

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

**B.Voc. SEMESTER-II, SEMESTER END EXAMINATION – WINTER 2025**

**SUBJECT CODE: 1SRE203**

**DATE: 09-01-2026**

**SUBJECT NAME: FUNDAMENTAL OF ELECTRICAL  
ENGINEERING - II**

**TIME: 11:00 AM to 01:00 PM**

**TOTAL MARKS: 50**

**Instructions**

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Attempt all questions in the question paper.
3. The figures to the right of each question indicate full marks. Make suitable assumptions with proper justification wherever required.
4. Simple, non-programmable scientific calculators are permitted.
5. BL - Cognitive Level (As per Revised Bloom's Taxonomy) (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

		<b>Marks</b>	<b>BL</b>	<b>CO</b>
<b>Q.1</b>	(a) Convert rectangular to polar form (i) $15 - j30$ (ii) $5 + j15$ (iii) $7 - j5$ (iv) $-8 - j8$ (v) $25 + j80$ (vi) $-30 + j25$	<b>05</b>	<b>A</b>	<b>4</b>
	(b) Discuss different method of representation of vector quantities.	<b>05</b>	<b>U</b>	<b>4</b>
<b>Q.2</b>	(a) Define real power, reactive power, and apparent power with their units and power triangle.	<b>05</b>	<b>R</b>	<b>1</b>
	(b) Define the following terms related to Alternating Waveform: (1) Cycle, (2) Frequency, (3) Time Period, (4) Form Factor, (5) Peak Factor	<b>05</b>	<b>R</b>	<b>1</b>
<b>OR</b>				
<b>Q.2</b>	(a) Define form factor and peak factor with their mathematical expressions.	<b>05</b>	<b>R</b>	<b>1</b>
	(b) Define RMS value. Derive the equation of RMS value.	<b>05</b>	<b>R</b>	<b>1</b>
<b>Q.3</b>	(a) Prove analytically that the current in purely inductive circuit lags behind its voltage by $90^\circ$ .	<b>05</b>	<b>U</b>	<b>2</b>
	(b) Prove that the current in purely capacitive circuit leads its voltage by $90^\circ$ .	<b>05</b>	<b>U</b>	<b>2</b>
<b>OR</b>				
<b>Q.3</b>	(a) Prove analytically that the power factor of purely resistive circuit is unity.	<b>05</b>	<b>U</b>	<b>2</b>
	(b) Give the comparison of series resonance and parallel resonance.	<b>05</b>	<b>U</b>	<b>2</b>

- Q.4** (a) Derive equations of current and power in series R-L circuit supplied with sinusoidal alternating voltage. Draw necessary vector diagram. **05 U 2**  
(b) Explain resonance of R-L-C series circuit. **05 U 2**

**OR**

- Q.4** (a) Derive equations of current and power in series R-C circuit supplied with sinusoidal alternating voltage. Draw necessary vector diagram. **05 U 2**  
(b) Derive an expression for current and power factor for R-L-C series circuit connected to single phase a.c supply. Also draw vector diagram for the circuit with 1)  $X_L > X_C$  , 2)  $X_C > X_L$  **05 U 2**

- Q.5** (a) Give relationship between line voltage and phase voltage in case of balanced delta-connected system. **05 R 3**  
(b) Give the advantages of 3-phase system over single phase system. **05 R 3**

**OR**

- Q.5** (a) Give relationship between line voltage and phase voltage in case of balanced Star-connected system. **05 R 3**  
(b) A 415V, 3-phase voltage is applied to a balanced star-connected 3phase load of phase impedance  $(3+j4)$  ohms each. Calculate (i) Line current and (ii) total power supplied in kw. **05 R 3**

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