

Code : T 01-D

Register  
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First Semester Diploma ( Annual ) Examination, 2006

E & C BOARD

**BASICS OF ELECTRICAL ENGG. AND  
ELECTRONIC COMPONENTS**

Course Code : EC, EP & IC

Time : 3 Hours ]

[ Max. Marks : 100

- Note :
- Section - I is compulsory.
  - Answer any six full questions choosing two questions each from Sections-II, III and IV.

**Section - I**

1. a) Fill in the blanks with appropriate word / words : 5 × 1 = 5
- The unit of capacitance is .... *Farad* .....
  - The average value of an alternating current is given by .....
  - If two capacitors of capacitances  $C_1$  and  $C_2$  are connected in parallel, the net capacitance is given by .....
  - Relative permittivity of air is ..... *1* .....
  - Unit of electrical power is .....
- b) Write a note on charging of a capacitor. 5

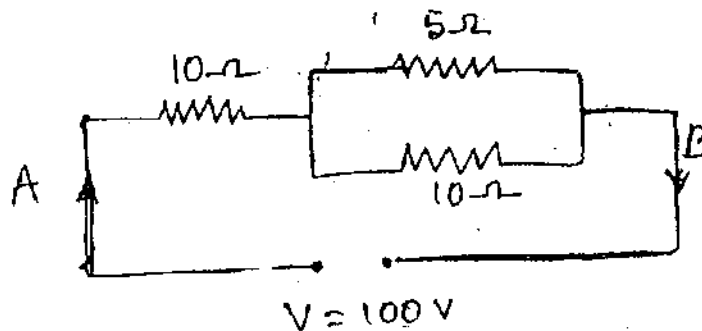
**Section - II**

2. a) State and explain the following laws : 8
- Coulomb's law
  - Ohm's law.
- b) What are the factors on which resistance of a conductor depends ? 3
- c) Define the following terms : 4
- Current
  - Electric flux.

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3. a) State and explain Faraday's law of Electromagnetic induction. 0
- b) Derive an expression for two capacitors connected in parallel. 5
- c) The three capacitors  $C_1 = 1 \mu F$ ,  $C_2 = 3 \mu F$  and  $C_3 = 4 \mu F$  are connected parallel across 100V supply. Determine the total capacitance and potential differences across each capacitor. 4
4. a) Define the power and energy. Mention their units. 4
- b) Find the equivalent resistance of the following circuit diagram. Also find total in the circuit current. 6



- c) Derive an expression for energy stored in an inductor. 5
- Section - III**
5. a) Explain with the help of circuits and vector diagram the relationship between voltage and current in a series R.L. circuits. Write the impedance and current equation. 8
- b) Define the following terms w.r.t sine wave : 4
- i) Average value
- ii) RMS value.
- c) The maximum value of an AC voltage is 100 volts. Find it's form factor. 3
6. a) Explain the working principle of a transformer. 8
- b) Define efficiency and regulation of a transformer. 4
- c) A 10 KVA single phase 2200/220V transformer has 50 turns on secondary, Calculate 3
- i) Number of turns on primary
- ii) Primary current
- iii) Secondary current.

Code : T 01 D

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First Semester ( First Year ) Diploma ( Supplementary ) Examination, 2003

E & C BOARD — 4(A)

**BASICS OF ELECTRICAL ENGG. AND  
ELECTRONIC COMPONENTS**

Time : 3 Hours ]

[ Max. Marks : 100

- Note :
- i) Section - I is compulsory.
  - ii) Answer any two full questions from Sections II, III and IV.

**Section - I**

1. a) Fill in the blanks with appropriate word / words : 5 × 1 = 5
- i) The unit of inductance is .....
  - ii) The S.I. unit of Electrical energy is .....
  - iii) If two capacitors of capacitance  $C_1$  &  $C_2$  are connected in series, the net capacitance is given by .....
  - iv) The colour code for 5% tolerance is .....
  - v) The average value of an alternating current is given by .....
- b) State and explain Ohm's law.

**Section - II**

2. a) State and explain Faraday's Laws of Electromagnetic Induction.
- b) Find the electrostatic force of repulsion between two similar charges  $100 \mu\text{C}$  each, placed in air at a distance of 1.5 m.
- c) Explain the factors on which the value of capacitance depends.

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[ Turn over

- id in 7. a) Explain the working principle and applications of an autotransformer. 8  
 b) No. of turns of primary and secondary are 1000 and 2000 respectively, calculate the current in secondary, if the primary current is 10 A. 4  
 8 c) Write a short note on J operator. 3  
 9

#### SECTION - IV

8. a) Explain the construction of a paper capacitor. Mention its applications. 7  
 b) Classify the various types of storage batteries. 4  
 c) On what factors the capacity of battery depends ? 4  
 9. a) What is a relay ? Explain the construction and working of a relay. 7  
 b) Differentiate between AF Choke and RF Choke. 4  
 c) Mention the application of an inductor. 4  
 10. a) Explain the constructional features of a metal film resistors. 7  
 b) What are thermistors ? Mention its applications. 4  
 c) What are Trimmer and Padder capacitors ? 4

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Explain the working principle and applications of an auto transformer.  
 No. of units of primary and secondary are 100 and 1000 respectively.  
 calculate the current in secondary if the primary current is 10 A.

