Department of Electrical Engineering
University of Engineering & Technology
Peshawar, Mardan Campus

Reg./ETEA No.: _____

Basic Electrical Engineering (EE-154)
Final Term Examination - Spring (2017)

Time Allowed: 2hrs **Max Marks: 50**

DIRECTIONS:

1. *Do NOT include unnecessary details and not to exceed 4 lines for a theory question having 2 or less marks.*
2. *No sharing of calculators or any helping material is allowed during exam.*
3. *Write your university registration numbers on answer sheets.*

Q: No. 1: Find the individual and Total Power **S**, Active Power **P** and Reactive Power **Q** for the circuit given by Fig. 1; (10)

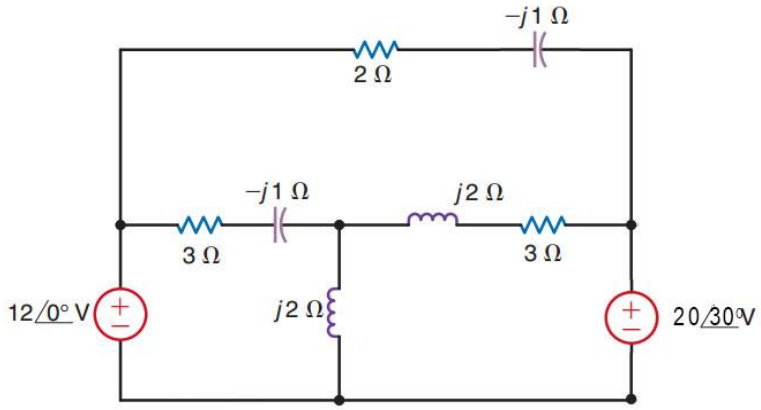

Fig. 1

Q: No. 2:

a) What is the significant role of capacitors in eliminating the effect of Inductance in an electrical system? (2)

b) A series RC circuit consists of **200-Ω** resistive element and a capacitor of **5μF**. For what value of frequency(f), the circuit will give **300-Ω** impedance? (2)

c) A parallel RLC circuit has a resistance of **50-Ω**, a Capacitance of **5μF** and an inductor of **20mH**. Find the frequency for which the reactance of capacitor will be equal to the reactance of inductor. (4)

d) For part (c), find the total circuit current $i_T(t)$, when a voltage v(t)= *12sin(2x60*π+60^o)-volts* is applied to energize the circuit (2)

Q: No. 3:

a) Find the total heat dissipated by a sinusoidal voltage given by *v(t)=1+12sin(100πt)* across a **50Ω** load. (8)

b) Draw the voltage *v(t)* and the current *i(t)* on a single graph for part (a). (2)

Q: No. 4: Give short answers to the following questions. (2x5=10)

a) If **KVarh** is the unit of an energy meter that is being used to find consumed energy by a system, what type of circuit element(s) will be neglected by such energy meter for energy calculation?

b) Why is the rating of a transformer given in **KVA** and not specified in **KW**?

c) A certain circuit consists of two points A and B. It is assumed that both the points are at zero potential. The only difference is that, point A quenches all the current/electrons that reaches to it while point B doesn't do so. What is the difference between point A and B?

d) What will be the resultant phasor ($\mathbf{I}e^{j(\omega t+\phi)}$ or $\mathbf{I}\angle\boldsymbol{\phi}$) of two instantaneous currents given by;

$$i_1(t)=12\sin(\omega t)$$

and

$$i_2(t)=10\cos(\omega t)$$

e) The turn ratio (N_2/N_1) of a certain current transformer (CT) is **200/5**. What will be the value of output current if the CT is mounted on a BUS bar drawing **140A** current at **11KV**?

Q: No. 5: A parallel magnetic circuit is given in Fig. 2.
[Ae: effective Area, le: effective length, μr: relative permeability]

a) Draw the equivalent electrical circuit. (4)

b) Find the net reluctance of the circuit given in Fig. 2 and calculate the magnitude of flux between point (a) and point (b) as in given figure if MMF = 20-At. (6)

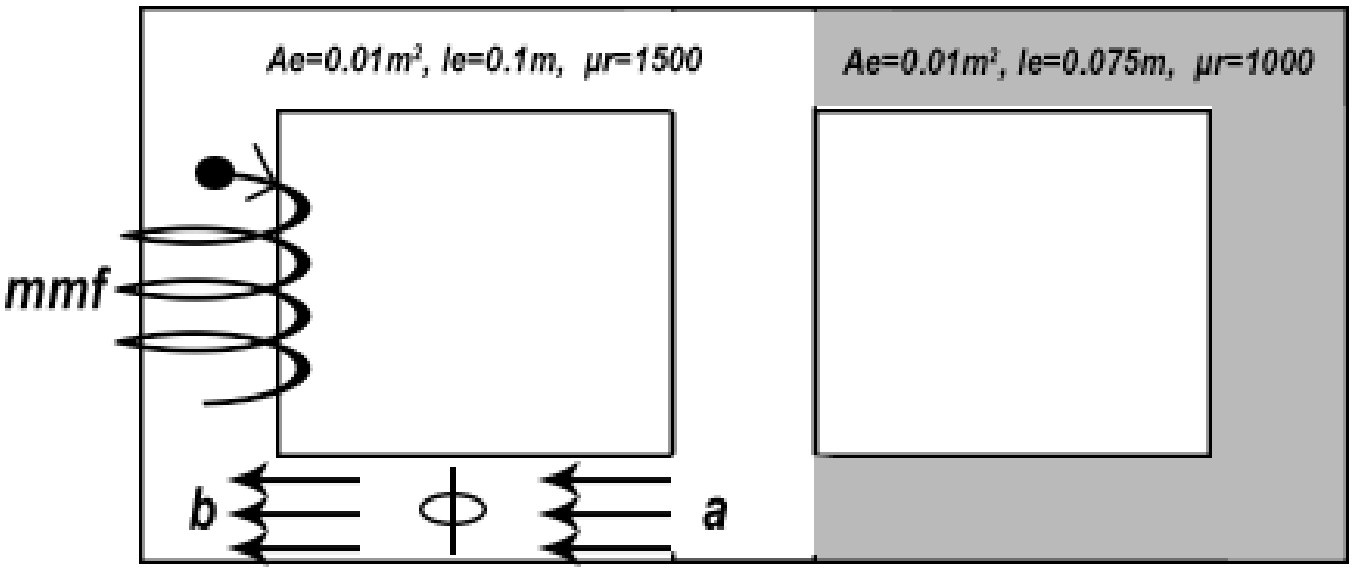

Fig. 2

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