

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B.Tech I Year I Semester Regular & Supplementary Examinations March-2023**  
**BASIC ELECTRICAL & ELECTRONICS ENGINEERING**  
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

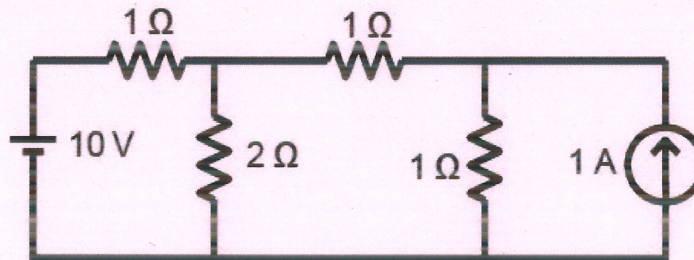
(Answer all Six Units 6 X 10 = 60 Marks)

**PART-A****UNIT-I**

- 1 a Write the derivation for equivalent resistance in series circuit. CO1 L3 5M  
b Write the derivation of RMS Value of Alternating voltage. CO1 L3 5M
- OR
- 2 State and prove Kirchhoff's laws and explain with suitable example. CO1 L2 10M

**UNIT-II**

- 3 a State Norton's theorem. CO2 L1 3M  
b Calculate the current in  $2\Omega$  resistor in the given circuit using super position theorem. CO2 L3 7M



OR

- 4 Explain the principle and operation of DC generator. CO2 L2 10M

**UNIT-III**

- 5 a Explain about constructional details of dc motor. CO3 L2 5M  
b The counter EMF of Shunt motor is 227 V. The field resistance is  $160\Omega$  and field current 1.5A. If the line current is 36.5A, find the armature resistance also find armature current when the motor is stationary. CO3 L5 5M

OR

- 6 a Explain the constructional details of transformer. CO3 L2 5M  
b A 100 kVA, 11000/400 V, 50 Hz transformer has 40 secondary turns. CO3 L4 5M  
Calculate the number of primary turns and primary and secondary currents.

**PART-B****UNIT-IV**

- 7 Discuss the conduction properties of semiconductors and explain the process of generation and recombination of an electron-hole pair. CO5 L2 10M
- OR
- 8 a Sketch the V-I Characteristics of a PN Junction Diode. CO5 L3 5M  
b Define 'Ripple Factor' and derive an expression for ripple factor of a full wave rectifier. CO5 L1 5M

**UNIT-V**

- 9 a Discuss the operation of NPN transistor with neat schematic diagram. CO5 L2 5M  
 b For a transistor, the leakage current is  $0.1\mu\text{A}$  in CB configuration, While it is  $19\mu\text{A}$  in CE configuration. Find  $\alpha$  &  $\beta$  of the same transistor? CO5 L3 5M

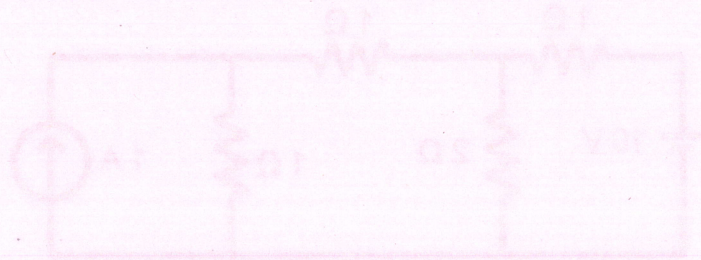
OR

- 10 With neat diagram, explain the Input and Output characteristics of a BJT in CB Configuration. CO5 L2 10M

**UNIT-VI**

- 11 a With a neat diagram deduce the CG configuration of JFET CO5 L5 5M  
 b Analyze the working condition of JFET working as a switch. CO5 L4 5M
- OR
- 12 a Explain the working principle of DMOSFET. CO5 L2 5M  
 b List the applications of JFET and MOSFET. CO5 L1 5M

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**UNIT-III**

**UNIT-IV**