

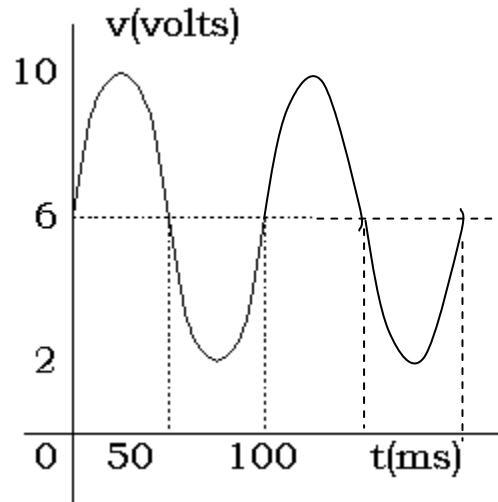
## EE 201 Midterm #3

**Name:-**

**Number:-**

- 1) Find the frequency of an alternating waveform whose period is 33.33 ms.  
a) 3.33 kHz      b) 30 Hz      c) 33.3 Hz      d) 3 Hz      e) All wrong
- 2) Convert 265 degrees to radians.  
a) 23.15 rad      b) 2.315 rad      c) 4.63 rad      d) 46.3 rad      e) All wrong
- 3) Convert 1.72 radians to degrees.  
a) 55°      b) 98.55°      c) 49.8°      d) 23.7°      e) All wrong
- 4) Find the angular velocity of a waveform with a period of 2.5 s.  
a) 1.67 rad/s      b) 2.83 rad/s      c) 2.51 rad/s      d) 3.4 rad/s      e) All wrong
- 5) Find the angular velocity of a waveform with a frequency of 415 Hz.  
a) 45 rad/s      b) 4.5 rad/s      c) 26.1 rad/s      d) 2.61 rad/s      e) All wrong
- 6) Find the frequency of a sine wave having an angular velocity of 5,000 rad/s.  
a) 46.7Hz      b) 467Hz      c) 79.6Hz      d) 796Hz      e) All wrong
- 7) What is the amplitude of the waveform  $120 \sin 377t$  ?  
a) 240      b) 84.84      c) 377      d) 120      e) All wrong
- 8) What is the frequency of the waveform in problem 7?  
a) 30Hz      b) 120Hz      c) 377Hz      d) 60Hz      e) All wrong
- 9) If  $e = 345 \sin 112t$ , how long (in seconds) does it take the waveform to complete a half cycle?  
a) 26.2ms      b) 27.5ms      c) 29.4ms      d) 28.1ms      e) All wrong

10) What is the average value of the waveform?



- a) 5V      b) 10 V      c) 6V      d) 0V      e) All wrong

11) For the waveform in problem 10, what is the period?

- a) 50ms      b) 100ms      c) 150ms      d) 25ms      e) All wrong

12) For the waveform in problem 10, what is the frequency?

- a) 10Hz      b) 2Hz      c) 1Hz      d) 4Hz      e) All wrong

13) What is the effective value of  $v = 23\sin 400t$ ?

- a) 23V      b) 400V      c) 16.26V      d) 11.5V      e) All wrong

14) What is the rms value of  $i = 63 \times 10^{-3} \sin(500t + 33^\circ)$ ?

- a) 31.5mA      b) 63mA      c) 500mA      d) 44.55mA      e) All wrong

15) The current through a  $10 \text{ k}\Omega$  resistor is  $3 \times 10^{-3} \sin 377t$ . What is the sinusoidal expression for the voltage across the resistor?

- a)  $30 \sin(377t + 30^\circ)$       b)  $30 \times 10^{-3} \sin 377t$       c)  $3 \sin 377t$   
d)  $30 \sin 377t$       e) All wrong

16) Determine the inductive reactance of a  $4 \text{ mH}$  coil at a frequency of  $50 \text{ kHz}$ .

- a)  $16.3 \Omega$       b)  $163 \Omega$       c)  $1.26 \text{ k}\Omega$       d)  $12.6 \text{ k}\Omega$       e) All wrong

17) What is the inductance of a coil that has an impedance of  $500 \text{ ohms}$  at a frequency of  $10 \text{ kHz}$ ?

- a)  $79.6 \text{ mH}$       b)  $7.96 \text{ mH}$       c)  $65 \text{ mH}$       d)  $6.5 \text{ mH}$       e) All wrong

18) At what frequency does a  $7 \text{ H}$  inductance have an impedance of  $500 \text{ ohms}$ ?

- a)  $114 \text{ Hz}$       b)  $456 \text{ Hz}$       c)  $65 \text{ mH}$       d)  $45.6 \text{ Hz}$       e) All wrong

19) Find the value of the impedance for a  $2\ \mu\text{F}$  capacitor at 100 Hz.

