

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE1005** | **Duration** | **3hrs** |
| **Course Title** | **DESIGN THINKING AND INNOVATION** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define creativity. | | CO1 | R | 1 |
| 2. | Combine the following elements.  Tent + TV remote control | | CO1 | A | 1 |
| 3. | Find the common word: cottage - swiss – cake | | CO2 | A | 1 |
| 4. | Compare whit hat and blue hat person. | | CO2 | U | 1 |
| 5. | Altavista is not as successful as Google – justify. | | CO3 | U | 1 |
| 6. | Sketch the structure of an empathy mapping. | | CO3 | R | 1 |
| 7. | Give an example for past circumstance excuse given by a fixed mindset person. | | CO4 | A | 1 |
| 8. | Give the opposite of “He/She is so smart, I can never be that smart”. | | CO4 | A | 1 |
| 9. | Formulate J K Rowling’s path to success. | | CO5 | A | 1 |
| 10. | Deduce the formulae for Design Thinking. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Mention the steps to personal creativity. | | CO1 | U | 3 |
| 12. | Demonstrate how a smartphone can sense and respond to a user’s mood using its built-in features. | | CO2 | A | 3 |
| 13. | Compare articulated and unarticulated needs with respect to mobile phone. | | CO3 | An | 3 |
| 14. | Road to success is bumpy – justify with an example. | | CO4 | A | 3 |
| 15. | Define empathy. | | CO5 | R | 3 |
| 16. | Outline the design thinking mindset. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Explain Fish Philosophy with a successful implementation. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. |  | Apply SCAMPER technique to a tea spoon and draw a mind map for the same. | CO2 | A | 12 |
|  |  |  |  |  |  |
| 19. |  | Demonstrate the 6-Step Roadmap to a Proof of Concept (POC). | CO3 | U | 12 |
|  |  |  |  |  |  |
| 20. |  | Compare Bootstrapping and Franchise method of entrepreneurial venture with its pros and cons. | CO4 | An | 12 |
|  |  |  |  |  |  |
| 21. |  | Examine the five components critical in developing emotional intelligence. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Enumerate the three major components of creativity with example.  (Passion+ Knowledge & Experience+ Method) | CO2 | U | 12 |
|  |  |  |  |  |  |
| 23. |  | Differentiate fixed mindset and growth mindset with respect to six features. | CO5 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Identify the six core principles of design thinking. | CO6 | U | 6 |
|  | b. | Give any 3 success stories of design thinking. | CO6 | A | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Comprehend the basic vocabulary and concepts of creativity study. |
| **CO2** | Evaluate materials relevant to innovations in educational and business settings based on case studies. |
| **CO3** | Analyse strategies for creative innovation, including product and pedagogical design. |
| **CO4** | Develop creative projects that provide an innovative solution to real‐world problems. |
| **CO5** | Apply effective strategies for designing innovative projects in collaboration with team members. |
| **CO6** | Estimate the strengths and weakness of different start-ups. |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE1008** | **Duration** | **3hrs** |
| **Course Title** | **ELECTRIC CIRCUITS AND ELECTRONIC DEVICES** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | A 60 W light bulb operates on a 120 V power supply. Using Ohm's Law, determine the resistance of the light bulb. | | CO1 | A | 1 |
| 2. | Indicate the phase angle difference between the three-phase voltages in a balanced three-phase system. | | CO1 | U | 1 |
| 3. | In a DC motor, the direction of rotation remains consistent. Justify the role of the commutator in achieving this. | | CO2 | E | 1 |
| 4. | Indicate the component in a DC generator that is responsible for collecting current from the armature and transferring it to the external circuit. | | CO2 | U | 1 |
| 5. | List the three terminals in a Bipolar Junction Transistor (BJT). | | CO3 | R | 1 |
| 6. | Identify the device that converts light energy directly into electrical energy. | | CO3 | U | 1 |
| 7. | State the principle of operation of a strain gauge. | | CO4 | R | 1 |
| 8. | Write one application of a photo sensor. | | CO5 | U | 1 |
| 9. | Name one application of a solenoid. | | CO5 | R | 1 |
| 10. | Sketch the device commonly used in a voltage regulator. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Compute the value of ‘I’ from the given circuit. | | CO1 | A | 3 |
| 12. | Differentiate between stepper motors and servomotors. | | CO2 | U | 3 |
| 13. | In a security system, an alarm should activate only when two sensors detect motion simultaneously. Deduce the Boolean expression representing this condition using an AND gate. | | CO3 | An | 3 |
| 14. | Criticize the effectiveness of an electro-pneumatic system used in an automated packaging process for moving and sealing cartons. | | CO4 | An | 3 |
| 15. | Discuss the use of optical transducers in communication systems. | | CO5 | U | 3 |
| 16. | Compare the advantages of SMPS with those of a linear power supply in electronic applications. | | CO6 | E | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | For the given circuit, compute the equivalent resistance across the terminals of the voltage source. Then, determine the total current (i) supplied by the voltage source if the applied voltage is 24V. | CO1 | A | 6 |
