ABES Engineering College, Ghaziabad

Department of Electrical & Electronics Engineering

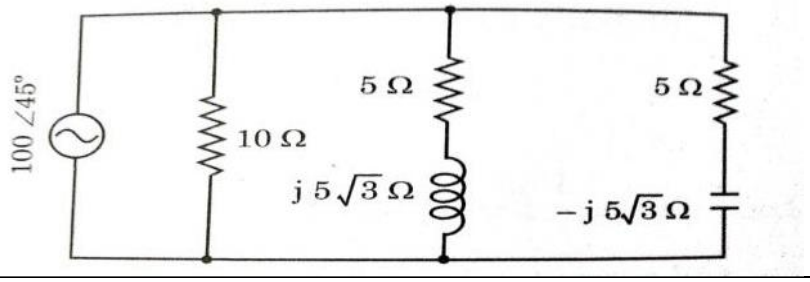
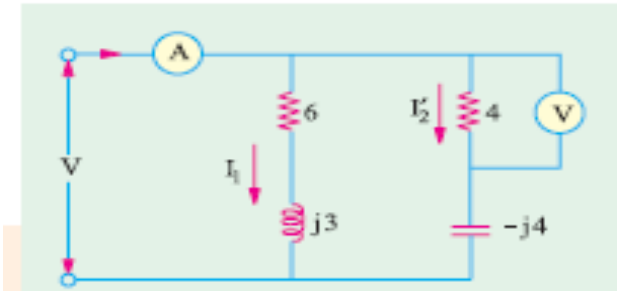
Session: 2023-24 **Semester:** I/II **Section:**

Course Code: BEE101/201 **Course Name:** Fundamentals of Electrical Engineering

Tutorial Sheet-

Topic: Steady State Analysis of Single Phase AC Circuits

Q. No.	KL	CO	Question	Ans.
Q-1	K3	CO2	An alternating voltage is given by V =141.4 sin 314 t. Find : (a) Frequency (b) R.M.S value (c) Average value (d) The instantaneous value of voltage when 't' is 3 m sec. (e) The time taken for the voltage to reach 100 v for the first time after passing through zero value	50Hz, 100V, 90V 114.4V, 2.5 m sec
Q-2	K3	CO2	It is desired to operate a 100W, 120V electric lamp at its rated current from a source of 240V, 50Hz, AC Supply. This is achieved by following methods (a) A resistor in series (b) Capacitor in series (c) A coil in series having resistance of 10 Ω. Find Circuit parameters in each case and which method is most economical in terms of power consumption	Case a) R=144 Ω., P_{CKT} =200W, PF =1 Case b) C =12.8μF, P_{CKT} = 100 W, PF = 0.5 lead Case c) L = 0.775H P_{CKT} = 107W, PF= 0.535 lagging , Case b
Q-3	K3	CO2	A 20 Ω resistance is connected in series with a inductive coil and a capacitor, across 25 Volts, variable frequency, single phase AC supply. When the supply frequency is 400 Hz the circuit current is at its maximum value of 0.5 A and voltage drop across capacitor is 150 Volts. Determine resistance and inductance of the coil.	R = 30 Ω, L = 0.119 H
Q-4	K3	CO2	. A coil of resistance 20 Ω and inductance 100 mH is connected in series with a capacitance of 40 μF across 100 v, 50 Hz ac supply. Calculate (i) magnitude of current (ii) power factor (iii) phase angle (iv) voltage across each element	1.92 A, 0.3835 Leading, 67.45˚ , 38.4 V, 60.3 V and 152.8V
Q-5	K3	CO2	A resistance R, capacitance C and inductance L of value 0.01 H are connected in series. When a voltage V = 400 cos(3000t-10˚) V is applied to the series combination. the current flowing is given by I= 10√2cos(3000t-55˚) A. Find the value of R and C	R = 20 Ω and C = 33.33 μF

Q-6	**K3**	**CO2**	A series combination of R and C is in parallel with 20 Ω resistance across 50 Hz supply. If the total current is 7A, Current through 20 Ω resistor is 5A and current in R-C branch is 3A. Find values of R & C	R =16.67 Ω C = 110.322 µF
Q-7	**K3**	**CO2**	For the circuit shown in fig. below find the values of branch current and the supply current. Also calculate power consumption of each branch and power consumption of the circuit. 	10 ∠45 A, 10 ∠-15 A and 10 ∠105A , Total 20∠45 A 1000 W, 500 W, 500 W and 2000 W
Q-8	**K3**	**CO2**	If in fig shown below given values are in ohms and the voltmeter reads 60 V find the reading of ammeter 	I = 22.47 A
Q-9	**K3**	**CO2**	An inductive coil of impedance Z = 6+8j Ω is connected to 100V, 50HZ ac supply. It is desired to improve power factor of supply current to 0.8 lagging by connecting a capacitor (i) in series with coil and (ii) in parallel of coil. Find the value of capacitor for the each case.	909.45 µF and 111.4 µF c=254
Q a-10	**K3**	**CO3**	Each phase of a Delta connected load consist of a resistance 25Ω, an inductance 0.15 henry and a capacitance of 120 micro farad in series. The load is connected across 400V, 50 Hz, 3-phase supply. Determine line current, power factor and active power.	23.64 A, PF = 0.853 lagg and 13.974 KW line current=21.40A Power factor=0.77(lag) Active power=11.416Kw