

PUNE INSTITUTE OF COMPUTER TECHNOLOGY

DHANKAWADI, PUNE - 43

CLASS : F.E.(COMMON)

SUBJECT : BXE

EXPT. NO.: 1

DATE:

TITLE: STUDY OF DIFFERENT ACTIVE AND PASSIVE ELECTRONIC COMPONENTS

OBJECTIVE: To study different types of Electronic components



- Resistors (Fixed & Variable), Calculation of resistor value using color code.
- Capacitors (Fixed & Variable)
- Inductors, Calculation of inductor value using color code.
- Devices such Diode, BJT, MOSFETs, various IC packages
- Switches & Relays

APPARATUS : Digital multimeter with probes, CRO with probes Samples of Resistors, Capacitors, Inductors, Diode, BJT, MOSFETs, various IC packages Switches & Relays.




CALCULATION:

Resistors

- Calculation of Resistor using colour coding:

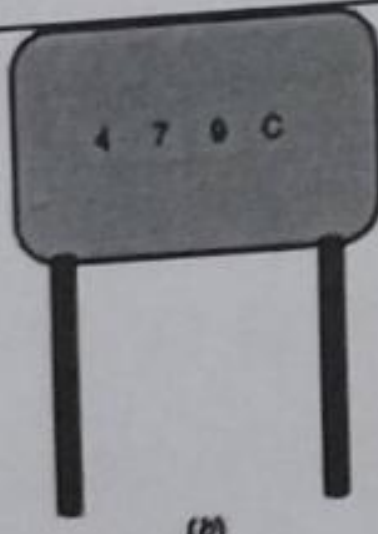


Sr. No	Colours	Values /Multiplier	Nominal Value	Actual value range
1	 Gold, Red, Black, Brown	$10 \times 10^2 \pm 5\%$	1000 Ω	950 Ω to 1050 Ω
2	 Orange, White, Brown, Gold	$29 \times 10 \pm 5\%$	290 Ω	275.5 Ω to 304.5 Ω


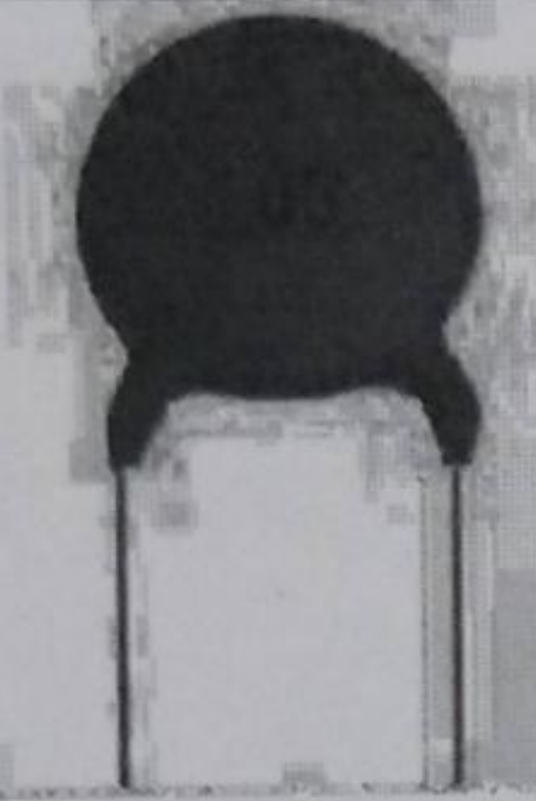
P:F:-LTL-UG/03/R1

3	 Gold, Orange, Red, Red	$22 \times 10^3 \pm 5\%$	22 k Ω	20.9 k Ω to 23.1 k Ω
4	 Gold, Green, Black, Brown	$10 \times 10^5 \pm 10\%$	1 M Ω	950 k Ω to 1050 k Ω
5	 Silver, Red, Blue, Green	$56 \times 10^2 \pm 10\%$	5.6 k Ω	5.04 k Ω to 6.16 k Ω