|  | b. | Explain the concept of reactive, real, and apparent power in AC circuits with relevant equations. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 18. |  | In electric vehicles, DC motors are often used for efficient and controllable power delivery. Explain the construction and working of a DC motor and justify its applications in this context. | CO2 | An | 12 |
|  |  |  |  |  |  |
| 19. |  | A Solar panel to battery charger uses a diode to allow current to flow in only one direction. Explain the working of a PN junction diode with its biasing and how it helps in this application. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 20. |  | In industrial automation, LVDTs are commonly used for precise position measurement. Explain the working principle of an LVDT and its applications in such measurement systems. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 21. | a. | Analyze the role of thermal sensors in industrial applications. | CO5 | An | 6 |
|  | b. | Examine the advancements in smart sensor technology and their applications. | CO5 | A | 6 |
|  |  |  |  |  |  |
| 22. | a. | Discuss the importance of digital oscilloscopes in modern electronics. | CO4 | U | 6 |
|  | b. | Evaluate the importance of microcontrollers in modern electronic devices. | CO3 | E | 6 |
|  |  |  |  |  |  |
| 23. |  | In audio amplifier circuits, BJTs are commonly used for signal amplification. Explain the working principle and key characteristics of a BJT in this application. | CO3 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | In power supply units, full-wave rectifiers are used to convert AC to DC for electronic devices. Explain the working principle of a full-wave rectifier in this context. | CO6 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Compute the electric circuit parameters for simple problems. |
| **CO2** | Comprehend the working principles and applications of electrical machines. |
| **CO3** | Analyse the characteristics of analog electronic devices |
| **CO4** | Infer the operating principles of measuring instruments. |
| **CO5** | Deduce the function of sensors and transducers. |
| **CO6** | Demonstrate the working principle of SMPS. |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2001** | **Duration** | **3hrs** |
| **Course Title** | **ELECTRICAL CIRCUIT ANALYSIS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Kirchhoff’s Current Law (KCL) states that:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 2. | Mesh analysis is generally used to determine \_\_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 3. | Superposition theorem is valid for \_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 4. | The reciprocity theorem is applicable to:\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 5. | If the roots of the characteristic equation of an R-L-C circuit are complex, the circuit response is:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO3 | U | 1 |
| 6. | The time constant of an R-C circuit is? | | CO3 | R | 1 |
| 7. | P = 269 W, Q = 150 VAR (capacitive). The power in the complex form is\_\_\_\_\_\_\_ | | CO4 | A | 1 |
| 8. | The standard form of a sinusoidal function represented using a phasor is:\_\_\_\_\_\_\_\_ | | CO4 | R | 1 |
| 9. | The Laplace Transform of a function f(t)f(t)f(t) is defined as:\_\_\_\_\_\_\_\_\_\_\_ | | CO5 | U | 1 |
| 10. | A two-port network consists of:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Summarize the concept of duality and dual networks in network analysis. Also list out any four dual pairs used in electrical networks. | | CO1 | R | 3 |
| 12. | State the principle of maximum power transfer theorem along with its expression. | | CO2 | U | 3 |
| 13. | Distinguish between transient response and steady state response of a circuit. | | CO3 | A | 3 |
| 14. | Compare the difference between Series and parallel resonances. | | CO4 | U | 3 |
| 15. | Draw the frequency response of RLC series circuit along with mathematical expression. | | CO5 | A | 3 |
| 16. | Define two port networks. List the different types of two-port network. | | CO6 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Find the Loop currents I1, I2 and I3 by Mesh loop analysis as shown in Fig.  example2 | CO1 | An | 12 |
|  |  |  |  |  |  |
| 18. |  | Find the Thevenin equivalent resistance Rth of the circuit is shown in below.5 | CO2 | An | 12 |
|  |  |  |  |  |  |
| 19. |  | Derive the second-order differential equation for a series R-L-C circuit subjected to a step input voltage. | CO3 | U | 12 |
|  |  |  |  |  |  |
| 20. |  | Explain the concept of a three-phase AC system and its advantages over a single-phase system. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 21. |  | Define the RMS value of an AC waveform. Derive its mathematical expression for a sinusoidal function. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Analyze the response of an RLC circuit to a sinusoidal input using Laplace Transform. | CO5 | An | 12 |
|  |  |  |  |  |  |
| 23. |  | Discuss in detail about following interconnection of two port networks along with the equivalent circuit representation.   1. Series Connection 2. Parallel Connection 3. Series and Parallel Connection 4. Cascade Connection | CO6 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Find the current flowing through 20 Ω resistor of the following circuit using superposition theorem. | CO2 | An | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Analyse the circuits using Mesh analysis and Nodal analysis techniques. |