Write a short note on a capacitor.

**BASICS OF ELECTRICAL ENGG. AND ELECTRONIC COMPONENTS**

Time : 3 Hours ) SECTION - IV [ Max. Marks : 100

- 8. a) Explain the construction of a paper capacitor. Mention its applications. 7
- b) Classify the various types of storage batteries. 4
- c) On what factors the capacity of battery depends? 4
- 9. a) What is a relay? Explain the construction and working of a relay. 7
- b) Differentiate between AF Choke and RF Choke. 4
- c) Mention the application of an inductor. 4
- 10. a) 1. a) Fill in the blanks with appropriate word / words : 7 5 x 1 = 5  
 Explain the constructional features of a metal film resistors.
- b) What are thermistors? Mention its applications. 4
- c) What are Triplen and Hadder capacitors? 4
- iii) If two capacitors of capacitance  $C_1$  &  $C_2$  are connected in series, the net capacitance is given by .....
- iv) The colour code for 5% tolerance is .....
- v) The average value of an alternating current is given by .....
- b) State and explain Ohm's law. 5

**Section - II**

- 2. a) State and explain Faraday's Laws of Electromagnetic Induction. 6
- b) Find the electrostatic force of repulsion between two similar charges of 100  $\mu$ C each, placed in air at a distance of 1.5 m. 4
- c) Explain the factors on which the value of capacitance depends. 5

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[ Turn over

CB-10115



- b) What are the factors on which resistance of a conductor depends ? a) 5
- c) A resistance of  $5\Omega$  is connected in series with a parallel combination of  $10\Omega$  and  $15\Omega$ . The total combination is connected across a  $200V$  supply. Find.
- i) Equivalent resistance b) 6
- ii) Total current in the circuit. 6
3. a) State and explain Coulomb's laws of electrostatics. 5
- b) Explain with suitable diagram, charging and discharging of a capacitor. 6
- c) Three capacitors  $C_1 = 1\ \mu F$ ,  $C_2 = 2\ \mu F$  and  $C_3 = 3\ \mu F$  are connected in parallel. Compute the total capacitance. c) 4
4. a) State Lenz's law. 2
- b) Calculate the inductance of a coil having 100 turns carrying a current of 10 A. Flux linked with the coil is  $4 \times 10^{-4}$  Wb. 7. 5
- c) State Ohm's law. 3
- d) Define and explain Electromagnetic Induction with the help of a diagram. 5
- Section - III**
5. a) Draw a sine wave and mark on it the following : 4
- i) Maximum value 8.
- ii) Time period.
- b) Define the following with respect to alternating voltage : 5
- i) Cycle 8.
- ii) Phase angle
- iii) Average value
- iv) Crest factor
- v) Phase angle difference.
- c) An alternating voltage is represented by  $v = 150 \sin 100t$ . Find, 6
- i) Maximum value
- ii) Frequency
- iii) RMS value.

- 3 a) Define the following and mention their units :  
 of  $10\Omega$   
 ad.  
 i) Inductive reactance  
 ii) Capacitive reactance  
 iii) Impedance. 6
- 6 b) An RLC series circuit has  $R = 200\Omega$ ,  $X_L = 50\Omega$  and  $X_C = 30\Omega$ . If it is  
 5 connected across 250V, 50Hz supply, find  
 6 i) Current  
 ii) Power factor  
 iii) Power. 6
- ed in 4 c) Draw the diagram of a 3-phase star connected system and write the  
 2 relationship between  
 i) Line current and phase current  
 ii) Line voltage and phase voltage. 3
- 5 7. a) With the help of diagram, explain the constructional details of a power  
 3 transformer. 6  
 b) Drive the *emf* equation of a transformer. 5  
 c) A step-up transformer consists of 500 and 1000 turns on primary and  
 secondary respectively. Calculate the current in secondary if the primary  
 current is 5 A. 4

#### Section - IV

8. a) Explain the working principle and operation of a 3-phase Induction motor. 6  
 b) Explain the construction of a lead-acid battery with a neat diagram. 6  
 c) What is a relay ? Classify relays. 3
9. a) Write the colour code for the following resistors : 4  
 i)  $47\text{ k}\Omega \pm 5\%$  tolerance  
 ii)  $220\Omega \pm 10\%$  tolerance.  
 b) With a neat sketch, explain the constructional details of a cracked carbon resistor. 8  
 c) What is a thermistor ? 3
10. a) What is a capacitor ? Classify the capacitors. 4  
 b) Explain the construction of a dry type electrolytic capacitor with a neat sketch. 6  
 c) What is an inductor ? Mention three applications of inductors. 5



3. a) Derive an expression for total inductance, when two coils are connected in series :
- Aiding
  - Opposing.
- b) The three capacitors  $C_1 = 4 \mu\text{F}$ ,  $C_2 = 3 \mu\text{F}$  and  $C_3 = 1 \mu\text{F}$  are connected in series across 100 volt supply. Determine the total capacitance and potential difference across each.
- c) Define power and energy. Mention their units.
4. a) Explain charging and discharging of a capacitor.
- b) What are the limitations of Ohm's Law ?
- c) Calculate the inductance of a coil having 100 turns carrying a current 10 A. Flux linked with the coil is  $4 \times 10^{-4}$  Wb.

