIVERSITY OF BARISAL
Final Examination

Course Title: Electronic Devices and Circuits

Course Code: EEE-2105

2nd Year 1st Semester

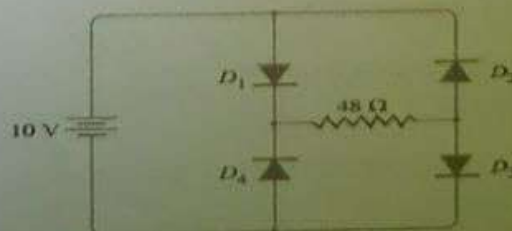
Session: 2020-21 (Admission Session 2019-20)

Time: 3 hour

Marks: 60

Answer any five Questions from the followings.

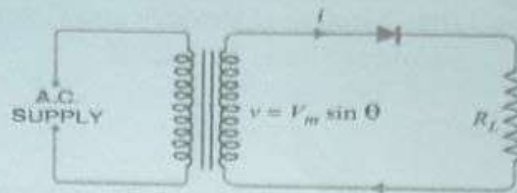
1. a) The electrons in the outer most orbit of an atom are known as valence electrons. How these electrons determine the electrical properties of a material? [3]
- b) Describe different types of voltage sources with appropriate examples, figures and equations. [6]
- c) A lead acid battery fitted in a truck develops 24 V and has an internal resistance of 0.01Ω . It is used to supply current to head lights etc. If the total load is equal to 100 watts, find: [3]
- i. Voltage drop in internal resistance
 - ii. Terminal voltage
2. a) Electrical conductivity of a semiconductor changes with the variations of temperature. Discuss the effect of temperature on semiconductor. [2]
- b) Define hole current. Explain how it is formed. [3]
- c) Explain how p-type semiconductor is formed? Elaborate the concept of majority and minority carriers in n-type and p-type semiconductor. [4]
- d) Why and how tunnel diode works very well in an oscillator? [3]
3. a) Discuss the effect of different types of biasing on pn junction. Show V-I characteristics in each situations. [4]
- b) Breakdown voltage and knee voltage are two important concept for pn junction. Why? [2]
- c) What is rectifier? Explain, how crystal diode can be used as rectifier? [3]
- d) Calculate the current through 48Ω resistor in the following circuit. Assume the diode to be of silicon and forward resistance of each diode is 1Ω . [3]



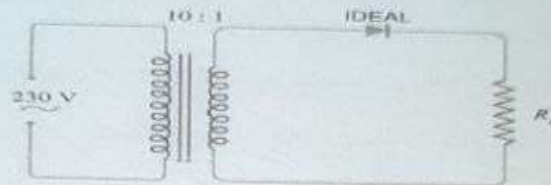
4. a) Identify forward current, peak inverse voltage and leakage current. Why these concepts are [3]

important in diode operation.

- b) Consider the following figure and find the rectifier efficiency. [6]



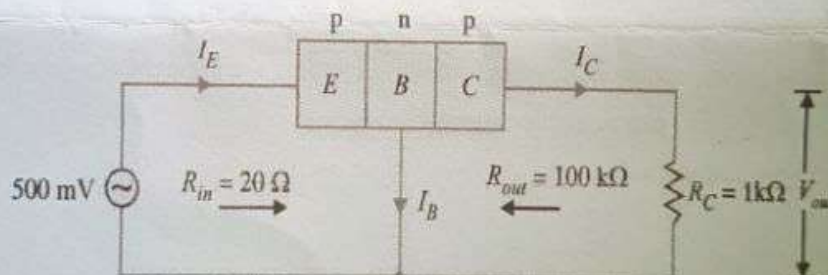
- c) Find (i) the output dc voltage and (ii) the peak inverse voltage from the following figure. [3]



5. a) Explain the working principle of an npn transistor. [4]

- b) How transistor can be used as an amplifier? Explain with appropriate diagrams. [4]

- c) A common base transistor amplifier has an input resistance of $20\ \Omega$ and output resistance of $100\ \text{k}\Omega$. The collector load is $1\ \text{k}\Omega$. if a signal of 500mV is applied between emitter and base, find the voltage amplification. Assume α_{ac} to be nearly 1. [4]



6. a) Explain the characteristics of a common base connection with appropriate figures and equations. [5]

- b) Establish relation between α and β . [3]

- c) How would you determine load line and operating point of a transistor. [4]

7. a) What is meant by hybrids parameters? Draw the h parameter equivalent circuit. [4]

- b) Describe the principle of operation of JFET. [5]

- c) How are h parameters of a transistor measured? [3]

8. a) What is meant by OP-AMP? Explain the term: SCR [4]

- b) Describe the principle of operation of MOSFET. [4]

- c) Distinguish between the single and multi-stage amplifiers. [4]