| **CO2** | Apply network theorems for solving the problems of electric circuits and networks. |
| **CO3** | Formulate the transient behavior of RL, RC and RLC networks as differential equations. |
| **CO4** | Explain fundamental concepts of single phase and three phase AC circuits. |
| **CO5** | Utilize Laplace transforms to find the transient response of circuits. |
| **CO6** | Solve the two-port networks for network parameters. |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2008** | **Duration** | **3hrs** |
| **Course Title** | **ELECTRICAL MACHINES** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | The working principle of a DC generator is based on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 2. | The process of converting AC in the armature to DC at the output terminals is called: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 3. | In a DC motor, the direction of rotation is determined by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 4. | Which type of DC motor is preferred for lifts and cranes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 5. | The primary function of a transformer is to: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO3 | U | 1 |
| 6. | An auto-transformer differs from a two-winding transformer because: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO3 | R | 1 |
| 7. | The rotor of a synchronous machine is usually made of: \_\_\_\_\_\_\_\_\_\_\_\_ | | CO4 | U | 1 |
| 8. | A synchronous motor runs at: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO4 | R | 1 |
| 9. | In a three-phase induction motor, the rotor rotates at a speed: \_\_\_\_\_\_\_\_\_\_ | | CO5 | U | 1 |
| 10. | The operation of a stepper motor is based on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Classify the different methods of excitation used in DC generators. | | CO1 | U | 3 |
| 12. | Define back EMF in a DC motor. Write the equation for back EMF in a DC motor. | | CO2 | R | 3 |
| 13. | Classify the different types of losses occurring in a transformer on load. | | CO3 | U | 3 |
| 14. | Differentiate between a salient pole and a non-salient pole synchronous machine. | | CO4 | U | 3 |
| 15. | Define slip in an induction motor. Derive the equation for slip and explain its significance. | | CO5 | R | 3 |
| 16. | Compare a stepper motor with a DC servomotor in terms of control, speed, and torque. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | With neat sketch describe the constructional features of a DC machine. Highlight the roles of the armature, commutator, brushes, and field windings. Also explain the principle of operation of a DC generator. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. |  | Examine the phenomenon of armature reaction in a DC generator. How does it affect the operation of the generator? What measures can be taken to minimize the adverse effects of armature reaction in DC generators? | CO2 | AN | 12 |
|  |  |  |  |  |  |
| 19. |  | Derive the expression for the torque developed in a DC motor. How is this torque related to the armature current and magnetic flux? | CO3 | A | 12 |
|  |  |  |  |  |  |
| 20. |  | Why is it necessary to use a starter for a DC motor? Discuss the implications of high starting current and how it can be controlled. Also explain the construction and working of a three-point starter for a DC shunt motor with neat sketch. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 21. |  | Illustrate the constructional details and the principle of operation of a single-phase transformer. Derive the EMF equation of a single-phase transformer. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Discuss the conditions that must be met for successful parallel operation of alternators. Explain the effect of load variation on two alternators running in parallel. | CO | A | 12 |
|  |  |  |  |  |  |
| 23. |  | Explain the constructional details of a three-phase induction motor with a neat diagram. | CO | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Elaborate the different types of electric motors used in Electric Vehicles (EVs). | CO6 | A | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Illustrate the operation of DC Machines. |
| **CO2** | Identify the differences in operation of different DC machine configurations. |
| **CO3** | Examine single phase and three phase transformers circuits. |
| **CO4** | Outline the working of autotransformers. |
| **CO5** | Analyse the effect of parameter variation on torque of Induction Motor and Identify suitable starting, speed control and braking methods for Induction Motor. |
| **CO6** | Comprehend the operation of various types of induction motor and Synchronous motor |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION –** **MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2009** | **Duration** | **3hrs** |
| **Course Title** | **POWER ELECTRONICS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Identify the power electronics device that supports bidirectional current flow. | | CO1 | U | 1 |
| 2. | The device most suited for high switching frequency operation is \_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 3. | The expression for average output voltage of single phase full-controlled converter for resistive load is given by Vavg = | | CO2 | R | 1 |
| 4. | A three-phase full converter will require \_\_\_\_\_\_\_\_\_\_ number of SCRs. | | CO2 | R | 1 |
