2013

(1st Semester)

ELECTRONICS

FIRST PAPER

(Electronic Measuring Instruments and Circuit Analysis)

(PART : A—OBJECTIVE)

(*Marks* : 20)

Answer **all** questions

SECTION—I

(*Marks* : 5)

Each question carries 1 mark

Tick (✓) the correct answer in the brackets provided :

1. No colour coding in a resistor indicates the tolerance of

(a) 5% ( )

(b) 10% ( )

(c) 20% ( )

(d) 25% ( )

2. A device that converts energy in one form to energy in another form is

(a) transformer ( )

(b) transducer ( )

(c) thermocouple ( )

(d) thermistor ( )

3. Unit of impedance is in

(a) ohm ( )

(b) henry ( )

(c) mho ( )

(d) farad ( )

4. Kirchhoff's voltage law (KVL) is concerned with

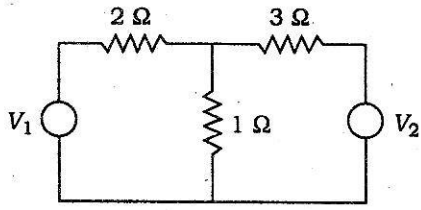
(a) IR drops ( )

(b) battery EMF's ( )

(c) junction voltage ( )

(d) Both *(a)* and *(b)* ( )

5. Total resistance of the network



is

(a) 6 ohm ( )

(b) $\frac{16}{5}$ ohm ( )

(c) $\frac{11}{3}$ ohm ( )

(d) $\frac{11}{4}$ ohm ( )

SECTION—II

(*Marks* : 15)

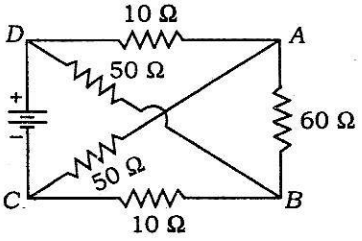
Each question carries 3 marks

1. Briefly explain the sharpness of resonance circuit.

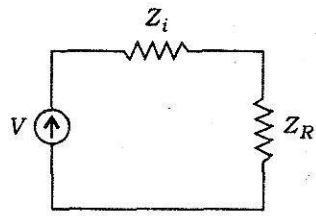
2. A power transformer has 200 primary turns and 800 secondary turns. If the primary voltage is 230 volts and full-load primary current is 20 amperes, find the secondary voltage and current.

3. Describe how a bandpass filter works.

4. Find the current in the branch AB of the network using nodal analysis for the circuit



5. A generating device has an impedance Z_i and is connected to a load by a line of Z_R. At what load will maximum power transfer received by the load when adjusted for maximum power?



$Z_i = 1 \cdot 5 - j1$; $Z_e = 1 \cdot 5 - j4$; $V = 30\,V$

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2013

(1st Semester)

ELECTRONICS

FIRST PAPER

(Electronic Measuring Instruments and Circuit Analysis)

Full Marks : 55

Time : 2 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 35)

The figures in the margin indicate full marks for the questions

UNIT—I

1. *(a)* What are the different types of inductors? 2

(b) Define inductance and derive an expression for mutual inductance of two coils. 2+3=5

Or

(a) Describe the construction of ceramic capacitor. Why is a ceramic capacitor preferred over a mica or a paper capacitor? 2+2=4

(b) Compare among wire-wound, carbon-film and carbon-composition resistors. 3

UNIT—II

2. Describe the principle of working of cathode-ray oscilloscope. 7

Or

(a) Can you operate a transformer on a constant DC voltage? Describe how an auto-voltage transformer works. 1+4=5

(b) What is a multimeter? Define the sensitivity of a multimeter. 1+1=2

UNIT—III

3. Derive an expression of alternating current through a series LRC circuit. 7

Or

What do you mean by *j*-operator? Derive the impedance of an RC circuit. 2+5=7

UNIT—IV

4. (a) What do you mean by 'node' and 'loop'? 2

(b) What is loop matrix? How will you express the complete loop matrix having 3 loops and 4 branches? 2+3=5

(Continued)

Or

(a) How will you convert a current source into a voltage source? 3

(b) State and explain the ladder method of network analysis. 4

UNIT—V

5. (a) State Thevenin's theorem and prove it in case of a two-terminal network. 4

(b) Show that the Norton's equivalent circuit can be found from the Thevenin's equivalent circuit. 3

Or

(a) State the maximum power transfer theorem and give its applications. 3+1=4

(b) Explain the superposition theorem. 3

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