- a)  $42.8\ \Omega$     b)  $428\ \Omega$     c)  $79.6\ \Omega$     d)  $796\ \Omega$     e) All wrong

20) A capacitor has an impedance of  $1,500\ \Omega$  at a frequency of 150 Hz. What is its capacitance?

- a)  $1\ \mu\text{F}$     b)  $7.07\ \mu\text{F}$     c)  $0.707\ \mu\text{F}$     d)  $10\ \mu\text{F}$     e) All wrong

21) Determine the frequency at which a  $5\ \mu\text{F}$  capacitor has an impedance of  $100\ \Omega$ .

- a) 3.18 Hz    b) 2.25 Hz    c) 225 Hz    d) 318 Hz    e) All wrong

22) The voltage across a  $25\ \Omega$  capacitive impedance is  $100\sin 377t$ . What is the current?

- a)  $2500\sin(377t + 90^\circ)$     b)  $250\sin(377t + 90^\circ)$     c)  $40\sin(377t + 90^\circ)$   
d)  $4\sin(377t + 90^\circ)$     e) All wrong

23) Determine the voltage across a  $300\ \Omega$  capacitive impedance if the current through it is  $i = 65\text{mA}\sin 5000t$ .

- a)  $16.8\sin(5000t - 90^\circ)$     b)  $19.5\sin(5000t - 90^\circ)$     c)  $168\sin(5000t - 90^\circ)$   
d)  $195\sin(5000t - 90^\circ)$     e) All wrong

24) A  $45\ \Omega$  capacitive impedance has a current through it of  $i = 35\text{mA}\sin(300t + 15^\circ)$ . What is the voltage across it?

- a)  $235.5\sin(300t - 75^\circ)$     b)  $23.55\sin(300t - 75^\circ)$     c)  $1.575\sin(300t - 75^\circ)$   
d)  $15.75\sin(300t - 75^\circ)$     e) All wrong

25) A  $1\ \mu\text{F}$  capacitor has a current of  $i = 0.05\sin 377t$  through it. What is the voltage across it?

- a)  $84.7\sin(377t - 90^\circ)$     b)  $847\sin(377t - 90^\circ)$     c)  $132.6\sin(377t - 90^\circ)$   
d)  $13.26\sin(377t - 90^\circ)$     e) All wrong

26) The impedance of a coil equals the resistance of a  $24\ \text{k}\Omega$  resistor at a frequency of 1 kHz. What is the inductance of the coil?

- a) 38.2H    b)    c) 3.82H    d) 5.78H    e) All wrong

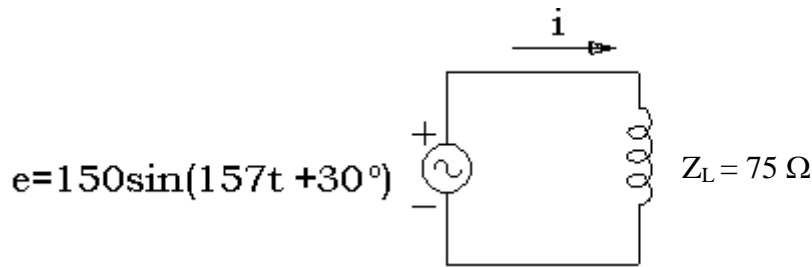
27) Determine the frequency at which a  $2.5\ \mu\text{F}$  capacitor and a 30 mH coil have the same impedance.

- a) 58.12 kHz    b) 6833.9 kHz    c) 581.2 Hz    d) 683.39 Hz    e) All wrong

28) Determine the inductance required to make its impedance equal to that of a  $150\ \mu\text{F}$  capacitor at 75 kHz.

- a)  $0.16\ \mu\text{H}$     b)  $1.6\ \mu\text{H}$     c)  $0.3\ \mu\text{H}$     d)  $3\ \mu\text{H}$     e) All wrong

29) In the circuit shown below, find  $i$



- a)  $1.5\sin(157t - 90^\circ)$       b)  $0.9\sin(157t + 60^\circ)$       c)  $2\sin(157t - 60^\circ)$   
 d)  $1.5\sin(157t + 60^\circ)$       e) All wrong

30) In problem 29, find the value of  $L$ .

- a) 5.77H      b) 3.78H      c) 0.478H      d) 1.34H      e) All wrong

31) Convert  $3 + j7$  to polar form.

- a)  $4 / \underline{66.8^\circ}$       b)  $10 / \underline{66.8^\circ}$       c)  $21 / \underline{66.8^\circ}$       d)  $7.62 / \underline{66.8^\circ}$       e) All wrong

32) Evaluate the expression  $(155 - j63) - (55 - j10)$  and express the answer in polar coordinates.

- a)  $210 / \underline{70^\circ}$       b)  $113.2 / \underline{-73^\circ}$       c)  $210 / \underline{-27.9^\circ}$       d)  $113.2 / \underline{-27.9^\circ}$       e) All wrong

33) Evaluate the expression  $(16.5 / \underline{9^\circ}) \times (5.6 / \underline{33^\circ})$  and express the answer in rectangular coordinates.

