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(NEP–2020)

(2nd Semester)

ELECTRONICS

(Multi-disciplinary Course)

(Introduction to Electronics)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

Use of Simple Calculator is allowed

(SECTION : A—OBJECTIVE)

(*Marks* : 10)

Tick (✓) the correct answer in the brackets provided : 1×10=10

1. The electron was discovered in

(a) 1891 ( ) *(b)* 1890 ( )

(c) 1893 ( ) *(d)* 1895 ( )

2. The tetrode was invented in 1916 by a/an

(a) British engineer ( )

(b) Dutch engineer ( )

(c) American engineer ( )

(d) German engineer ( )

3. Flextronics entered India in

(a) 2001 ( ) *(b)* 2000 ( )

(c) 2003 ( ) *(d)* 2002 ( )

4. The medium-scale integration (MSI) was started in

(a) 1961 ( ) *(b)* 1966 ( )

(c) 1980 ( ) *(d)* 1970 ( )

5. The resistance value of wire-wound resistor ranges from

(a) 10 to 10 k ( )

(b) 10 to 100 k ( )

(c) 1 to 100 k ( )

(d) 1 to 100 M ( )

6. The main function of a capacitor is to

(a) block current flow ( )

(b) help current flow ( )

(c) dissipate heat ( )

(d) store energy ( )

7. The coefficient of coupling between two coils is given by (symbols have usual meanings)

(a) $K \quad \frac{M}{\sqrt{L_1 L_2}}$ ( )

(b) $K \quad \frac{\sqrt{L_1 L_2}}{M}$ ( )

(c) $K \quad \frac{M}{L_1 L_2}$ ( )

(d) $K \quad \frac{L_1 L_2}{M}$ ( )

8. An ideal voltage source is one whose internal impedance is

(a) very low ( ) *(b)* zero ( )

(c) very high ( ) *(d)* infinity ( )

9. What is the equivalent voltage for a current source of 8 A in parallel with 4 resistance?

(a) 8 V ( ) *(b)* 2 V ( )

(c) 32 V ( ) *(d)* 4 V ( )

10. According to KVL, the algebraic sum of all IR drops and EMFs in any close loop of a network is always

(a) zero ( )

(b) positive ( )

(c) negative ( )

(d) greater than unity ( )

(SECTION : B—SHORT ANSWERS)

(*Marks* : 25)

Answer *five* questions, taking at least *one* from each Unit : 5×5=25

UNIT—I

1. Explain the major growth drivers and trends in the electronics industry.

2. Explain the importance of electronics in defence application.

3. Discuss the most common job in the field of electronics.

UNIT—II

4. Write a short note on wire-wound resistors.

5. State and explain the capacitance of capacitor.

6. Explain inductance of an inductor.

UNIT—III

7. Write a short note on the cells in series and parallel connection.

8. Derive an expression for voltage division law.

9. Explain ideal and practical current sources.

(SECTION : C—DESCRIPTIVE)

(*Marks* : 40)

Answer *four* questions, taking at least *one* from each Unit : 10×4=40

UNIT—I

1. What is electronics? Discuss the development of electronics. 10

2. Discuss the challenges and opportunities of electronics industry in India. 10

3. Discuss the applications of electronics in medicine. 10

UNIT—II

4. *(a)* Explain the value tolerance of resistors. 3

(b) Explain in detail resistance colour bands with example. 7

5. *(a)* Explain the capacitor connected to a battery. 6

(b) State and explain the factors controlling capacitance. 4

6. *(a)* State and explain the different types of inductors. 5

(b) Define self-induction and mutual induction. Also explain the coefficient of coupling in an inductor. 2+3=5

UNIT—III

7. *(a)* Differentiate between the following : 6

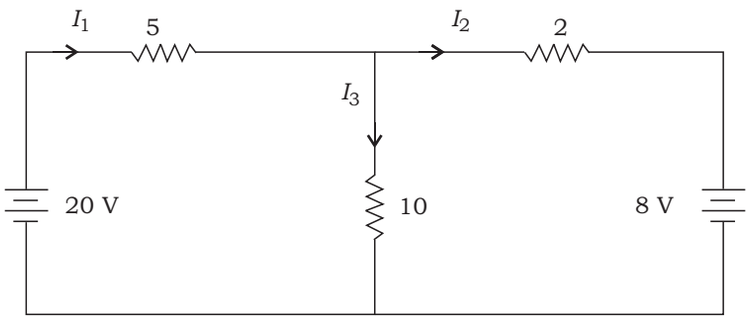
(i) Kirchhoff's current law and Kirchhoff's voltage law

(ii) Active element and Passive element

(iii) Linear resistor and Non-linear resistor

(b) What is Ohm's law? Explain the graphical representation of Ohm's law. 4

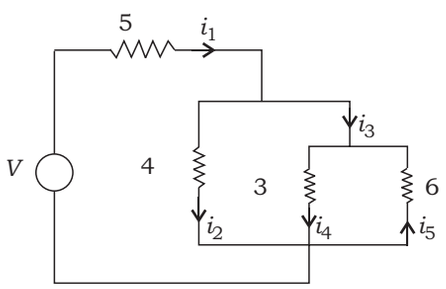
8. *(a)* From the circuit, find all the branch current and voltage drops across all the resistors : 6



(b) How will you convert a voltage source into current source? 4

9. *(a)* Derive an expression for current division law. 5

(b) For the given circuit, assuming i_1 6 A, determine i_2, i_3, i_4 and i_5 : 5



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