### Section - III

5. a) Explain with the help of circuit and vector diagram the relationship between voltage and current in a series R-L circuit. Write the impedance and current equation.
- b) Define the following terms with respect to sine wave :
- RMS value
  - Form factor.
- c) The maximum value of an a.c. voltage is 100 volts. Find its form factor.
6. a) Explain the working principle of a transformer with neat diagram.
- b) The capacitor of  $79.5 \mu\text{F}$  is connected in series with resistance of  $30 \Omega$  across 100 volt, 50 Hz supply. Find
- Impedance
  - Circuit current.
- c) Define the efficiency and regulation of a transformer.
7. a) Explain the working principle of an armature controlled DC shunt motor. Mention its applications.
- b) A 10 kVA single phase 2200/220 volt transformer has 60 turns on secondary. Calculate :
- No. of turns on primary
  - Primary current
  - Secondary current.
- c) Mention the applications of transformers.

## Section - IV

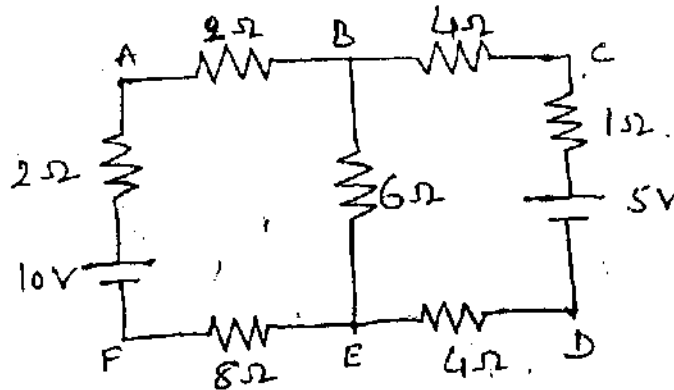
- |     |    |  |   |
|-----|----|--|---|
| 8.  | a) | Explain the construction and working of a Lead-acid battery.                     | 8 |
|     | b) | Classify the capacitor according to dielectric used.                             | 4 |
|     | c) | Mention the applications of metal film resistors.                                | 3 |
| 9.  | a) | Explain the construction and working of a relay.                                 | 7 |
|     | b) | What are the precautions to be taken in the maintenance of a Lead-acid battery ? | 4 |
|     | c) | Classify the resistors based on the materials used for construction.             | 4 |
| 10. | a) | Explain the construction of a carbon potentiometer.                              | 7 |
|     | b) | Differentiate between Trimmer and a Padder.                                      | 4 |
|     | c) | What are primary and secondary cells ? Give example for each.                    | 4 |
-

7. a) Define the following : 6
- i) RMS value
  - ii) Average value
  - iii) Amplitude.
- b) Explain the following terms : 4
- i) Inductive reactance
  - ii) Impedance.
- c) Calculate the RMS and average values of an alternating voltage : 5
- $$e = 20 \sin 30t.$$

#### Section - IV

8. a) Explain the construction and operation of a lead acid battery with a neat sketch. 8
- b) Explain the working principle of shunt wound type DC motor. 5
- c) What are primary & secondary cells ? 2
9. a) Explain the operation of an electromagnetic relay with necessary diagram. 6
- b) With the help of a diagram, explain how dynamically induced e.m.f. produced in a coil. 5
- c) Explain the meaning of a 'Q' factor of an inductor. 4
10. a) Describe the construction and application of electrolytic capacitor. 5
- b) Explain the construction of wire-wound resistance with neat diagram. 6
- c) Mention the Applications of inductors. 4

3. a) State and explain KVL & KCL. 6  
 b) Define power, energy and its units. 4  
 c) Find the current through  $6\Omega$  resistor of the circuit given below, by applying Kirchhoff's laws. 5



4. a) Explain with suitable diagram, the charging and discharging of a capacitor. 6  
 b) Derive the expression for effective capacitance when three capacitors are connected in series. 5  
 c) State Lenz's law and Fleming's right hand rule. 4

### Section - III

5. a) Derive an *e.m.f.* equation of a transformer. 5  
 b) Explain losses in a transformer. 5  
 c) A  $11000/220$  V, 50 Hz,  $1 - \phi$  transformer takes a current of 20 A. Find the secondary current. If the number of turns on primary is 1000, what will be the number of turns on secondary? 5
6. a) Derive an expression to show the current lags behind the applied voltage in a pure inductive coil. 6  
 b) An AC circuit consists of  $R = 20\Omega$ ,  $L = 0.07$  H. If this is connected to a 200 V, 50 Hz supply, find  
 i) current ii) power. 4  
 c) Explain the following terms  
 i) Power factor ii) Form-factor. 5

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First Semester ( First Year ) Diploma ( Supplementary ) Examination, 2003

E & C BOARD — 4(A)

## BASICS OF ELECTRICAL ENGG. AND ELECTRONIC COMPONENTS

Time : 3 Hours ]

[ Max. Marks : 100

- Note :
- Section - I is compulsory.
  - Answer any *two* full questions from Sections II, III and IV.

