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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 08 – 01- 2025 **Time:** 01:00 pm – 04:00 pm |

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| **School:** School of Engineering | **Program:** B. Tech (First Year) | |
| **Course Code :** EEE1007 | **Course Name :** Basics of Electrical and Electronics Engineering | |
| **Semester**: I | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** |
| **Marks** | **-** | **-** | **-** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Define a circuit and a network. How are they different? | **2 Marks** | **L1** | **CO1** |
| **2** | Calculate the total current in a series R-L-C circuit where R=10 Ω, L=0.2H L = 0.2 H, C=10μF and the supply voltage is V=100V at a frequency of 50 Hz. | **2 Marks** | **L1** | **CO1** |
| **3** | What is the Mass Action Law in semiconductors | **2 Marks** | **L1** | **CO2** |
| **4** | What is the difference between ideal and practical diode behaviour? | **2 Marks** | **L1** | **CO2** |
| **5** | Write the EMF equation of a single-phase transformer. | **2 Marks** | **L1** | **CO3** |
| **6** | A 220 V DC motor draws 10 A current when running. If the back EMF is 180 V, calculate the mechanical power developed by the motor. | **2 Marks** | **L1** | **CO3** |
| **7** | What are special electrical machines and its applications. | **2 Marks** | **L1** | **CO4** |
| **8** | Explain the current gain in the Common Base (CB) and Common Emitter (CE) configuration of a BJT. | **2 Marks** | **L1** | **CO4** |
| **9** | What is the difference between BJT and FET. | **2 Marks** | **L1** | **CO4** |
| **10** | What is the difference between enhancement and depletion modes of a MOSFET. | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions Total 80 Marks** | | | | | |
| **11.** | **a.** | List and explain the types of Network Elements. | **10**  **Marks** | **L2** | **CO1** |
|  | **b.** | Calculate the rms value, the form factor and peak factor of a periodic current, having the following values for equal time intervals, changing suddenly from one value to the next. 0,5,10,20,50,60,50,20,10,5,0,-5,-10A etc.What would be the rms value of a sine wave, having the same peak value? |
| **Or** | | | | | |
| **12.** | **a.**  **b.** | Convert the Delta network in a) Fig.(a) to an equivalent star network    Fig (a) Delta network  Convert the star network in fig(b) to delta network    Fig (b) star network | **10**  **Marks** | **L2** | **CO1** |
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| **13.** | **a.** | A series RLC circuit containing a resistance of 12Ω, an inductance of 0.15H and a capacitor of 100uF are connected in series across a 100V, 50Hz supply. Calculate the total circuit impedance, the circuits current, power factor and draw the voltage phasor diagram | **10**  **Marks** | **L2** | **CO1** |
| **or** | | | | | |
| **14.** | **a.** | Zener diodes are semiconductor devices that allow current to flow in both directions but specialize in current flowing in reverse. Explain with a neat circuit diagram how a Zener diode works as a voltage regulator. Discuss its operation for variations in input voltage and load current. | **10**  **Marks** | **L2** | **CO2** |

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| **15.** | **a.** | Explain the principle of operation of a DC motor, and back EMF and torque equation. | **10**  **Marks** | **L** | **CO3** |
| **Or** | | | | | |
| **16.** | **a.** | Explain the principle of operation of an induction motor and discuss its applications. | **10**  **Marks** | **L** | **CO3** |

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| **17.** | **a.** | Explain the concept of DC Load line on output characteristics in  Common emitter transistor circuit. | **15**  **Marks** | **L** | **CO4** |
| **Or** | | | | | |
| **18.** | **a.** | Discuss the input and output characteristics of a transistor and the current components in a transistor. | **15**  **Marks** | **L** | **CO4** |

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| **19.** | **a.** | Explain the Characteristics of JFET.  (i). Output characteristics (Drain) V-I curves of JFET  (ii). Transfer characteristics of JFET | **15**  **Marks** | **L** | **CO4** |
| **Or** | | | | | |
| **20.** | **a.** | Explain the Construction, Principle of Operation and types of MOSFET. | **15**  **Marks** | **L** | **CO4** |

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| **21.** | **a.** | Explain the concepts of (i) Series Positive Clipper (ii) Series Negative Clipper with example. | **20**  **(10+10)**  **Marks** | **L** | **CO2** |
|  | **b.** | Clamper is a device that changes the DC level of a signal to the desired level without changing the shape of the input AC signal.Explain the types of clampers with circuit and waveforms |
| **Or** | | | | | |
| **22.** | **a.** | Transformer is an electrical device which increases or reduces the AC voltage. Explain construction and working of a single-phase transformer with proper diagram. (5+5) | **20**  **(10+10)**  **Marks** | **L** | **CO3** |
|  | **b** | Compare core type and shell type transformer with proper diagram. [5 + 5 Marks] |  | **CO3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***