

University of Mumbai
Examinations Summer 2022
Curriculum Scheme: Revised 2016

Examination: First Year Semester I (All Branches)

Course Code: 58603/20189 and Course Name: Basic Electrical Engg.

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The sinusoidal current reaches 15 A first time at $t=3.375$ ms and second time at $t=9.125$ ms. Find maximum value of current.
Option A:	10 A
Option B:	15 A
Option C:	20 A
Option D:	30 A
2.	The sinusoidal current reaches 15 A first time at $t=3.375$ ms and second time at $t=9.125$ ms. Find frequency of current waveform
Option A:	30 Hz
Option B:	40 Hz
Option C:	50 Hz
Option D:	60 Hz
3.	If $1\mu\text{F}$, $2\mu\text{F}$, $4\mu\text{F}$, $6\mu\text{F}$ are connected in parallel, which capacitor will carry maximum current. Supply frequency is constant.
Option A:	$1\mu\text{F}$
Option B:	$2\mu\text{F}$
Option C:	$4\mu\text{F}$
Option D:	$6\mu\text{F}$
4.	If $1\mu\text{F}$, $2\mu\text{F}$, $4\mu\text{F}$, $6\mu\text{F}$ are connected in series, which capacitor will have maximum voltage across it?. Supply frequency is constant.
Option A:	$1\mu\text{F}$
Option B:	$2\mu\text{F}$
Option C:	$4\mu\text{F}$
Option D:	$6\mu\text{F}$
5.	A circuit consists of resistance R and capacitive reactance of $60\ \Omega$ connected in series. Determine the value of R for which p.f of the circuit is 0.8
Option A:	$50\ \Omega$
Option B:	$60\ \Omega$
Option C:	$70\ \Omega$
Option D:	$80\ \Omega$
6.	A transformer has full load copper loss of 64 W, what will be copper loss at half load
Option A:	128 W
Option B:	64 W

Option C:	32 W
Option D:	16 W
7.	If 2 Watt meters are used for 3 phase power measurement, if pf is unity, the relation between two Watt meters reading (W1 & W2) is
Option A:	$W1 = W2$
Option B:	$W1 > W2$
Option C:	$W1 < W2$
Option D:	$W1 = -W2$
8.	According to Thevenin's theorem, any bilateral network can be replaced by a network with—
Option A:	An independent current source in parallel to the equivalent resistance
Option B:	An independent voltage source in series with the equivalent resistance
Option C:	An independent voltage source in parallel to the resistance
Option D:	An independent current source in series to the equivalent resistance
9.	A circuit contains two un-equal resistances in parallel
Option A:	current is same in both
Option B:	large current flows in larger resistance
Option C:	potential difference across each is same
Option D:	smaller resistance carry smaller current
10.	Three resistance 14.5Ω , 25.5Ω and 60Ω are connected in series across 200 V. What will be the voltage drop across 14.5Ω
Option A:	29 V
Option B:	13.5 V
Option C:	14 V
Option D:	18 V

Q2	
A	Solve any Two 5 marks each
i.	In a particular R-L circuit voltage of 10 V at 25 Hz produces 100 mA, while the same voltage at 75 Hz produces 60 mA. Draw the circuit diagram and insert values of the constants
ii.	Two voltage sources have equal emf's and a phase difference α , when they are connected in series, the voltage is 200 V. when one source is reversed, the voltage is 15 V. Find their emf's and phase angle α
iii.	A 50 KVA, single phase transformer has an efficiency of 98 % at full load, 0.8 pf and 97 % at half full load, 0.8 pf. Determine the full load copper loss and iron loss.
B	Solve any One 10 marks each
i.	Explain how two watt-meters can be used to measure power and power factor in a three phase balanced delta connected load lagging pf.

ii.	<p>Find current through 22Ω by mesh analysis</p>
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Q3	Solve any Two Questions out of Three	10 marks each
A	Find current through 4Ω by Thevenin's theorem	
B	A 600 KVA, single phase transformer has an efficiency of 92 % at both full load and half load at unity pf. Determine the efficiency at 75% of full load, 0.9 pf lagging	
C	Coil A takes 2 Amps at a power factor of 0.8 lagging with an applied voltage of 10 Volts. A second coil B takes 2 Amps with a power factor of 0.7 lagging with an applied voltage of 5 Volts. What voltage will be required to produce a total current of 2 Amps With A and B in parallel	

Q4	Solve any Two Questions out of Three	10 marks each
A	An equipment consumes 2 KW when connected across a 110 V, 100 Hz supply and takes a lagging current of 25 A. If a capacitor is connected in parallel with equipment to make the pf unity, Determine the value of capacitance	
B	A source of 1MHz is connected across series R L C circuit. The capacitor 'c' is variable. When capacitor is 500 pf. maximum current is passed through circuit. For 600 pf. The current is half of the previous case. Calculate parameters R , L , Bandwidth & Quality factor at resonance.	
C	A 100Ω resistor is connected in series with a choke coil when a 400 V , 50 Hz supply is applied to this combination the voltage across the resistance and the choke coil are 200 V and 300 V respectively. Find the power consumed by the choke coil. Also calculate the power factor of choke coil and power factor of the circuit	