### Section - I

1. a) Fill in the blanks with appropriate word / words : 5 × 1 = 5
- The unit of inductance is .....
  - The S.I. unit of Electrical energy is .....
  - If two capacitors of capacitance  $C_1$  &  $C_2$  are connected in series, the net capacitance is given by .....
  - The colour code for 5% tolerance is .....
  - The average value of an alternating current is given by .....
- b) State and explain Ohm's law. 5

### Section - II

2. a) State and explain Faraday's Laws of Electromagnetic Induction. 6
- b) Find the electrostatic force of repulsion between two similar charges of  $100 \mu\text{C}$  each, placed in air at a distance of 1.5 m. 4
- c) Explain the factors on which the value of capacitance depends. 5

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[ Turn over

7. a) Explain the working principle and applications of an autotransformer. 8  
 b) No. of turns of primary and secondary are 1000 and 2000 respectively, calculate the current in secondary, if the primary current is 10 A. 4  
 c) Write a short note on J operator. 3

#### SECTION - IV

8. a) Explain the construction of a paper capacitor. Mention its applications. 7  
 b) Classify the various types of storage batteries. 4  
 c) On what factors the capacity of battery depends ? 4  
 9. a) What is a relay ? Explain the construction and working of a relay. 7  
 b) Differentiate between AF Choke and RF Choke. 4  
 c) Mention the application of an inductor. 4  
 10. a) Explain the constructional features of a metal film resistors. 7  
 b) What are thermistors ? Mention its applications. 4  
 c) What are Trimmer and Padder capacitors ? 4

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First Semester Diploma ( Supplementary ) Examination, 2005

E & C BOARD

**BASICS OF ELECTRICAL ENGG. AND  
ELECTRONIC COMPONENTS**

Course Code EC, IC & EP

[ Max. Marks : 100

Time : 3 Hours ]

- Note :
- Section - I is compulsory.
  - Answer any six full questions choosing two questions each from Sections-II, III and IV.

**Section - I**

1. a) Fill in the blanks with appropriate word / words : 5 × 1 = 5
- Power consumed by a pure capacitor circuit is .....
  - Temperature sensitive resistor is called .....
  - Iron cores are laminated in order to minimise ..... losses.
  - The unit of specific resistance is .....
  - In a step-up transformer, secondary voltage is ..... than primary voltage.
- b) State and explain Coulomb's law. 5

**Section - II**

2. a) State and explain Faraday's laws of electromagnetic induction. 4
- b) Define the following :
- Electric field
  - Relative permittivity
  - Flux density.
- c) A current of 5A flows through a coil of 100 turns and produces a flux of 30 mWb. Find the inductive reactance and inductance of the coil at 60 Hz. 6
- 5

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- |    |   |   |
|----|---|---|
| a) | Write a note on stepper motor and its applications.   | 5 |
| b) | Write a note on autotransformer and its applications. | 6 |
| c) | State and explain Lenz's law.                         | 4 |

#### Section - IV

- |     |    |  |   |
|-----|----|--|---|
| 8.  | a) | Classify the various types of storage batteries.                       | 4 |
|     | b) | Explain the construction and working of a lead - acid battery.         | 8 |
|     | c) | Mention the applications of metal-film resistor.                       | 3 |
| 9.  | a) | What is a relay ? Classify relays. Mention the applications of relays. | 6 |
|     | b) | With a neat diagram, explain the construction of carbon potentiometer. | 6 |
|     | c) | Mention the applications of an inductor.                               | 3 |
| 10. | a) | What are trimmers and padders ?  | 4 |
|     | b) | Explain the construction of a mica capacitor.                          | 7 |
|     | c) | Distinguish between cell and battery.                                  | 4 |



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First Semester Diploma ( Supplementary ) Examination, 2004

E & C BOARD

**BASICS OF ELECTRICAL ENGG. AND  
ELECTRONIC COMPONENTS**

Time : 3 Hours ]

[ Max. Marks : 100

- Note :
- i) Section - I is compulsory.
  - ii) Answer any six full questions choosing two questions each from Sections-II, III and IV.
  - iii) Each question of Sections-II, III and IV carries 15 marks.

**Section - I**

1. a) Fill in the blanks with appropriate word / words : 5 × 1 = 5
- i) The unit of charge is .....
  - ii) Transformer works on the principle of .....
  - iii) Secondary cell is one in which chemical action is .....
  - iv) Relay is a ..... device.
  - v) The purpose of laminating the core is to reduce ..... and .....
- b) Write a note on star and delta connection. 5

**Section - II**

2. a) State and explain the following Laws : 8
- i) Faraday's Laws
  - ii) Coulomb's Laws.
- b) What are the factors on which resistance of a conductor depends ? 3
- c) Define the following terms : 4
- i) Flux density
  - ii) Mutual inductance.

