# R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT
## *(An Autonomous College U/s UGC Act 1956)*

### B.Tech. SEMESTER-I, SEMESTER END EXAMINATION - WINTER 2024

| | |
|---|---|
| **Subject Code: 1EL104** | **Date: 21-12-2024** |
| **Subject Name:** FUNDAMENTAL OF ELECTRICAL & ELECTRONICS ENGINEERING | |
| **Time: 11:00 AM to 01:30 PM** | **Total Marks: 70** |

**Instructions**
1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Write answers of **Section A** and **Section B** in **separate answer books**.
3. Attempt all questions from both **Section A** and **Section B**.
4. Each section carries **35 marks**, with a total of **70 marks** for the examination.
5. The figures to the right of each question indicate full marks, make suitable assumptions with justification.
6. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

## SECTION A

|  | Marks | BL | CO |
|---|---|---|---|

**Q.1** **Objective-Type Questions** **[05]**

**(a)** Which of the following is not an expression of power? **1 R 1**

    **(i)** $P = I^2R$         **(ii)** $P = VI$

    **(iii)** $P = V^2/R$         **(iv)** $P = I/R$

**(b)** The unit of resistivity is **1 R 1**

    **(i)** $\Omega$         **(ii)** $\Omega$ - metre

    **(iii)** $\Omega$ / metre         **(iv)** $\Omega$ / m²

**(c)** The ac voltmeter or ammeter indicates the_____ value. **1 R 2**

    **(i)** Average         **(ii)** RMS

    **(iii)** Peak         **(iv)** None of these

**(d)** The unit of apparent power is _____. **1 U 2**

    **(i)** Volt-amp         **(ii)** VAR or KVAR

    **(iii)** Watt         **(iv)** None of these

**(e)** The RLC series circuit is_____ if $X_L = X_C$.     **1   U   2**

    **(i)** Inductive                 **(ii)** Resistive

    **(iii)** Capacitive           **(iv)** None of these

**Q.2   Attempt Any Two**                                     **[10]**

**(a)** Explain ohm's law & its limitation.                 **5   U   1**

**(b)** Explain Thevenin's theorem with its steps in brief.       **5   U   1**

**(c)** Determine the electricity bill amount for a month of April, if 4 bulbs of 40 W for    **5   E   1**
5 hrs. 4 tube lights of 60 W for 5 hrs. A TV of 100 W for 6 hrs. A washing
machine of 400 W for 3 hrs. A water pump of 0.5 HP for 15 minutes are used per
day. The cost per unit is Rs. 3.50. Consider 1 HP = 746 watts.

**Q.3   Attempt Any Two**                                     **[10]**

**(a)** Define following terms in connection with A.C wave forms: (i) Time Period    **5   R   2**
(ii) Frequency (iii) Power Factor (iv) Form Factor (v) Average Value.

**(b)** Determine the current & average power equation for Pure Inductive AC circuit    **5   E   2**
and draw voltage and current waveform.

**(c)** Compare series resonance and parallel resonance.          **5   U   2**

**Q.4   Attempt Any Two**                                     **[10]**

**(a)** Explain Construction, Working of solar cell and also write advantage and    **5   A   5**
disadvantage.

**(b)** Explain Construction and Working of BJT.          **5   A   5**

**(c)** Give the difference between MOSFET and JFET.       **5   U   5**

# SECTION B

| | Marks | BL | CO |
|---|---|---|---|

**Q.5** **Objective-Type Questions** [05]

(a) Elimination of a hole and a free electron is called as _____     **1**   **U**   **4**

     (i) carrier generation          (ii) carrier recombination

     (iii) carrier generation and carrier     (iv) none of these
         recombination

(b) For Intrinsic semiconductors, the Fermi level lies _____     **1**   **U**   **3**

     (i) near the valance band          (ii) near the conduction band

     (iii) in the middle of forbidden band    (iv) all of these.

(c) The Fermi level of Extrinsic semiconductor depends on ____     **1**   **U**   **3**

     (i) temperature          (ii) concentration of impurity

     (iii) both (i) and (ii)          (iv) none of these

(d) Which of the following impurity is used to make P –type semiconductor?     **1**   **U**   **3**

     (i) P          (ii) As

     (iii) Al          (iv) Sb

(e) Temperature coefficient of semiconductor is ____     **1**   **U**   **3**

     (i) positive          (ii) negative

     (iii) zero          (iv) infinite

**Q.6** **Attempt Any Two** [10]

(a) Explain extrinsic semiconductor in details.     **5**   **U**   **3**

(b) At what temperature we can expect 45% Fermi probability function when the energy level is lying 0.02eV above its Fermi level?     **5**   **A**   **3**

(c) Describe the Pulling technique for the crystal growth in detail.     **5**   **U**   **3**

**Q.7** **Attempt Any Two** [10]

(a) Explain Construction, Working and IV characteristics of PN Junction diode.     **5**   **U**   **4**

(b) Explain Full Wave rectifier in detail.     **5**   **A**   **4**

(c) Describe in detail Principle, Construction and Working of ZENER Diode.     **5**   **U**   **4**

**Q.8  Attempt Any Two**                                                      **[10]**

**(a)** Describe in detail construction, working and IV characteristics of LED.      **5    U    4**

**(b)** Describe principle, construction, working of Schottky diode and list out       **5    U    4**
application.

**(c)** Write down the difference between conductor, semiconductor and insulator.    **5    U    3**


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