



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

	InSem Examination-IWinter 2023		
	Exam Seat No.:		
	Academic Year:2023-2024	Semester:III	
	Name of Programme: S. Y. B. Tech Electrical Engineering	Pattern:2022	
	Name of Course:Transformer and Induction Machines	Course Code:ELE222005	
	Max. Marks:30	Duration: 1 hour	

	<p><b>Instructions:</b> Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.</p> <ol style="list-style-type: none"><li>1. This question paper contains 02 page(s).</li><li>2. Answer to each new question is to be started on a new page.</li><li>3. Assume suitable data wherever required, but justify it.</li><li>4. Draw the neat labelled diagrams, wherever necessary.</li><li>5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question</li></ol>	
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**Question No. 1 Attempt following Question**

- a) Draw the construction diagram of the core type of transformer and explain its working. (4) CO1

**OR**

- b) State following statements are true or false with justification
- (i) In a step-up transformer, the current in secondary is greater than the primary current. (4) CO1

(ii) A transformer works on constant flux.

- c) A 1 phase 2000/200V transformer takes 2A of no-load current at 0.2 power factor lagging when the primary side is connected to the supply. Calculate (i) Watt-full component of no-load current (5) CO3  
(ii) Magnetising component of no-load current (iii) Core loss

**OR**

- d) A single phase 2kVA, 2000/200V transformer has following parameters  
 $R_1=1\ \Omega$ ,  $X_1=2\ \Omega$ ,  $R_2=0.1\ \Omega$ ,  $X_2=0.2\ \Omega$  Calculate (5) CO3  
 (i) Equivalent impedance referred to primary (ii) Equivalent impedance referred to secondary.

- e) A single-phase transformer has 1% ohmic losses and 5% reactive voltage drop. Calculate (6) CO4  
 (i) Regulation at full load 0.8 power factor leading  
 (ii) Power factor at which voltage regulation is zero.

**OR**

- f) A single phase 25kVA, 1000/500V transformer has 500W iron loss and 700W copper loss at full load, determine (i) The load at which efficiency is maximum (ii) The maximum efficiency at full load unity power factor (6) CO4

**Question No. 2 Attempt following Question**

- a) What are the requirements of the welding transformer? Draw its connection diagram. (4) CO1

**OR**

- b) Draw the connection diagram of the following (4) CO1  
 (i) Yd transformer (ii) Yy transformer

- c) A 100kVA, 11kV/440V three-phase transformer is connected in delta-star and has 1000 turns on primary. Calculate (i) Full load line current of primary and secondary current (ii) Number of turns on secondary. (5) CO3

**OR**

- d) A three-phase star-delta 33/11kV transformer has a 100A full load line current in the primary. Calculate (i) Secondary line current (ii) Rating of transformer (5) CO3

- e) Derive the condition for maximum efficiency of the transformer. (6) CO4

**OR**

- f) Derive the formula for voltage regulation with lagging load. (6) CO4