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**E&C B-10115**

## Section - III

5. a) Derive the expression for impedance in series R-L-C circuit with necessary vector diagrams. 8
- b) Explain the concept of 'j' operator. 3
- c) A resistance of  $10 \Omega$  and a capacitive reactance of  $30 \Omega$  are connected in series across 230 V, 50 Hz supply. Calculate
- i) impedance of the circuit 4
- ii) current drawn from the circuit. 6
6. a) Explain the principle of operation of a transformer. 6
- b) A single phase 50 Hz, 3300/440 V transformer has a maximum flux of 60 mWb. Find the number of turns on primary and secondary windings. 4
- c) Explain the working principle of DC motor. 5
7. a) Explain the different losses in a transformer. How are they minimized? 6
- b) Distinguish between primary cell and secondary cell. 3
- c) Explain the construction of lead-acid battery. 6

## Section - IV

8. a) Explain the working principle of an Electromagnetic relay. 6
- b) Explain 'tolerance' and 'power rating' of a resistor. Give examples. 4
- c) Explain the construction of fixed carbon resistor. 5
9. a) Explain briefly the classification of capacitors based on dielectric materials used. 5
- b) Distinguish between trimmer and padder. 4
- c) Explain the construction of a wet type electrolytic capacitor. 6
10. a) Write a brief note on LDR. 5
- b) Explain the factors on which the value of inductance depends. 6
- c) List out the applications of inductors. 4

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First Semester Diploma ( Annual ) Examination, 2005

E & C BOARD

**BASICS OF ELECTRICAL ENGG. AND  
ELECTRONIC COMPONENTS**

( Course Code EC, IC & EP )

Time : 3 Hours ]

[ Max. Marks : 100

- Note :
- Section - I is compulsory.
  - Answer any six full questions choosing two questions each from Sections-II, III and IV.

**Section - I**

1. a) Fill in the blanks with appropriate word / words : 5 × 1 = 5
- The unit of capacitance is .....
  - If two resistors of  $R_1 \Omega$  and  $R_2 \Omega$  are connected in parallel, the net resistance is given by .....
  - Self induced e.m.f. always *opposite*..... the applied voltage.
  - The RMS value of an alternating voltage is given by .....
  - The impedance of R-C series circuit is given by .....
- b) Write a short note on charging and discharging of capacitor. 5

**Section - II**

2. a) Define the following terms : 5
- Flux density
  - Dielectric constant
  - Dielectric strength
  - Relative permittivity
  - Specific resistance.

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- b) Find the total capacitance of the following circuit diagram in Fig. :

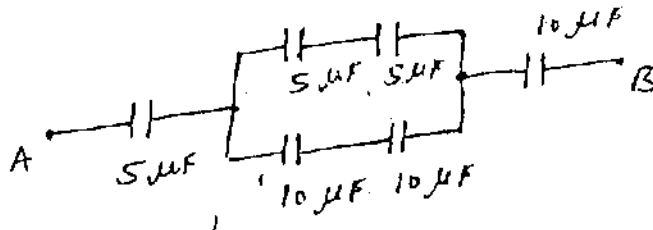


Fig.

- c) State and explain Kirchhoff's laws. 6
3. a) State Faraday's laws of electromagnetic induction. 5
- b) A wire of 100 m length and  $0.2 \times 10^{-6} \text{ m}^2$  cross-sectional area, has a resistance of  $330 \Omega$ . Find the resistivity of the material. 5
- c) Differentiate between self-induced e.m.f. and mutually induced e.m.f. 5
4. a) Define the following terms with respect to an alternating voltage : 5
- Amplitude
  - Cycle
  - RMS value
  - Form factor
  - Time period.
- b) An alternating current is given by  $i = 100 \sin 50 t$ . Calculate : 5
- RMS value
  - Average value
  - Crest factor.
- c) Define the following terms w.r.t. 3-phase system.
- Phase voltage
  - Phase current
  - Line voltage
  - Line current.

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First Semester Diploma ( Supplementary) Examination, 2006

E &amp; C BOARD

## BASICS OF ELECTRICAL ENGG. AND ELECTRONIC COMPONENTS

( Course Codes : EC, EP & IC )

Time : 3 Hours ]

[ Max. Marks : 100

- Note :
- i) Section - I is compulsory.
  - ii) Answer any six full questions choosing two full questions each from Sections-II, III and IV.

### Section - I

1. a) Fill in the blanks with appropriate word / words : 5 × 1 = 5
- i) The unit of capacitance is ..... *Farads* .....
  - ii) Resistance of a conductor is ..... proportional to its area of cross-section.
  - iii) Power factor of a pure inductive circuit is .....
  - iv) DC motor converts ..... energy to ..... energy.
  - v) Temperature sensitive resistor is called .....
- b) State and explain KCL and KVL.

### Section - II

2. a) Define the following and mention their units :
- i) Electric current
  - ii) Resistance
  - iii) EMF.

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I Semester Diploma Examination, May 2009

ELECTRONICS & COMMUNICATION ENGG. BOARD

**BASICS OF ELECTRICAL ENGINEERING AND  
ELECTRONIC COMPONENTS**

Time : 3 Hours ]

[ Max. Marks : 100

- Note : (1) Section - I is compulsory.  
(2) Answer any six full questions choosing two full questions from each of the remaining Sections.

**SECTION - I**

1. (a) Fill in the blanks with suitable keyword.
- (i) Secondary cell is one in which chemical action is \_\_\_\_\_.
  - (ii) The gold band on a resistor indicates \_\_\_\_\_ % of tolerance.
  - (iii) Self induced emf always \_\_\_\_\_ the applied voltage.
  - (iv) The ratio of resistance to impedance gives \_\_\_\_\_.
  - (v) The unit of electric energy is \_\_\_\_\_.
- (b) Define resistance and list the factors on which the resistance of a resistor depend on.

