GANPAT UNIVERSITY
U. V. PATEL COLLEGE OF ENGINEERING
B.TECH. SEM-I
2ES103: BASIC OF ELECTRICAL ENGINEERING
CH. 5: A.C. CIRCUITS - I
2: ASSIGNMENT &TUTORIAL

Part – I Multiple Objective Questions (MCQ)

1.	The power factor of a purely inductive circuit is			
	A)	zero	**B)**	unity
	C)	lagging	**D)**	leading.
2.	In an ac circuit, the ratio of kW / kVA represents			
	A)	Power factor	**B)**	Load factor
	C)	Form factor	**D)**	Peak factor
3.	In an R – L –C circuit, the phase of the current with respect to the circuit voltage will be_____.			
	A)	Leading	**B)**	Same
	C)	Lagging	**D)**	Depends upon the value of Land C
4.	The frequency of DC supply is_____.			
	A)	Zero	**B)**	50 Hz
	C)	100 Hz	**D)**	25 Hz
5.	A sine wave has a maximum value of 20 V. Its value at 135^0 is			
	A)	10 V	**B)**	$14.14\ V$
	C)	15 V	**D)**	5 V
6.	If the value of *C* in a series *RLC* circuit is decreased, the resonant frequency			
	A)	is not affected	**B)**	increases
	C)	is reduced to zero	**D)**	decreases
7.	In a series *RC* circuit, 12 $V_{(rms)}$ is measured across the resistor and 15 $V_{(rms)}$ is measured across the capacitor. The rms source voltage is			
	A)	3 V	**B)**	27 V
	C)	19.2 V	**D)**	1.9 V
8.	A phasor represents			
	A)	the magnitude and a quantity direction	**B)**	the width of a quantity
	C)	the phase angle	**D)**	the magnitude of a quantity
9.	The peak to peak alternating potential difference across a 150 Ω resistor is 339 V. The rms current in the resistor is			
	A)	0.5 A	**B)**	1.2 A
	C)	0.8 A	**D)**	1.6 A
10.	The reactance of 1 F capacitance when connected to a d.c. circuit is			
	A)	Infinite	**B)**	Zero
	C)	1 Ω	**D)**	0.5 Ω

Part – II Shorts Questions

(only for preparation)
(1 & 2 Marks)

1.	Define following terms: (a) Frequency (b) phase (c) phase difference (d) time period (e) form factor (f) rms value. (g) Average value (h) amplitude.
2.	Write an expression for calculating real, reactive and apparent power in an ac circuit?
3.	Define the term (1) reactance, (2) inductive reactance (3) capacitive reactance and explain how it depends on frequency in an a.c. Circuit.
4.	A certain waveform has a form factor of 1.2 and a peak factor of 1.5.if the maximum value is 100, find rms value and average value.
5.	Only draw impedance triangle and power triangle for R-L and R-C series circuit.

Part – III Examples

1.	A sinusoidally varying alternating current of frequency 60Hz has a maximum value of 15A i) Write down the equation for instantaneous value. ii) Find the value of current after 1/200 second. iii) Find the time taken to reach 10 amperes for the first time iv) Find its average value. **Ans:** **i) $15\sin 120\pi t$ iii) 0.001936 second** **ii)14.266A iv) 9.55A**
2.	An alternating voltage is v=100sin100t. Find (i) Amplitude (ii) Time period and frequency (iii)Angular velocity (iv) form factor (v) peak factor **Ans:** **i)100V iii)100rdians/second** **ii)15.9Hz v)1.4142** **iv)1.11**
3.	A coil of inductance 0.08H and negligible resistance is connected in series with a 15 ohms non-inductive resistance. The combined circuit is energized from a 240V, 50Hz supply. Calculate i)Reactance of the coil ii)Impedance of the circuit iii)The current in the circuit iv)Voltage across the resistance v)Voltage across the coil vi)Power absorbed by the circuit vii)Power factor of the circuit **Ans: (i) 25.13ohm, (ii) 29.27 ohm (iii) 8.2A (iv)123V (v)206V(vi)1008.6W(vii)0.5125**

Part – IV Long Questions **(Only For Preparation)**

1.	Obtain the rms value, average value, form factor and peak factor of half-wave rectifier output voltage wave.
2.	Obtain rms value, average value, form factor and peak factor of full-wave rectifier output voltage wave.
3.	Prove that current through pure inductors is always lagging by 90° to its voltage and power consumed is zero.
4.	Prove that in a purely capacitive circuit power consumed is zero when a.c. Voltage is applied. Draw relevant phasor diagram and waveform.

5.	Derive the expression of impedance, current and power factor for (i) R-L series circuit (ii) R-C series circuit. Draw phasor diagram.

***Notes: Students have to write only Part I and Part III.**