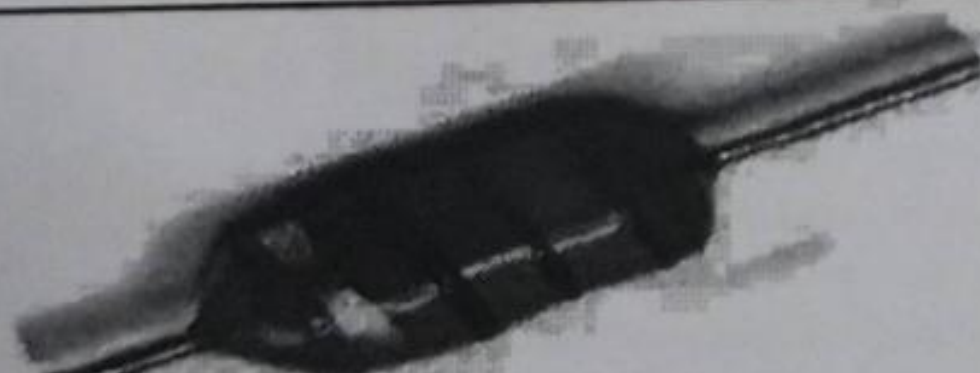

Capacitor

1) Calculation of Capacitor using number coding:

Sr. No	Code	Values /Multiplier	Capacitor Value
1	 (b) Film Capacitor	$47 \times 10^9 \text{ pF}$ $\pm 0.2\%$	47 mF
2		$26 \times 10^3 \pm 0.5\%$ pF	26 nF
3	 Chip Capacitor	82 pF	82 pF

4	 <p>Chip Capacitor</p>	$10 \times 10 \text{ pF}$	100 pF
5	 <p>Ceramic Capacitor</p>	$10 \times 10^3 \text{ pF}$	$0.01 \mu\text{F}$

Inductor

Sr. No	Code	Values /Multiplier	Inductor Value
1	 <p>Red Violet Brown Black</p>	$27 \times 10 \pm 20\%$	$270 \mu\text{H}$
2	 <p>Silver, Brown, Black, Brown</p>	$10 \times 10 \pm 10\%$	$100 \mu\text{H}$
3	 <p>Yellow, Black, Brown, Silver</p>	$40 \times 10 \pm 10\%$	$400 \mu\text{H}$

CONCLUSION :


We can determine the exact value of resistance using color coding.
We can determine the exact value of capacitor by using colour code.
We can determine the exact value of inductor by using colour code technique.

Teacher Sign with Date

Remark

Virtual Lab Quiz on Resistor -


1.



Enter the resistance value: choose unit

Enter the tolerance : +/- %


2.



Enter the resistance value: choose unit

Enter the tolerance : +/- %

3.



Enter the resistance value: choose unit

Enter the tolerance : +/- %

4.



Enter the resistance value:

3300

choose unit →

 Ω

Enter the tolerance: +/-

0.1

%

check

5.



Enter the resistance value:

158000

choose unit →

M Ω

Enter the tolerance: +/-

2

%

check

6.



Enter the resistance value:

615000

choose unit →

M Ω

Enter the tolerance: +/-

0.25

%

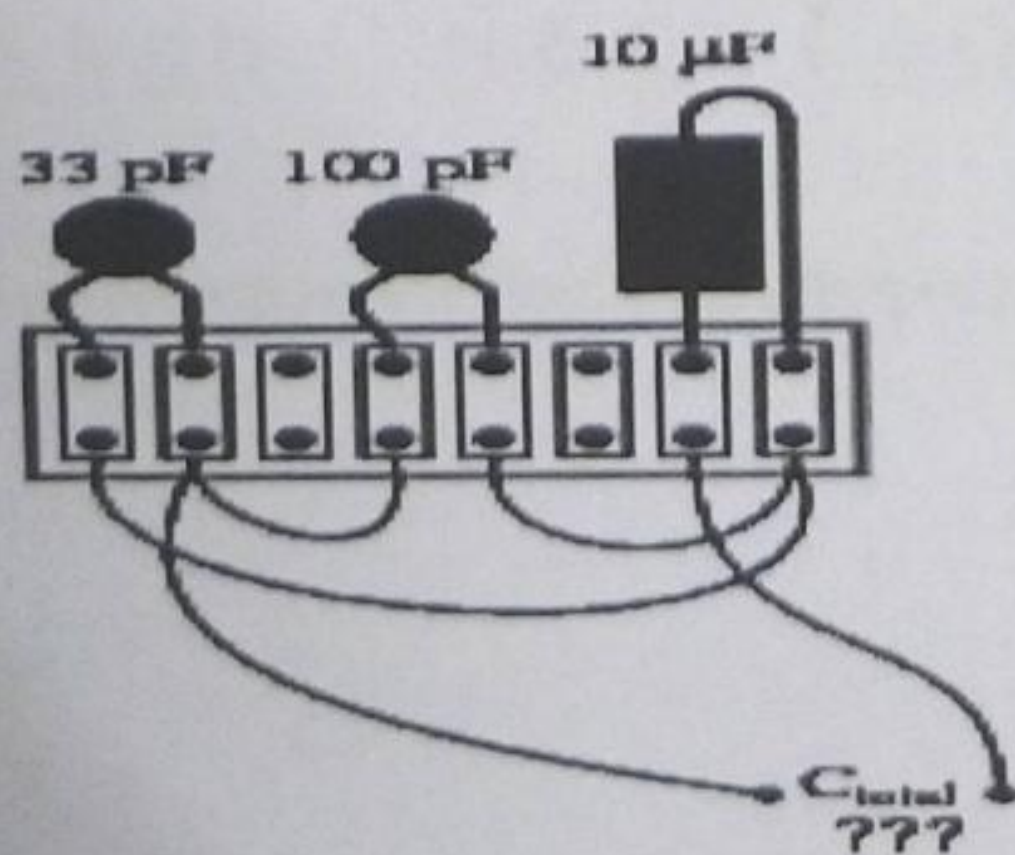
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Virtual Lab Quiz on Capacitor –

1. Two 33 μF capacitors are connected in series with each other. What will their combined capacitance be in Farads?

- ☒ 16.5 μF
- ☐ 120 μF
- ☐ 66 μF
- ☐ 200 μF

2. Calculate the total capacitance in this collection of capacitors, as measured between the two wires:



Calculate total capacitance given the values of inductors C1, C2, and C3

- ☐ 130.990 pF
- ☐ 200.8 pF
- ☐ 130 pF
- ☒ 132.998 pF

3. A $10\mu\text{F}$ capacitor is charged to a voltage of 20 volts. How many coulombs of electric charge are stored in this capacitor?

- ☐ 20 μC of charge
- ☐ 120 μC of charge
- ☐ 20 mC of charge
- ☒ 200 μC of charge

4. Two $470\mu\text{F}$ capacitors connected in series are subjected to a total applied voltage that changes at a rate of 200 volts per sec. How much current will there be through these capacitors?

(Hint : The total voltage is divided evenly between the two capacitors.)

- ☒ 47 mA
- ☐ 470 mA
- ☐ 94 mA
- ☐ 940 mA

5. Two capacitors $470\mu\text{F}$ capacitors connected in parallel are subjected to a total applied voltage that changes at a rate of 200 volts per sec. How much total current will there be through these capacitors?