3  
15 x 6  
90  
95  
5  
5 x 1 = 500

**SECTION - II**

2. (a) Define the terms with units.
- (i) Specific resistance.
  - (ii) Electric power.
  - (iii) Electric intensity.
- (b) Derive the equation for effective capacitance when capacitors all connected in series.
- (c) Three capacitors of value 8  $\mu\text{F}$ , 12  $\mu\text{F}$  and 16  $\mu\text{F}$  respectively are connected in series across a 240 V dc supply.  
Calculate
- (i) Resultant capacitance.
  - (ii) Potential difference across each capacitor.

[Turn over

3. (a) State and explain coulomb's laws of electrostatics. 5  
 (b) Find the force between two charges 10 cm apart in vacuum, the charges are  $4 \times 10^{-5} \text{ C}$  and  $6 \times 10^{-8} \text{ C}$ . 4  
 (c) Define the terms with units. 6  
 (i) M.M.F.  
 (ii) Self inductance  
 (iii) Flux density
4. (a) Derive an expression for effective inductance when inductor are connected in parallel. 5  
 (b) A coil consists of 750 turns and a current of 10A the coil gives rise to a magnetic flux of 1200  $\mu\text{Wb}$ . Calculate the inductance of the coil. 4  
 (c) Define and explain mutual inductance. 6
- SECTION - III**
5. (a) Define the following : 6  
 (i) Cycle  
 (ii) Frequency  
 (iii) Form factor
- (b) An alternating current is given by  $i = 141.4 \sin 314t$ .  
 Find (i) The max. value  
 (ii) Frequency  
 (iii) Time period 5
- (c) A 318  $\mu\text{F}$  capacitor is connected across a 230 V, 50 Hz supply determine. 4  
 (i) The capacitive reactance.  
 (ii) Current flowing in the circuit.
6. (a) Derive the expression for impedance in series RLC circuit with vector diagram. 6  
 (b) A 230 V, 50 Hz ac supply is applied to a coil of 0.06 H inductance and 2.5  $\Omega$  resistance connected in series with a 6.8  $\mu\text{F}$ . Calculate. 6  
 (i) Impedance  
 (ii) Current  
 (iii) Power factor  
 (iv) Power consumed
- (c) Define the following : 3  
 (i) Power factor  
 (ii) Q factor



7. (a) Derive the EMF equation of a transformer. 6  
(b) Explain losses in a transformer. 4  
(c) A 2000/200 V, 20 KVA transformer has 60 turns on secondary. Calculate primary turns and secondary current. 5

#### SECTION - IV

8. (a) Explain the construction of lead acid battery. 7  
(b) Give the difference between primary and secondary cells. 4  
(c) What is a relay ? Give the classification of relays. 4
9. (a) Explain colour coding of resistors. 6  
(b) Give the construction of carbon potentiometer. 5  
(c) Write a note on thermistors. 4
10. (a) Explain the construction of Mica capacitors. 6  
(b) Mention the application of inductors. 4  
(c) Classify the capacitors based on the dielectric medium. 5



Code : 9EC-01-C

Register Number 

441	EC	0	9	0	8	9.
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I Semester Diploma Examination, May 2010

**ELECTRONICS & COMMUNICATION ENGG. BOARD**  
**BASIC ELECTRICAL ENGG. & ELECTRONICS**  
**COMPONENT**

Time : 3 Hours ]

[ Max. Marks : 100

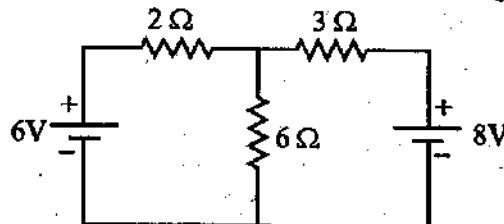
- Note : (1) Section-A is compulsory.  
(2) Answer any *two* full question from each Sections B, C & D.

**SECTION - A**

1. (a) Fill in the blanks : 1 × 5 = 5
- (i) The SI units of emf is \_\_\_\_\_.
  - (ii) Lenz's law is used to find the direction of \_\_\_\_\_ induced emf.
  - (iii) Peak factor of an AC sinusoidal voltage equation to \_\_\_\_\_.
  - (iv) The winding to which the load is connected is called \_\_\_\_\_.
  - (v) In an aircore inductor \_\_\_\_\_ core is used.
- (b) Explain the working of stepper motor. 5

**SECTION - B**

2. (a) State ohm's law and write ohm's law equation. 4
- (b) Derive the equation to find equivalent resistance when three resistance are connected in parallel. 5
- (c) Find the current through  $6\Omega$  resistance of the circuit given below : 6



[Turn over

3. (a) What is a capacitor ? What are the factors on which capacitance of capacitor depends. 4
- (b) 3 Capacitor of  $5 \mu\text{F}$  each are connected in parallel. Find the total capacitance and capacitive reactance at 50 Hz frequency. 5
- (c) State and explain colomb's law. 6
4. (a) Define the following and mention their unit. 4
- (i) Self inductance.
- (ii) Mutual inductance
- (b) State and explain electro magnetic induction. 5
- (c) Derive the expression for dynamically induced emf. 6