| 5. | AC voltage controller converts \_\_\_\_\_\_AC to \_\_\_\_\_\_\_ AC. | | CO3 | U | 1 |
| 6. | A cycloconverter is also termed as \_\_\_\_\_\_\_\_\_\_\_\_\_\_ converter. | | CO3 | R | 1 |
| 7. | Give the expression for the average output voltage of a step-up chopper. | | CO4 | U | 1 |
| 8. | Abbreviate SMPS. | | CO4 | R | 1 |
| 9. | \_\_\_\_\_\_ type of commutation is used in Inverters. | | CO5 | U | 1 |
| 10. | A matrix converter directly converts \_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_ without an intermediate DC stage. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Indicate the need of snubber circuit in power electronics. | | CO1 | A | 3 |
| 12. | State the significance of free-wheeling diode in power converters. | | CO2 | U | 3 |
| 13. | List the applications of a single-phase AC voltage controller. | | CO3 | U | 3 |
| 14. | Mention the control strategies of DC chopper circuits. | | CO4 | U | 3 |
| 15. | Sketch the diagram of single-phase series inverter circuit. | | CO5 | U | 3 |
| 16. | Compare zeta and cuk converter. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Explain the static and switching characteristics of Thyristor (SCR) with neat diagrams. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. | a. | Explain the working of single-phase semi converter with neat diagram and waveforms. | CO2 | U | 8 |
| b. | Compare single phase semi converter with full converter. | CO2 | U | 4 |
|  |  |  |  |  |  |
| 19. | a. | With neat diagram and waveforms, describe the operation of a single-phase AC full-wave voltage controller. | CO3 | U | 8 |
| b. | Evaluate the performance of a TRIAC and an SCR in an AC voltage controller. | CO3 | E | 4 |
|  |  |  |  |  |  |
| 20. | a. | Elucidate the operation of step-down DC chopper with necessary circuit diagram and waveforms. | CO4 | U | 8 |
| b. | A DC chopper has input voltage of 30V and resistance of R = 10Ω. Find the average output voltage during step-down and step-up mode when duty ratio is 0.3. | CO4 | A | 4 |
|  |  |  |  |  |  |
| 21. |  | Illustrate the working of 180-degree mode operation of an inverter with neat diagram and waveforms. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 22. | a. | With neat diagram explain the reverse recovery characteristics of Power Diode. | CO1 | U | 6 |
| b. | Compare Power MOSFET with Power BJT. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 23. | a. | Examine the operation of a four-quadrant chopper with appropriate diagrams and waveforms, and evaluate its impact on motor performance. | CO4 | An | 8 |
| b. | List any four latest EV models in Indian Market. | CO4 | R | 4 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Assess the impact of power electronics on the efficiency of solar PV systems with neat diagram. | CO6 | An | 8 |
| b. | Mention any 4 modern power converters used in the power sector. | CO6 | U | 4 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the switching characteristics of power devices and select a suitable power device for power conversion. |
| **CO2** | Design a power converter with criteria (power, efficiency, ripple voltage and current, harmonic distortions, power factor). |
| **CO3** | Implement and verify the performance characteristics of power converters. |
| **CO4** | Interpret terminal characteristics of the components for designing the circuitry for power converters. |
| **CO5** | Estimate the required converters for renewable based applications. |
| **CO6** | Assess the quality of power by analyzing the factors such as harmonics, ripples, etc., |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2010** | **Duration** | **3hrs** |
| **Course Title** | **LINEAR INTEGRATED CIRCUITS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | State the bandwidth of the ideal op-amp. | | CO1 | R | 1 |
| 2. | Estimate the compensating resistance of a non-inverting amplifier with input resistance R1= 10KΩ and the feedback resistance Rf = 10KΩ. | | CO2 | E | 1 |
| 3. | Infer the advantage of precision rectifiers over the conventional diode rectifiers. | | CO2 | U | 1 |
| 4. | List any two applications of a comparator circuit. | | CO3 | A | 1 |
| 5. | Recall the multivibrator that produces square wave. | | CO3 | R | 1 |
| 6. | Recall the output voltage of an IC 7809. | | CO4 | R | 1 |
| 7. | State the filter that is used to remove a particular noise frequency from the signals. | | CO5 | R | 1 |
| 8. | Illustrate band pass filter. | | CO5 | U | 1 |
| 9. | State the draw back of weighted resistor DAC. | | CO6 | R | 1 |
| 10. | Determine the number of clock cycles required for a 4-bit conversion to complete and trigger the End-of-Conversion (EOC) signal in a Successive Approximation ADC. | | CO6 | E | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Outline the pin diagram of an 8 pin DIP package operational amplifier. | | CO1 | U | 3 |
| 12. | Define Common Mode Rejection Ratio (CMRR). | | CO2 | R | 3 |
| 13. | Explain Barkhausen’s criteria. | | CO3 | U | 3 |
| 14. | Contrast the transfer characteristics of a band reject filter. | | CO4 | U | 3 |
| 15. | Evaluate the pulse width of a monostable multivibrator having Resistance R= 2KΩ, and Capacitance C = 1micro Farad. | | CO5 | E | 3 |
| 16. | Evaluate the output voltage produced by a DAC whose output range is 0 to 10V for an input binary number 10. | | CO6 | E | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Design a non-inverting amplifier circuit that scales the 0–1V output of a thermocouple sensor to a 0–5V range. | CO1 | C | 6 |