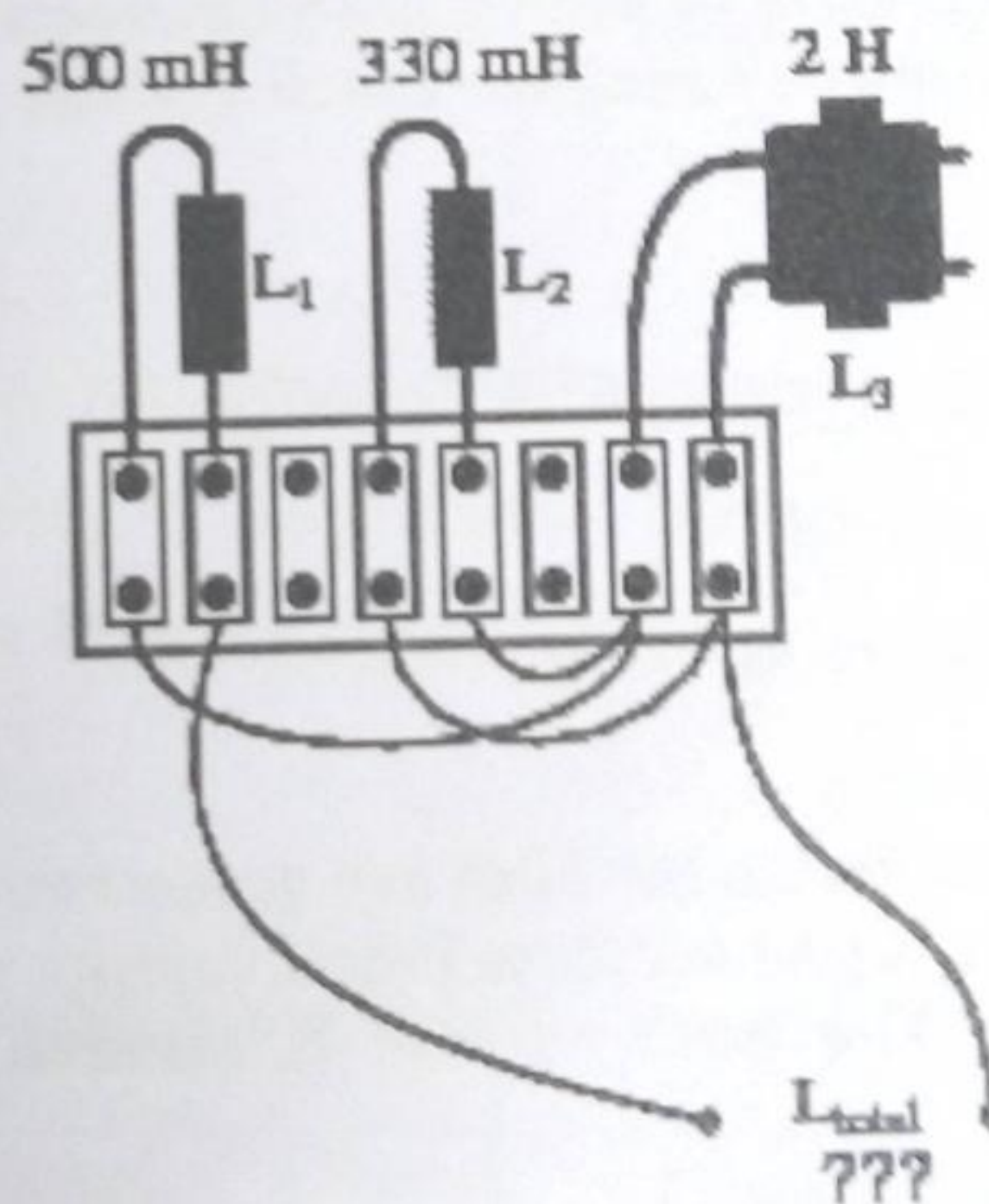
- ☐ 47 mA
- ☐ 18 mA
- ☒ 188 mA
- ☐ 18.8 mA