## SECTION - C

5. (a) Define instantaneous value amplitude and frequency with respect to sine wave. 6
- (b) A sinusoidal alternating current is represented by  $i = 30 \sin 30 t$   
Find
- (i) Maximum value
- (ii) Current when  $t = 0.002$  second passing through zero in +ve direction
- (iii) RMS value of current 6
- (c) Define the following :
- (i) Inductive reactance
- (ii) Capacitive reactance 3
6. (a) Write the equation to find the impedance and current of an RL circuit connection to AC circuit. 5
- (b) A resistance of  $100 \Omega$  is connected in series with a capacitance of  $150 \mu\text{f}$  of this is connected to a 200 V 50 Hz supply.  
Find
- (i) Capacitive reactance
- (ii) Impedance &
- (iii) Power consumed 6
- (c) Write the characteristic of 3 phase star connection system. 4
7. (a) Derive the transformer EMF equation. 5
- (b) Difference b/w auto transformer and regular transformer. 5
- (c) Write the losses in the transformer. 5

## SECTION - D

8. (a) Define the primary & secondary cells with example. 5  
(b) Write the working principal of electromagnetic relay. 5  
(c) Explain the construction and working of variable reactance of stepper motor. 5
9. (a) Write the application of inductor. 5  
(b) Write the classification of inductor based on core material used. 5  
(c) Write the difference b/w timmer and padder. 5
10. (a) Draw and explain the working principal of LDR. 5  
(b) Explain specification of resistor. 5  
(c) Classify the capacitors based on the dielectric material used. 5
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Code : E-02

Register  
Number

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I Semester Diploma Examination, May 2009

**ELECTRONICS & COMMUNICATION ENGG. BOARD**  
**ELECTRICAL AND ELECTRONICS ENGINEERING**

Time : 3 Hours ]

[ Max. Marks : 100

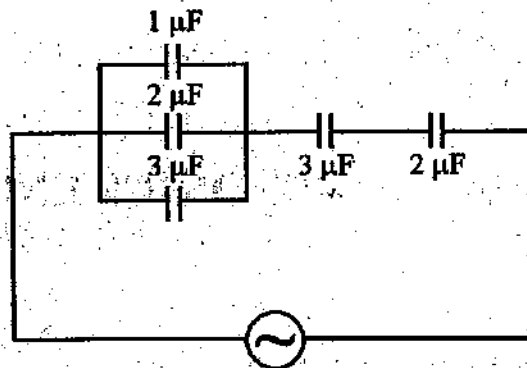
- Instructions :** (1) Question No. 1 is compulsory.  
(2) Answer any six full questions taking two full questions from each section.

1. (a) Fill in the blanks with appropriate word/words : 5
- (i) The insulating material used in a capacitor is called \_\_\_\_\_.
  - (ii) In a pure capacitive circuit current \_\_\_\_\_ the voltage by  $90^\circ$ .
  - (iii) The value of resistance with colour code red, black, green represents \_\_\_\_\_.
  - (iv) The number of valence electrons in donor impurities is \_\_\_\_\_.
  - (v) The current amplification factor ( $\alpha$ ) is always \_\_\_\_\_ unity.
- (b) Explain with suitable diagram the working principle of an NPN transistor and function of each terminal. 5

**SECTION - I**

2. (a) Find the effective resistance when three resistances are connected in series and when three resistances are connected in parallel. 6
- (b) State and explain the Kirchhoff's voltage and current laws. 6
- (c) What factors on which resistance of a conductor depends. 3

3. (a) State and explain Coulombs law. 5  
 (b) Calculate the equivalent capacitance in the circuit as shown in figure. 4



- (c) Define the terms : 3 × 2 = 6  
 (i) Self inductance  
 (ii) Mutual inductance  
 (iii) Dielectric constant
4. (a) Derive an expression for impedance of a RLC series circuit. 5  
 (b) Define the terms : 3 × 2 = 6  
 (i) Average value  
 (ii) RMS value  
 (iii) Form factor  
 (c) State Fleming's right hand rule and Lenz's law. 4

### SECTION - II

5. (a) With a neat sketch, explain the working principle of transformer and derive EMF equation of a single-phase transformer. 9  
 (b) Compare core type transformer with shell type transformer. 3  
 (c) What are the characteristics of a good fuse wire? 3



6. (a) What is a stepper motor ? And explain the working principle of stepper motor with neat sketch. 8
- (b) Explain with suitable sketch the construction of a carbon resistor. 4
- (c) List the application of capacitor. 3
7. (a) Explain briefly working principle of electromagnetic relay with a neat diagram. 5
- (b) List the applications of an inductor. 3
- (c) Classify switches based on their operation. 3
- (d) What is electron emission ? List the different types of electron emission. 4
- SECTION - III**
8. (a) What is doping ? Briefly explain how p-type and N-type semiconductors are formed. 5
- (b) Explain how transistor is used as a switch. 4
- (c) Explain with a neat circuit diagram, the working of SCR and draw its characteristic curve. 6
9. (a) Explain the working of Op-Amp series voltage regulator. 4
- (b) With a neat circuit diagram, explain the drain characteristics of a JFET. 6
- (c) Mention the ideal Op-Amp characteristics. 5
10. (a) Explain with a circuit diagram the working of timer 555 as an Astable Multivibrator. 6
- (b) With a neat diagram, explain the working of an active low pass filter. 5
- (c) With a neat diagram, explain Op-Amp integrator circuit. 4
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Code : 9EC-01-C

