Enrolment No/Seat No.: _____

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT

(An Autonomous Institute U/s UGC Act 1956)

B.Tech. SEMESTER-I, SEMESTER END EXAMINATION – WINTER 2025

SUBJECT CODE: 1EL104 **DATE: 22-12-2025**

SUBJECT NAME: FUNDAMENTAL OF ELECTRICAL AND 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	**Multiple-Choice Questions**	**[05]**		
	(a) The unit of resistivity is	**1**	**R**	**1**
	(i) Ω **(ii)** Ω - metre			
	(iii) Ω / metre **(iv)** Ω / m^2			
	(b) Power factor in purely resistive circuit?	**1**	**R**	**2**
	(i) Zero **(ii)** Both			
	(iii) Unity **(iv)** None of these			
	(c) The average power in purely capacitive circuit is	**1**	**R**	**2**
	(i) Unity **(ii)** Zero (leading)			
	(iii) Zero (lagging) **(iv)** None of these			
	(d) The main material used in a solar cell is	**1**	**R**	**5**
	(i) Copper **(ii)** Silicon			
	(iii) Iron **(iv)** Nickel			

(e)	FETs are widely used because they have	**1**	**R**	**5**
	(i) High power loss **(ii)** High input impedance			
	(iii) Low input impedance **(iv)** High noise			

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

(a)	Explain KCL and KVL.	**5**	**U**	**1**
(b)	Explain Thevenin's theorem with its steps in brief.	**5**	**U**	**1**
(c)	Calculate the electricity bill amount for a month of April, if 4 bulbs of 40 W for5 h, 4 tube lights of 60 W for 5 h, a TV of 100 W for 6 h, a washing machine of 400 W for 3 h, 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.	**5**	**R**	**1**

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

(a)	Define following terms in connection with A.C wave forms: (i) Frequency (ii) Form Factor (iii) R. M. S. Value (iv) Amplitude (v) Peak Factor	**5**	**R**	**2**
(b)	Compare series and parallel resonance.	**5**	**U**	**2**
(c)	Explain the current in purely inductive circuit leads its voltage by 90° and average power consumption in pure inductor is zero.	**5**	**U**	**2**

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

(a)	List out types of FETs and explain its operation.	**5**	**R**	**5**
(b)	Explain structure and operation of BJT.	**5**	**U**	**5**
(c)	Explain principle and working of solar cells.	**5**	**U**	**5**

SECTION B

		Marks	BL	CO
Q.5	**Multiple-Choice Questions**	**[05]**		
(a)	Which of the following, when added as an impurity, into the silicon, produces n-type semiconductor?	**1**	**R**	**3**
	(i) Phosphorous **(ii)** Aluminum **(iii)** Magnesium **(iv)** Sulfur			
(b)	What are the charge carriers in semiconductors?	**1**	**R**	**3**
	(i) Electrons and holes **(ii)** Electrons **(iii)** Holes **(iv)** Charges			
(c)	In the zone melting method _____ of the charge is melted at any one time.	**1**	**R**	**3**
	(i) Small part **(ii)** Large part **(iii)** Solid part **(iv)** Anionic part			
(d)	Which column elements are combined to make compound semiconductors?	**1**	**U**	**3**
	(i) Fifth and sixth **(ii)** Second and fourth **(iii)** First and fourth **(iv)** Third and fifth			
(e)	What type of material is obtained when an intrinsic semiconductor is doped with trivalent impurity?	**1**	**U**	**3**
	(i) P-type semiconductor **(ii)** N-type semiconductor **(iii)** Insulator **(iv)** Conductor			
Q.6	**Attempt Any Two**	**[10]**		
(a)	Write difference between intrinsic semiconductor and extrinsic semiconductor.	**5**	**U**	**3**
(b)	Explain Czochralski process of crystal growth in detail.	**5**	**U**	**3**
(c)	Write difference between Conductors, Semiconductors and Insulators.	**5**	**U**	**3**
Q.7	**Attempt Any Two**	**[10]**		
(a)	What is PN junction? Describe its forward and reverse biasing.	**5**	**R**	**4**
(b)	Write a short note on LED.	**5**	**R**	**4**

	(c) Explain Full wave rectifier with appropriate diagram.	**5**	**R**	**4**
Q.8	**Attempt Any Two**	**[10]**		
	(a) Explain half wave rectifier with appropriate diagram.	**5**	**U**	**4**
	(b) Explain construction and working of Schottky diode.	**5**	**U**	**4**
	(c) Write a short note on drift and diffusion.	**5**	**U**	**4**

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