|  | b. | Summarize input bias current and input offset current of an operational amplifier. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | Explain the full wave precision rectifier with necessary circuit diagrams. | CO2 | U | 6 |
|  | b. | Design an operational amplifier circuit that produce the output voltage of  Vo = -(2V1+3V2), where V1 and V2 are input voltages. | CO2 | C | 6 |
|  |  |  |  |  |  |
| 19. |  | Explain the functioning of an astable multivibrator using IC 741. | CO3 | U | 12 |
|  |  |  |  |  |  |
| 20. |  | Design a second order low pass Butterworth filter for a cutoff frequency of 2 KHz with a pass band gain of 1. | CO4 | C | 12 |
|  |  |  |  |  |  |
| 21. |  | Design an astable multivibrator for 1KHz with the duty ratio of 75% (high). | CO5 | C | 12 |
|  |  |  |  |  |  |
| 22. | a. | Discuss the functioning of Schmitt trigger using 555 timer. | CO5 | U | 6 |
|  | b. | Explain the functional blocks of a voltage controller | CO4 | U | 6 |
|  |  |  |  |  |  |
| 23. | a. | Illustrate the principle and operation of an R-2R ladder Digital-to-Analog Converter. | CO6 | An | 8 |
|  | b. | Device a method to overcome the drawback of R-2R ladder DAC. | CO6 | A | 4 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Examine how a successive approximation ADC operates, illustrating your explanation with an example. | CO6 | An | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the fundamentals of OP-AMP and its characteristics. |
| **CO2** | Use OP-AMP to design circuits such as Amplifiers, differentiator and Integrator |
| **CO3** | Infer the significance of OP-AMP in multivibrators and IC voltage regulators. |
| **CO4** | Design active filters using OP-AMP and power amplifiers. |
| **CO5** | Explore the Timer, pulse generation, and oscillator applications of IC555 timer. |
| **CO6** | Understand the fundamentals of ADCs, DACs and Phase Locked Loops |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2011** | **Duration** | **3hrs** |
| **Course Title** | **ELECTRIC POWER TRANSMISSION AND DISTRIBUTION** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Name the primary components of an electrical power supply system. | | CO1 | U | 1 |
| 2. | List the key differences between A.C. and D.C. transmission systems. | | CO1 | R | 1 |
| 3. | State the reason for the occurrence of the skin effect in transmission lines. | | CO2 | R | 1 |
| 4. | Define voltage regulation of a transmission line. | | CO2 | R | 1 |
| 5. | Name the phenomenon that causes an increase in receiving-end voltage in a lightly loaded long transmission line. | | CO3 | U | 1 |
| 6. | Write the standard voltage levels used in secondary distribution. | | CO3 | R | 1 |
| 7. | Name the circuit breakers which has the lowest operating voltage | | CO4 | U | 1 |
| 8. | Define isolator in power system protection | | CO4 | R | 1 |
| 9. | Identify the cable which connects the distributor to the consumer terminals | | CO5 | U | 1 |
| 10. | State the advantages of suspension type insulators | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | **Justify the use of ring main distribution over radial distribution for urban areas.** | | CO1 | An | 3 |
| 12. | **Calculate the conductor size required for a three-phase transmission line carrying 500 A over a distance of 50 km with a permissible voltage drop of 5%.** | | CO2 | A | 3 |
| 13. | Name any three sag compensation methods used in transmission line | | CO3 | R | 3 |
| 14. | Infer the effect of load power factor on voltage regulation of a transmission line | | CO4 | U | 3 |
| 15. | Classify the substation according to the service. | | CO5 | U | 3 |
| 16. | Summarize the benefits of integrating energy storage with renewable energy sources. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Determine the factors affecting the selection of conductor size in a transmission line and justify their impact on efficiency. | CO1 | A | 6 |
|  | b. | The DC distributor shown in fig is loaded as follows: I1 =100A; I2=150A; I3 =200A. The resistance of conductor (go and return) is 0.1Ω per 1000m. Find the voltage at points C, D and B if voltage at A VA=200V. | CO1 | A | 6 |
|  |  |  |  |  |  |
| 18. | a. | Illustrate the construction of a typical transmission tower with neat diagram and explain any two components. | CO2 | U | 6 |
|  | b. | Explain the key steps in the construction of a high-voltage transmission line and assess the factors influencing tower height selection. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. |  | A single phase overhead transmission line delivers 1100 kW at 33 kV at 0·8 p.f.  lagging. The total resistance and inductive reactance of the line are 10 Ω and 15 Ω respectively. Determine : (i) sending end voltage (ii) sending end power factor and (iii) transmission efficiency | CO3 | A | 12 |
|  |  |  |  |  |  |
| 20. | a. | Sketch the structure of pole mount substation and describe its operation | CO4 | U | 6 |
|  | b. | Describe the following terms (i) Ferranti Effect (ii) Corona effect (iii) Skin effect | CO4 | U | 6 |
|  |  |  |  |  |  |
| 21. | a. | Explain the following: (a) Neutral grounding. (b) Resistance grounding. | CO5 | U | 6 |
|  | b. | Describe wireless power transmission methods and write its feasibility  for large-scale applications. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 22. | a. | An overhead line at a river crossing is supported from two towers of heights 30 metres and 90 metres above water level with a span of 300 metres. The weight of the conductor is 1 kg/metre and the working tension is 2000 kg. Determine the clearance between the conductor and the water level mid-way between the towers. | CO5 | A | 6 |