Register  
Number

2	0	4	EC	0	9	0	0	8
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I Semester Diploma Examination, November 2009

E & C BOARD

**BASIC ELECTRICAL & ELECTRONICS  
COMPONENTS**

Time : 3 Hours ]

[ Max. Marks : 100

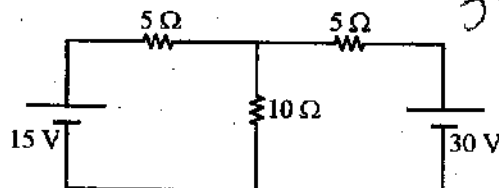
- Instructions :** (1) Section – A is compulsory.  
(2) Answer any two full questions from each section B, C, D.

**SECTION – A**

1. (a) Fill in the blanks : 1 × 5 = 5
- (i) The unit of power is \_\_\_\_\_.
  - (ii) The unit of absolute permeability \_\_\_\_\_.
  - (iii) The peak factor is given by \_\_\_\_\_.
  - (iv) Autotransformer has \_\_\_\_\_ winding.
  - (v) The rms value of sine wave is given by  $V_{rms} =$  \_\_\_\_\_.
- (b) Explain the working of Stepper Motor. 5

**SECTION – B**

2. (a) State Ohm's law. Find the current flowing through the resistor of  $50 \Omega$  is connected to 250 V voltage source. 4
- (b) Derive the equivalent resistance R, if 3 resistors  $R_1$ ,  $R_2$  and  $R_3$  are connected in series. 5
- (c) Find the current through  $10 \Omega$  resistor. 6



*Blow up B  
add 8m  
E & C*

[Turn over

3. (a) Define :

6

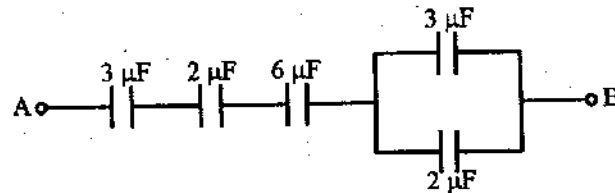
- (i) Electric flux
- (ii) Field strength
- (iii) Dielectric strength

(b) State and explain Coulomb's laws.

5

(c) Find the equivalent capacitance across AB.

4



4. (a) Define :

6

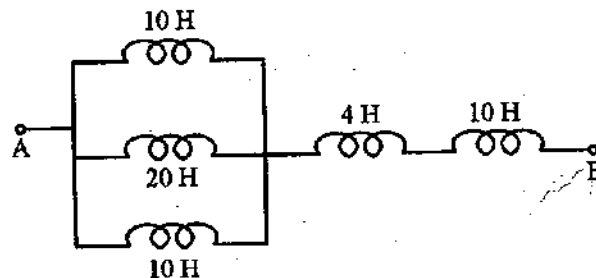
- (1) Flux
- (2) MMF
- (3) Reluctance

(b) State and explain Faraday's law of electromagnetic induction.

5

(c) Find the equivalent inductance across AB.

4



SECTION - C

5. (a) Define amplitude, frequency, time period w.r.t. sine wave.

6

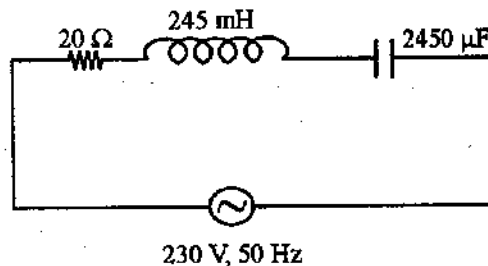
(b) Derive the expression for RMS value.

5

(c) Define form factor. Find the form factor, if r.m.s. value of current is 2A and average value of current is 1A.

4

6. (a) Explain the working of RC circuit connected to AC source. 5  
 (b) Find the :  
 (1) Impedance  
 (2) Current  
 For the circuit shown below 5



- (c) Explain the principle of 3-phase system. 5
7. (a) Explain the working principle of a transformer. 5  
 (b) Classify the transformers. 5  
 (c) A 50 kVA transformer has 500 turns of the primary and 100 turns on the secondary winding and primary is connected to 1000 V.  
 Calculate :  
 (1) Secondary emf  
 (2) Primary and Secondary currents 5

#### SECTION - D

8. (a) Explain the lead acid battery with diagram. 5  
 (b) Explain the working principle of relay. 5  
 (c) Explain the working principle of DC motor. 5
9. (a) List out the applications of Resistors. 4  
 (b) Explain the working principle of VDR. 4  
 (c) Explain the working principle of LDR. 4  
 (d) List out the applications of Transistor. 3
10. (a) Explain the working of Gary capacitor with diagrams. 5  
 (b) Classify the inductors. 4  
 (c) List the applications of capacitors. 3  
 (d) List the applications of inductors. 3

