Minia University
CSE Dept.
1st Year

LAB(1)
Time allowed: 3 Hrs.
29/05/2018

- ***This is a closed book exam.***
- ***The exam has 5 questions in three pages, answer all of them.***
- ***Good Luck!***

QUESTION (1) [20 points]:

a) State the superposition theorem.

b) List the steps in applying the theorem.

c) Describe how you can verify it experimentally.

QUESTION (2) [20 points]:

The two voltmeters in Figure 1 indicate the voltages shown.

a) Determine if there are any opens or shorts in the circuit and, if so, where they are located.

b) If the voltage source V_s has an internal resistance R_s =100Ω, determine its effect on the meters readings.

c) If the only fault in Figure 1 is that R_2 is shorted, what will voltmeters read?

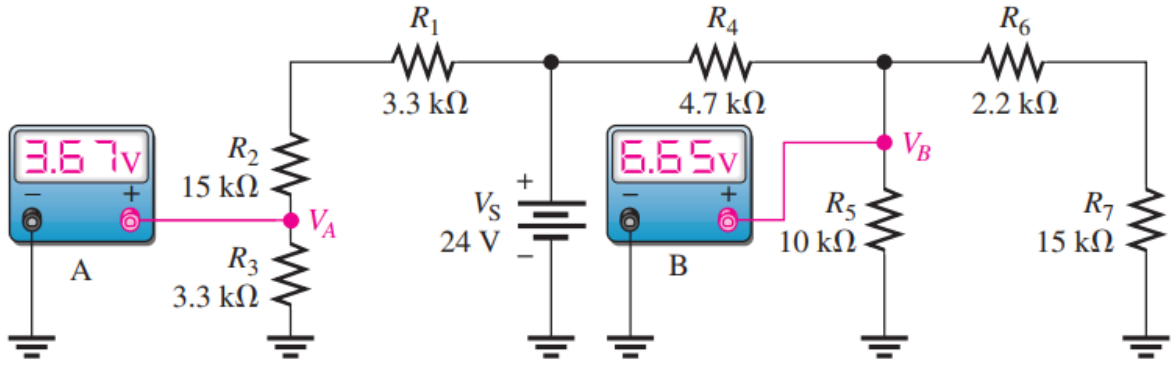

Figure 1

QUESTION (3) [20 points]:

a) Design and show how to verify experimentally a half wave rectifier circuit.

b) Briefly discuss the ripple effect on the output from a filtered rectifier circuit.

c) What is the effect of using the Zener diode in rectifier circuits?

QUESTION (4) [20 points]: Choose the correct answers:

i. Power dissipation in ideal inductor is

a) Maximum b) Minimum c) Zero d) A finite value

ii. Which quantity should be measured by the voltmeter?

a) Current b) Voltage c) Power d) Speed

iii. RMS value is defined based on which of the following?

a) Heating effect b) Charge transfer c) Current d) Voltage

iv. For steady state current, inductor acts as

a) Short circuit b) Open circuit c)Voltage source d) Current source

v. If the supply frequency of a purely inductive circuit is reduced by half, then the circuit current is

a) zero b) remain same. c) doubled d) reduced by half

vi. Resistor stores the energy in the form of

a) Magnetic field b) Electrical field

c) Both A and B d) None of the above

vii. An electrolytic capacitor can be used for

a) DC only. b) AC only. c) both A and B. d) none of the above

viii. The internal conductance of an ideal current source is

a) infinite b) zero c) the internal resistance. d) the external conductance.

ix. What kind of filter can be used to select a signal of one particular radio station?

a) lowpass b) highpass c) bandpass d) bandstop

x. The total capacitance of two 40 mF series-connected capacitors in parallel with a 4 mF capacitor is:

a) 3.8 b) 5 mF c) 24 mF d) 44 mF

QUESTION (5) [20 points]:

In Figure 2, assume that R = 1 kΩ, V1= 4 V, V2= 6 V and the peak value of Vin is 10 V.

a) Draw the waveform of signals appeared at point A.
b) If the magnitudes of V1 and V2 had been reversed, what would the output waveform look like? Would the peaks of the output have changed?
c) What would the output waveform look like if D2 and V2 had been omitted?
d) What are the applications of such type of circuits?

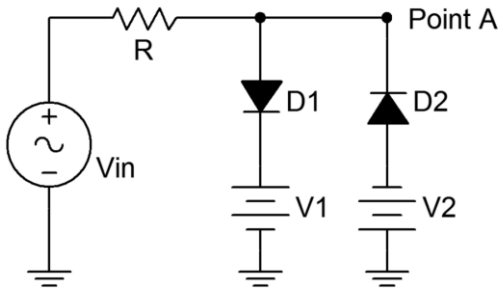

Figure 2

With my best wishes *H.S. Mogahed*