|  | b. | Compare overhead lines and underground cables. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 23. | a. | Describe the general construction of 3-conductor cable with neat sketch. | CO5 | U | 6 |
|  | b. | Sketch the single line diagram of a Substation and name the components | CO4 | U | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Examine the challenges faced in integrating renewable energy sources like solar and wind into the conventional power grid. | CO6 | An | 6 |
|  | b. | Sketch the block diagram of Superconducting magnetic energy storage systems (SMES) and explain its components. | CO6 | U | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Recall the standard operation of electric transmission and distribution systems. |
| **CO2** | Describe the components and operation of low voltage AC distribution systems. |
| **CO3** | Analyze and interpret the functioning of extra high voltage transmission systems. |
| **CO4** | Evaluate the reliability and performance of low voltage AC distribution systems |
| **CO5** | Construct innovative approaches to enhance the reliability of transmission and distribution line components |
| **CO6** | Recall the standard operation of electric transmission and distribution systems. |



**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2025** | **Duration** | **3hrs** |
| **Course Name** | **FOUNDATION OF MACHINE LEARNING** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Mention the three central tendency measures used in descriptive analytics | | CO1 | R | 1 |
| 2. | Differentiate kurtosis and skewness with a graphical representation. | | CO1 | R | 1 |
| 3. | Interpret the given statement. P (bread | butter) = 0.7 | | CO2 | U | 1 |
| 4. | Give two uses of supervised learning. | | CO2 | U | 1 |
| 5. | Name the most important data processing step used in ML. | | CO3 | U | 1 |
| 6. | Identify the following as ordinal or nominal data.  a. Socioeconomic status: Low, Middle, High  b. Blood type: A, B, AB, O | | CO3 | R | 1 |
| 7. | Name the function that converts values into a probability between 0 and 1. | | CO4 | R | 1 |
| 8. | Represent diagrammatically a linearly separable and non-linearly separable data. | | CO4 | R | 1 |
| 9. | Interpret the scenario of a child touching a hot object. | | CO5 | U | 1 |
| 10. | In Binary Clustering, how many clusters are typically formed?  (A) Two  (B) Three  (C) Four  (D) Unlimited | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Identify a real-world application for use of cosine similarity in NLP. | | CO1 | U | 3 |
| 12. | Mention 3 application of datamining in finance. | | CO2 | R | 3 |
| 13. | Nominal data do not have an inherent order – Justify. | | CO3 | An | 3 |
| 14. | Outline 3 features of PIBL. | | CO4 | U | 3 |
| 15. | Name the probabilistic model used in the following application. “Voice assistants like Siri and Google Assistant to convert spoken words into text” | | CO5 | R | 3 |
| 16. | Compare Agglomerative Hierarchical Clustering (AHC) and K-Means clustering in terms of working principle. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Identify the maths concept behind dimensionality reduction used in Machine Learning and give two real-time applications for the same. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. |  | Enumerate the different types of machine learning algorithms with one application each. | CO2 | U | 12 |
|  |  |  |  |  |  |
| 19. |  | Explain the seven types of data encoding with an example each. | CO3 | U | 12 |
|  |  |  |  |  |  |
| 20. |  | Find the best separating line between two classes given below using SVM.  • Class 1: (1,2) (2,3)  • Class 2: (3,3), (4,5) | CO4 | A | 12 |
|  |  |  |  |  |  |
| 21. |  | Determine the probabilistic model used to identify consumer electricity usage patterns for energy optimization | CO5 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | GMMs help in combining data from multiple sensors for better accuracy – Justify. | CO2 | U | 12 |
|  |  |  |  |  |  |
| 23. |  | Assess the impact of the iterative E-Step and M-Step process on clustering accuracy in smart meter analysis. | CO5 | E | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Examine the effectiveness of K-Means clustering in identifying peak demand periods in a smart grid system. | CO6 | U | 6 |
|  | b. | Design a clustering model to detect power theft using smart meter data. | CO6 | A | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand different types of machine learning algorithms |
| **CO2** | Apply probability, linear algebra and optimization concepts for machine learning. |
| **CO3** | Encode text and image data for machine learning applications |
| **CO4** | Analyze simple machine learning algorithms. |
| **CO5** | Explain the underlying concepts of supervised machine learning algorithms |
| **CO6** | Solve data grouping problems using clustering algorithms |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2073** | **Duration** | **3hrs** |
| **Course Title** | **DIGITAL FORENSICS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Describe the branch of science that applies scientific methods to solve crimes. | | CO1 | U | 1 |
| 2. | Summarize the first step in the digital forensic process. | | CO1 | U | 1 |
