



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

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester: II
Class: FY COMP/R&A/ELECT/IT/AIDS/CSD	Program: FY B.Tech
Branch Code: FYE	Pattern:2023
Name of Course: Fundamentals of Electrical Engineering	Course Code:2300105A
Max. Marks:60	Duration:2.30 Hrs.

Instructions: 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.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

- 1a) Solve any one (6) CO1
- a) How can you calculate the insulation resistance of a cable? Provide the formula and explain how it is derived.
- OR
- b) Derive the formula for Resistance Temperature Coefficient

Question No. 2 Attempt following Question

- 2a) Solve any one (6) CO1
- a) State and Explain Thevenin's Theorem
- OR
- b) Derive the formula for Star to Delta transformation

Question No. 3 Attempt following Question

- 3a) A RL series circuit is connected across single phase AC supply, Derive equation for instantaneous current also draw (i) Circuit diagram (ii) Phasor diagram (iii) Waveforms (8) CO1
- OR
- 3b) A series RLC circuit is connected across single phase AC supply and it is forming resonance, Derive formula for Resonance frequency also draw (i) Circuit diagram (ii) Phasor diagram (iii) Waveforms (8) CO1

- 3c) A single phase 230V, 50Hz AC supply is applied across a series combination of resistance of 40 Ohm and capacitance of 200 microFarad. Calculate (i) Capacitive reactance (ii) Impedance (iii) Current (iv) power factor (v) Active power (vi) Reactive power (8) CO4

OR

- 3d) A series RL circuit with $R=25\text{ ohm}$ and $L=0.1\text{H}$ is connected to a 250 v, 50Hz source calculate i) Impedance ii) Current (iii) Power (iv) power factor v) Draw phasor diagram (8) CO4

Question No. 4 Attempt following Question

- 4a) Explain the construction and working of MCCB Also write, advantages and disadvantages. (8) CO3

OR

- 4b) For a Three Phase Delta connected load with the help of circuit and phasor diagram show that line current is $\sqrt{3}$ times of phase current and line voltage is equal to phase voltage (8) CO4

- 4c) A total load of 20kW at 0.8 power factor lagging is connected across 400V, 50Hz supply in star. Find (i) Line and phase current (ii) Circuit parameters (R and L) (8) CO4

OR

- 4d) A series combination 50 Ohm resistance and 30 Ohm capacitive reactance per phase are connected in delta across three phase 400V, 50Hz power supply. Calculate (i) Line and phase voltage (iii) Line and phase current (iii) Active and reactive power iv) Draw Phasor Diagram (8) CO4

Question No. 5 Attempt following Question

- 5a) Draw the sketch/schematic diagram of the transformer. Explain working principle and material used for different parts of transformer (8) CO3

OR

- 5b) Draw the sketch/schematic diagram of DC machines showing all labels. Elaborate any two parts of it (8) CO3

- 5c) In a 25 kVA, 2000/200V transformer has iron loss and full load copper loss 250W and 300 W respectively. Calculate the efficiency at unity power factor on i) Full load ii) half full load (8) CO5

OR

- 5d) A 500 kVA, single phase transformer has efficiency of 92% at full load unity power factor and 95% at half load 0.8 power factor Determine its efficiency at 80% of the full load and 0.95 power factor (8) CO5

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