



Department of Electrical and Electronic Engineering

Level-I, Term-II

Mid Term Examination, Spring-2023

Course Code: EEE 121

Course Title: Electrical Circuits II

Notes:

Time: 1 Hour

Full Marks: 60

- Each question carries 30 marks.
- Figure on the right of each question indicate marks for respective question.
- Answer any two questions including question no.-1

- Consider five (5) household AC appliances A (1V), B (2V), C (3V), D (4V), and E (5V) connected in series where flows 2A, and the corresponding phase angle between current and voltage is $\Theta_A=60^\circ$, $\Theta_B=45^\circ$, $\Theta_C=40^\circ$, $\Theta_D=30^\circ$, $\Theta_E=10^\circ$. Please determine the power consumption level of each appliance and comment on which appliance power factor is close to the unity. (13)

- Determine the phase relation between following set also mention the leading and lagging parameter and sketch the wave shape of v and i in a same plot (12)

$$i = -2\cos(\omega t - 60^\circ) \text{ and } v = 3\sin(\omega t - 10^\circ)$$

- Show that, *sine wave* is a periodic wave (5)

- From the following signal in Fig. 2(a), determine: (25)
 - Peak value (3)
 - Peak to peak value (3)
 - Frequency (3)
 - Time period (3)
 - Average value (6)
 - RMS value (7)

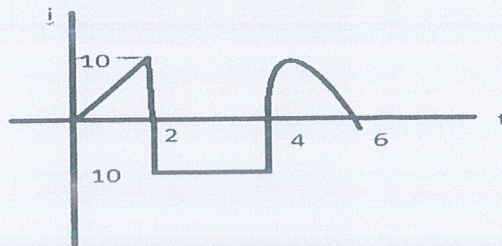


Fig. 2(a)

- What is the basic difference between AC and DC? Describe shortly (5)
- Show that, $P_{avg} = V_{rms} * I_{rms} * \text{power factor}$ (10)

- b. From the following RLC series circuit in Fig. 3(b). Determine the following (20) parameters:
- RMS supply, E
 - Total Impedance, Z
 - Total AC current, I
 - Voltage drops of each branch, v_R , v_L and v_C
 - Real Power, P
 - Power factor, P_f

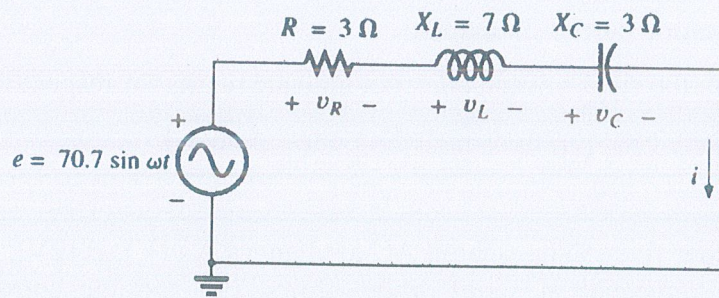


Fig. 3 (b).