- a)  $68.7 - j61.8$       b)  $68.7 + j61.8$       c)  $22.1 + j15.9$       d)  $22.1 - j15.9$       e) All wrong

34) Evaluate the expression  $(71 / \underline{43^\circ}) \div (16 / \underline{33^\circ})$  and express your answer in rectangular coordinates.

- a)  $4.37 - j7.71$       b)  $7.71 + j4.37$       c)  $4.37 + j7.71$       d)  $7.71 - j4.37$       e) All wrong

35) Evaluate the expression  $(4 + j5) \times (39 / \underline{-42^\circ})$  and express the answer in polar form.

- a)  $249.6 / \underline{-9.3^\circ}$       b)  $79.5 / \underline{9.3^\circ}$       c)  $249.6 / \underline{9.3^\circ}$       d)  $79.5 / \underline{-9.3^\circ}$       e) All wrong

36) Express  $150\sin(377t - 61^\circ)$  in phasor form.

- a)  $150 / \underline{-61^\circ}$       b)  $106.1 / \underline{-61^\circ}$       c)  $145 / \underline{-61^\circ}$       d)  $110.1 / \underline{-61^\circ}$       e) All wrong

37) Express  $39.3 \cos(300t - 15^\circ)$  in phasor form.

- a)  $39.3 \angle 15^\circ$     b)  $27.8 \angle -285^\circ$     c)  $27.8 \angle -15^\circ$     d)  $39.3 \angle -15^\circ$     e) All wrong

38) Express the phasor  $100 \angle 60^\circ$  as a sine wave with a frequency of 60 Hz.

- a)  $100\sin(60t + 60^\circ)$     b)  $141.4\sin(60t + 60^\circ)$     c)  $100\sin(377t + 60^\circ)$   
 d)  $141.4\sin(377t + 60^\circ)$     e) All wrong

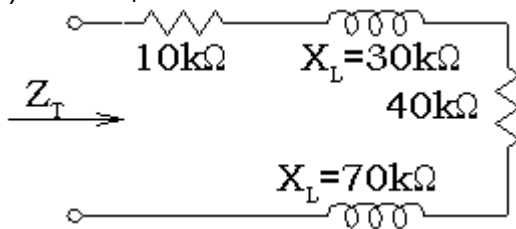
39) Express the impedance of a 3H coil at a frequency of 60Hz in polar form.

- a)  $3.16 \text{ k}\Omega \angle 0^\circ$     b)  $3.16 \text{ k}\Omega \angle -90^\circ$     c)  $1.13 \text{ k}\Omega \angle 90^\circ$     d)  $3.16 \text{ k}\Omega \angle 90^\circ$   
 e) All wrong

40) Express the impedance of a  $14 \mu\text{F}$  capacitor at a frequency of 1kHz in polar form.

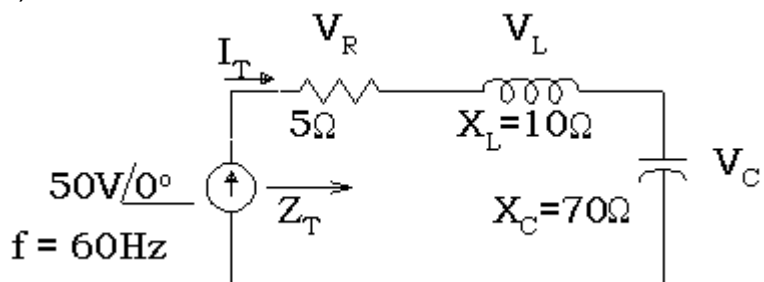
- a)  $11.36 \Omega \angle 0^\circ$     b)  $21.4 \text{ k}\Omega \angle 0^\circ$     c)  $21.4 \Omega \angle 90^\circ$     d)  $11.36 \Omega \angle -90^\circ$   
 e) All wrong

41) Find  $Z_T$ .



- a)  $1.13 \text{ k}\Omega \angle -90^\circ$     b)  $315 \text{ k}\Omega \angle 0^\circ$     c)  $112 \text{ k}\Omega \angle 63.4^\circ$     d)  $214 \text{ k}\Omega \angle 90^\circ$   
 e) All wrong

42) Find  $Z_T$ .



- a)  $11.2 \Omega \angle 63.4^\circ$     b)  $60.21 \Omega \angle -85.23^\circ$     c)  $21.4 \Omega \angle 44^\circ$     d)  $21.4 \text{ k}\Omega \angle -44^\circ$   
 e) All wrong

43) Find  $Z_T$  for the circuit in problem 42 if  $X_L = X_C$

- a)  $11.2 \Omega \angle 63.4^\circ$     b)  $11.2 \Omega \angle -63.4^\circ$     c)  $5 \Omega \angle 0^\circ$     d)  $21.4 \text{ k}\Omega \angle -44^\circ$   
 e) All wrong