**20CB/DS/CM/IT/ME103**

**Hall Ticket Number:**

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| **I/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | | |
| **February, 2024** | | **Common to CB,DS, CM, IT & ME** | | |
| **First Semester** | **Basic Electrical & Electronics Engineering** | | | |
| **Time:** Three Hours | | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | | **(4X14=56 Marks)** |
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|  |  |  | CO | L | M | |
| 1 | a) | State ohms law. | CO1 | L1 | 1M | |
|  | b) | State Norton theorem. | CO1 | L1 | 1M | |
|  | c) | What is the unit of charge? | CO1 | L1 | 1M | |
|  | d) | Define power. | CO1 | L2 | 1M | |
|  | e) | A 6 pole three phase induction motor operates at a frequency 50Hz supply, determine the speed of the rotor. | CO2 | L2 | 1M | |
|  | f) | Why is the core of Transformer is laminated? | CO3 | L2 | 1M | |
|  | g) | Write any two applications of DC shunt motor. | CO3 | L1 | 1M | |
|  | h) | In a DC machine, what are the roles of the commutator? | CO3 | L1 | 1M | |
|  | i) | Mention any two applications of P-N Junction diode. | CO4 | L1 | 1M | |
|  | j) | Draw the symbol of a PNP transistor. | CO4 | L2 | 1M | |
|  | k) | Define cut-in voltage of a diode. | CO4 | L2 | 1M | |
|  | l) | Draw the symbol for inverting amplifier. | CO6 | L2 | 1M | |
|  | m) | Differentiate between BJT and JFET. | CO5 | L2 | 1M | |
|  | n) | Compare CB and CC configurations. | CO6 | L1 | 1M | |
| **Unit-I** | | | | | | |
| 2 | a) | State and prove Kirchoff’s voltage law. | CO1 | L2 | | 7M |
|  | b) | Derive the relationships between voltage and current in star connected systems. | CO1 | L3 | | 7M |
| **(OR)** | | | | | | |
| 3 | a) | Find all the node voltages and current flowing through 6Ω resistor for the circuit shown in Fig. using nodal analysis. | CO1 | L3 | | 7M |
|  | b) | State Thevenin’s theorem. Obtain the Thevenins equivalent across **a-b** terminals for the circuit shown in Fig. and obtain the current in 1 ohm resistor. | CO1 | L3 | | 7M |
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| **Unit-II** | | | | | | |
| 4 | a) | Derive EMF equation of transformer. | CO2 | L2 | | 7M |
|  | b) | Explain in detail the constructional features of a DC generator. | CO3 | L2 | | 7M |
| **(OR)** | | | | | | |
| 5 | a) | Explain the construction and working principle of a single phase induction motor with a neat sketch. | CO2 | L2 | | 7M |
|  | b) | Explain the construction details of a single phase transformer. | CO2 | L2 | | 7M |
| **Unit-III** | | | | | | |
| 6 | a) | What is a zener diode? Draw the equivalent circuit of an zener diode when it acts as a voltage regulator. | CO4 | L1 | | 7M |
|  | b) | Explain about P-N junction diode with neat diagrams. | CO4 | L2 | | 7M |
| **(OR)** | | | | | | |
| 7 | a) | What are the applications of the semiconductor diode? Explain each one with suitable circuit diagram. | CO4 | L1 | | 7M |
|  | b) | Why the BJT is called a current controlled device? In a bipolar transistor which region is wider and which region is thinner? Why? | CO5 | L1 | | 7M |
| **Unit-IV** | | | | | | |
| 8 | a) | Draw the circuit and explain the drain and gate characteristics of a JFET. | CO6 | L2 | | 7M |
|  | b) | Explain the constructional details of MOSFET. | CO6 | L3 | | 7M |
| **(OR)** | | | | | | |
| 9 | a) | Explain about OP-AMP with a neat sketch. | CO6 | L1 | | 7M |
|  | b) | Draw the circuit diagram of OP-AMP based Differentiator and explain the operation of it. | CO6 | L2 | | 7M |