| 3. | Identify the structure used by operating systems to manage and organize data on storage devices. | | CO2 | R | 1 |
| 4. | Describe the term used for saving digital information on physical or cloud-based media. | | CO2 | U | 1 |
| 5. | Identify the term used to refer to the process of tracking the possession of evidence throughout its handling. | | CO3 | R | 1 |
| 6. | Define the term used for collecting digital data from a device or system for forensic examination. | | CO3 | R | 1 |
| 7. | Describe how the Recycle Bin works in terms of file deletion in Windows. | | CO4 | U | 1 |
| 8. | Identify the Windows feature used to create backups of files or folders, even when they are in use. | | CO4 | R | 1 |
| 9. | Identify the legal principle that requires digital forensic evidence to be collected and preserved in a manner acceptable in court. | | CO5 | R | 1 |
| 10. | Define the term steganography in the context of digital forensics. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Explain the main goals of forensic science in criminal investigations. | | CO1 | U | 3 |
| 12. | Apply your knowledge of memory organization to explain how volatile and non-volatile memory is used during forensic data acquisition. | | CO2 | A | 3 |
| 13. | Distinguish between live and dead system forensics. | | CO3 | U | 3 |
| 14. | Analyze the role of hibernating files (hiberfil.sys) in Windows and explain how these files can provide valuable evidence during a forensic investigation. | | CO4 | An | 3 |
| 15. | Describe the process of electronic discovery (e-discovery) and its role in legal proceedings involving digital evidence. | | CO5 | U | 3 |
| 16. | Identify three primary goals of image forensics. | | CO6 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Explain the complete digital forensic process, detailing the purpose and importance of each stage. | CO1 | R | 6 |
|  | b. | Interpret Locard’s Exchange Principle in the context of a digital crime scene. | CO1 | A | 6 |
|  |  |  |  |  |  |
| 18. | a. | Explain the role of file systems in data storage and retrieval, and compare at least two different types of file systems (e.g., FAT32 vs NTFS). | CO2 | R | 6 |
|  | b. | Apply email analysis techniques to interpret an email header and trace the origin, path, and potential malicious activity. | CO2 | A | 6 |
|  |  |  |  |  |  |
| 19. |  | Analyze the process of maintaining the chain of custody for digital evidence. Discuss how failure to maintain this chain can affect the integrity of evidence and the outcomes of a forensic investigation. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 20. | a. | Summarize how analyzing the registry can reveal user activity. How does this contribute to an investigation? | CO4 | An | 6 |
|  | b. | Explain the operation of the Recycle Bin in Windows. | CO4 | U | 6 |
|  |  |  |  |  |  |
| 21. | a. | Explain the importance of legal aspects in digital forensics. Discuss how laws such as data privacy and evidence admissibility impact the collection and use of digital evidence. | CO5 | U | 6 |
|  | b. | Compare hardware and software tools used in digital forensics. | CO5 | An | 6 |
|  |  |  |  |  |  |
| 22. | a. | Describe the role of digital forensics in modern investigations, and highlight how it supports evidence recovery from electronic devices. | CO1 | U | 6 |
|  | b. | Describe how web browser analysis helps in tracking a user's online activity during a forensic investigation. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 23. | a. | Discuss the differences between forensic cloning and simple data copying, and why forensic cloning is crucial in preserving the integrity of the original evidence. | CO3 | A | 6 |
|  | b. | Assess the importance of RAM analysis using Volatility in a digital forensic investigation. | CO4 | E | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Describe how a message is hidden within a file, and name at least one tool used for this purpose. | CO6 | A | 6 |
|  | b. | Evaluate a real or hypothetical case in which steganography was used to hide illegal information. Discuss a tool used by investigators to check if data was hidden in images. | CO6 | E | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Illustrate Forensic science and Digital Forensic concepts. |
| **CO2** | Determine various digital forensic operandi and motive behind cyber-attacks. |
| **CO3** | Interpret the cyber pieces of evidence, digital forensic process model and their legal perspective. |
| **CO4** | Demonstrate various forensic tools to investigate the cybercrime. |
| **CO5** | Categorize the digital pieces of evidence. |
| **CO6** | Analyze the digital evidence used to commit cyber offences |

A black background with red text

Description automatically generated

**END SEMESTER EXAMINATION – MAY / JUNE 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23EE2079** | **Duration** | **3hrs** |
| **Course Title** | **PYTHON PROGRAMMING** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | List the building blocks of an algorithm in computational problem-solving. | | CO1 | R | 1 |
| 2. | Determine the output of the following code snippet.  numbers = [3, 6, 9, 12, 15]  print(sum(numbers)) | | CO2 | A | 1 |
| 3. | Interpret the use of the iteration-based algorithm design approach. | | CO1 | U | 1 |
| 4. | Apply Python functions to convert a given sentence into title case.  “Learning python is fun” | | CO3 | A | 1 |
