PRANVEER SINGH INSTITUTE OF TECHNOLOGY KANPUR
Even Semester   Session 2021-22   CT - II
B. Tech. II Semester
Basic Electrical Engineering (KEE-201T)

CO Number	Course Outcome
CO1	To define [L1: Knowledge] basic laws, terminologies and theories pertaining to DC and AC (1-phase and 3-phase) electrical circuits.
CO2	Explain [L2: Comprehension] concepts of electrical circuits, the components of low voltage electrical installations, transformers and electromechanical energy conversion devices and their applications.
CO3	Apply [L3: Application] the concepts of transformers, AC & DC Electric circuits, machines and energy consumption in solving relevant numerical problems.
CO4	Analyze [L4: Analysis] and categorize different types of DC and AC electrical circuits (1-phase and 3-phase).

Time: 1.5 Hrs.   M. M. 15

Section A

Q1. Attempt all questions: (1X3 = 3 Marks)

a)   What is the use of form factor and peak factor?   CO1

b)   Define resonance and the quality factor.   CO1

c)   Explain the difference between three phase balanced and unbalanced load.   CO2

Section B

Q2. Attempt all questions:

(2X4 = 8 Marks)

a i)   Explain pure inductive circuit with the help of phasor and wave diagram and show that   CO2
in a pure inductive circuit power absorbed is zero.

Or

ii)   Describe series resonance. Draw the graphical representation of resonance in an RLC   CO2
series circuit

b i)   Two impedance $Z_1 = (10+j5)$ ohms and $Z_2 = (6-j8)$ ohms are connected in parallel. The
total current supplied is 15 A. What is the power taken by each impedance?   CO4
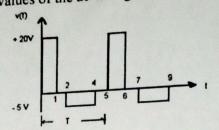
Or

ii)   Draw the phasor diagram showing the following voltages given below.
$V_1=100 \sin 500t$, $V_2= 200 \sin (500t+\Pi/3)$, $V_3= -50 \cos 500t$, $V_4= 150 \sin (500t-\Pi/4)$.   CO4
Find rms value, average value, form factor and peak factor of resultant voltage.

c i) Find the average and rms values of the ac voltage whose waveform is given below.   CO4

Or

ii) A resistance and inductance are connected in series across voltage $v = 283 \sin 314t$. The current expression is found to be $4 \sin (314t - \Pi/4)$. Find the values of resistance, inductance and power factor.   CO4

d i) Illustrate the relationship between line and phase voltages and currents for a Delta-connected 3-phase balanced system.   CO3

Or

ii) Illustrate various types of magnetic materials. Also, explain ferrites and its types.   CO3

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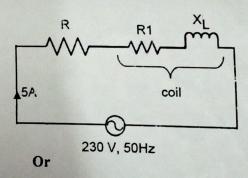
Section C

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Q3. Attempts all the questions.   **1x4=4 Marks**

i) A current of 5A flows through a non-inductive resistance connected in series with a choking coil when a voltage of 230V, 50 Hz is applied across it. If the voltage across the resistance is 115V and that across choking coil is 184V, calculate (a) resistance, reactance and impedance of the coil, (b) the power absorbed by the coil and (c) the total power.   CO4

230 V, 50Hz

Or

ii) A 46 mH inductive coil has resistance of 10 Ω. How much current will it draw, if connected across 100 V, 50 Hz source? Also, determine the value of capacitance that must be connected across the coil to make the power factor of the circuit be unity.   CO4