Virtual Lab Quiz on Inductor –

1. Two 50 mH inductors are connected in parallel with each other. What will their combined inductance be in Henrys?

- ☐ 200 mH
- ☐ 50 mH
- ☐ 100 mH
- ☒ 25 mH

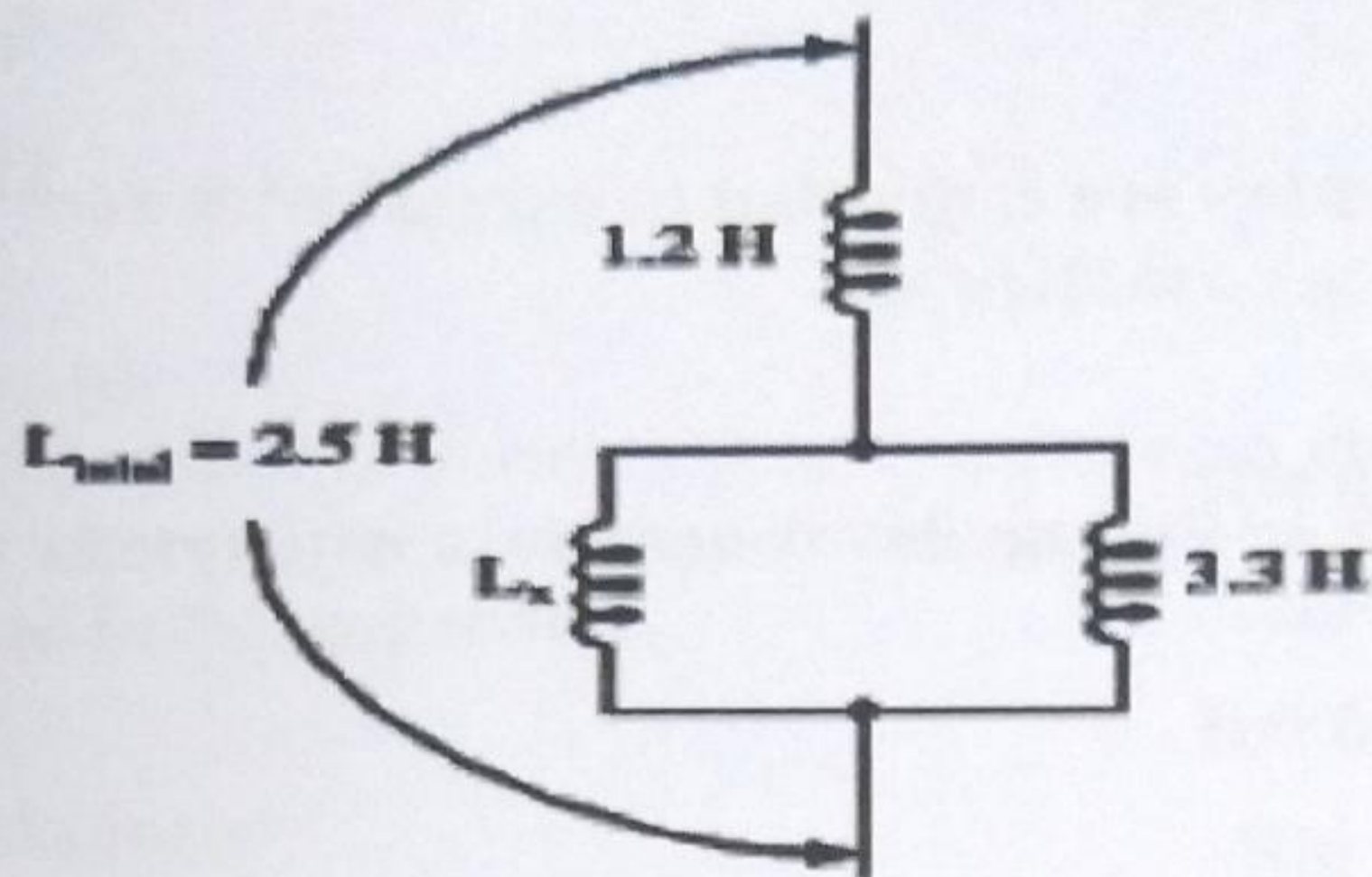
2. Calculate the total inductance in this collection of inductors, as measured between the two wires:



Calculates total inductance given the values of inductors L_1 , L_2 , and L_3 .

- ☐ 700 mH
- ☒ 783.26 mH
- ☐ 689.09 mH
- ☐ 583.26 mH

3. How large must Inductor L_x be in order to provide a total inductance of 2.5 H in this network of inductors?



- ☐ 214.5 H
- ☒ 2.145 H
- ☐ 1.245 H
- ☐ 12.45 H

4. Two 5 H inductors connected in series are subjected to an electric current that changes at a rate of 4.5 amps per sec. How much voltage will be dropped across the series combination?

- ☒ 45 V
- ☐ 22.5 V
- ☐ 11.25 V
- ☐ 90 V

5. Two 5 H inductors connected in parallel are subjected to an electric current that changes at a rate of 4.5 amps per sec. How much voltage will be dropped across the series combination? (Hint: The total current is divided evenly between the two inductors).

- ☐ 45 V
- ☐ 22.5 V
- ☒ 11.25 V
- ☐ 90 V