| 5. | Find errors in the following code snippet:  data = {"name": "Alice", "age": 25, "city": "New York"}  print(data.get["age"])  data.append("country", "USA") | | CO2 | E | 1 |
| 6. | Identify the output of: print("Programming"[::-2]) | | CO3 | R | 1 |
| 7. | Write the syntax for defining a lambda function in Python. | | CO3 | A | 1 |
| 8. | Determine the output of the following code snippet:  student\_scores = {"Annie": 85, "Bobie": 92, "Charlie": 78}  print(student\_scores.get("Bobie")) | | CO2 | A | 1 |
| 9. | Interpret the need for the Python Image Library (PIL) in image processing. | | CO4 | U | 1 |
| 10. | List two Turtle operations used for drawing in Python. | | CO5 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Explain the strategies used for developing algorithms in Python. | | CO2 | U | 3 |
| 12. | Compute the output of the following code:  def count(s):  for str in s.split():  s = "&".join(str)  return s    print(count("Python Programming is fun.")) | | CO2 | A | 3 |
| 13. | Identify the output of the following code snippet.  def thrive(n):  if n % 15 == 0:  print("thrive", end = “ ”)  elif n % 3 != 0 and n % 5 != 0:  print("neither", end = “ ”)  elif n % 3 == 0:  print("three", end = “ ”)  elif n % 5 == 0:  print("five", end = “ ”)  thrive(35)  thrive(56) | | CO4 | R | 3 |
| 14. | Predict the output of the following code snippet.  numbers = (4, 7, 19, 2, 89, 45, 72, 22)  sorted\_numbers = sorted(numbers)  odd\_numbers = [x for x in sorted\_numbers if x % 2 != 0]  print(odd\_numbers) | | CO5 | E | 3 |
| 15. | Write a Python program using the Turtle module to draw a square and fill it with a specific color. | | CO5 | A | 3 |
| 16. | Explain the difference between Terminal-Based and GUI-Based programs in Python with suitable examples. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Describe the fundamentals of algorithms, their notations, and problem-solving approaches using iteration and recursion with examples. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. | a. | **Explain** the different data types in Python with examples, and discuss the precedence of operators. | CO2 | U | 6 |
|  | b. | Develop python programs for the following operations:   1. Reversing a string 2. Printing length of the user entered string 3. Counting the number of vowels in a string. | CO1 | A | 6 |
|  |  |  |  |  |  |
| 19. | a. | Develop a Python program that demonstrates list slicing to perform the following operations:   1. Extract a sublist containing the middle three elements from a given list of at least seven elements. 2. Reverse the entire list using slicing. 3. Extract every second element from the list using slicing. | CO3 | A | 6 |
|  | b. | Explain the concept of functions in Python and write Python programs for the following tasks using functions:   1. Generating the Fibonacci series up to a given number of terms. 2. Calculating the Greatest Common Divisor (GCD) and Least Common Multiple (LCM) of two numbers. 3. Checking whether a given number is prime. | CO3 | An | 6 |
|  |  |  |  |  |  |
| 20. | a. | Write a Python program that takes a number as input and checks whether it is positive, negative, or zero using if-elif-else statements. Additionally, use a loop to print all even numbers from 1 to the given number, skipping multiples of 5 using the continue statement. If the number entered is negative, display a message and exit the loop using break. | CO4 | A | 6 |
|  | b. | Write a python function that accepts a list of numbers and returns the sum of odd numbers. | CO4 | A | 6 |
|  |  |  |  |  |  |
| 21. | a. | Explain the concept of fruitful functions with suitable examples. | CO4 | A | 6 |
|  | b. | Write a Python program that reads a text file and counts the frequency of each unique word, ignoring case sensitivity. Display the words along with their corresponding frequencies in descending order. | CO4 | A | 6 |
|  |  |  |  |  |  |
| 22. |  | Explain dictionaries in Python and implement the below operations:   1. Sort a dictionary by its values. 2. Remove a key-value pair from a dictionary. 3. Convert all keys in a dictionary to uppercase. 4. Find the sum of all values in a dictionary. 5. Merge two dictionaries and remove duplicate values. 6. Find the maximum and minimum values in a dictionary. | CO4 | An | 12 |
|  |  |  |  |  |  |
| 23. |  | Write a Python program using the Turtle module to draw a colorful geometric pattern. Additionally, use the Python Imaging Library (PIL) to load an image, convert it to grayscale, and apply a blurring effect. Display both the original and processed images. | CO5 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Explain the key components of a GUI-based program in Python and discuss the role of command buttons, entry fields, and pop-up dialog boxes in user interaction. | CO6 | An | 6 |
|  | b. | Develop a Python GUI application using **Tkinter** that allows a user to enter their name and age in text fields and display the entered information upon clicking a button. | CO6 | A | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Analyze different strategies for developing algorithms |
| **CO2** | Identify errors in python code with the help of IDE. |
| **CO3** | Write python functions to facilitate code reuse and manipulate strings |
| **CO4** | Utilize the python data structures effectively |
| **CO5** | Employ python for simple image processing applications |
| **CO6** | Develop GUI applications using python |