



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

	SUMMER-2023		
	Exam Seat No.:		
	Academic Year:2022-2023	Semester:II	
	Name of Programme:B.Tech	Pattern:2022	
	Name of Course:Fundamentals of Electrical Engineering	Course Code:FYE221006	
	Max. Marks:60	Duration:2.50	

	<p>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.</p> <ol style="list-style-type: none">1. This question paper contains 04 pages.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	
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Question No. 1 Attempt following Question

1)

Attempt any one of the following.

(I) What is the impact of temperature on resistance of following materials. Explain with graph.

(i) Aluminium (ii) Silicon (iii) Mica

(6) CO1

OR

(II) Define following terms related to work power energy.

(i) Efficiency (ii) Specific heat capacity (iii) Potential energy

Question No. 2 Attempt following Question

2)

Attempt any one of the following

(I) State the Thevenin's theorem principle and explain it.

(6) CO1

OR

(II) Explain ideal and practical voltage source.

Question No. 3 Attempt following Question

3a) In case sinusoidal current, show that rms value is 0.707 times of maximum value of current.

(5) CO4

OR

3b) A pure capacitance is connected across single phase AC supply, derive equation of instantaneous current and average power

(5) CO4

3c) A series RL circuit is connected across single phase AC supply, derive equation of impedance, current and average power. Also draw circuit diagram.

(5) CO4

OR

3d) A series RLC circuit is connected across single phase AC supply and it is forming resonance, draw

(5) CO4

(i) Circuit diagram (ii) Phasor diagram (iii) Waveforms

3e) A single-phase supply of $v=200\sin(314t)$ is applied across pure inductance of 30mH. Calculate (i) rms value of voltage (ii) Frequency (iii) inductive reactance (iv) Equation of current.

(6) CO4

OR

- 3f) A single phase 230V, 50 Hz AC supply is applied across a series combination of resistance of 10 Ohm, unknown capacitance and inductance of 30mH. Calculate (6) CO4
- (i) Value of capacitance to form resonance at 50Hz frequency. (ii) Impedance (iii) Current (iv) Active Power

Question No. 4 Attempt following Question

- 4a) Explain working of Kit-Kat/ rewirable fuse with diagram, advantages and disadvantages. (5) CO3

OR

- 4b) Explain working of MCB, advantages and disadvantages. (5) CO3

- 4c) Define following terms related three phase supply: (5) CO1
- (i) Balanced supply (ii) Unbalanced supply

OR

- 4d) Write the formula of active and reactive power for star connected balanced load (5) CO1
- (i) Using line values (ii) Using phase values

- 4e) Three coils, each having 40 Ohm resistance and 30 Ohm inductive reactance are connected in star across three phase 400V, 50Hz power supply. Calculate (6) CO4

(i) Line and phase voltage (ii) Line and phase current
(iii) Active and reactive power

OR

- 4f) A total load of 25kW at 0.9 power factor lagging is connected across 400V, 50Hz supply in star. Find (6) CO4
- (i) Line and phase current (ii) Circuit parameters (R, L or C)

Question No. 5 Attempt following Question

- 5a) Draw the sketch/schematic diagram of core type of transformer and explain its construction. State its features. (5) CO3

OR

- 5b) In DC machine, explain functions and material used in following parts (5) CO3
(i) Armature (ii) Commutator (iii) Brush.

- 5c) Select the type of transformer used in following cases (5) CO5
(i) Raise voltage (ii) Reduce voltage (iii) Power Transformer (iv) Distribution Transformer

OR

- 5d) Draw the torque speed characteristic of following motors. State two applications of each. (5) CO5
(i) DC shunt motor (ii) DC series motor

- 5e) A 50 kVA, 3300/330 V, single phase transformer has iron loss and full load copper loss 400 W and 600W respectively. Calculate the efficiency at (6) CO6
(i) half load and 0.9 power factor lagging (ii) full load unity power factor

OR

- 5f) A 1000 kVA, single phase transformer has efficiency of 90% at full load unity p.f. and 90% at half load 0.8 p.f. Determine its efficiency at 80% of the full load and 0.9 p.f. (6) CO6