

**Scheme – I**  
**Sample Question Paper**

**Program Name** : Mechanical & Automobile Engineering  
**Program Code** : ME / AE  
**Semester** : Third  
**Course Title** : Basic Electrical & Electronics Engineering  
**Marks** : 70

22310

**Time: 3 Hrs.**

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**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**SECTION A**

**Q.1) Attempt any SIX of the following.**

**12 Marks**

- a) Define Magnetic circuit.
- b) Define: (i) Permeability (ii) Reluctance
- c) Define RMS value and average value with respect to sinusoidal ac waveform.
- d) Draw sinusoidal waveform and show the various quantities associated with it.
- e) State the working principle of 1-phase transformer.
- f) Write EMF equation of transformer. State the meaning of each notation in it.
- g) Define FHP motor.

**Q.2) Attempt any THREE of the following.**

**12 Marks**

- a) Compare Electric Circuit and Magnetic Circuit on the basis of: (i) Definition (ii) Relation between flux and current (iii) Analogy and (iv) Diagram.
- b) Draw a balanced 3-phase delta connected load. Show various line and phase quantities on it. Also write relationship between line and phase values of voltages and currents.
- c) Explain the construction and working principle of transformer.
- d) Explain working of autotransformer. State its any two applications.

**Q.3) Attempt any TWO of the following.**

**12 Marks**

- a) Explain with neat diagram statically and dynamically induced EMF.
- b) A capacitance of  $20\ \mu\text{F}$  and a resistance of  $100\ \Omega$  are connected in series across a  $230\text{V}$ ,  $50\ \text{Hz}$  supply mains. Determine: (i) Capacitive reactance (ii) Angular frequency (iii) impedance and (iv) Current. (v) Circuit Power. Draw circuit diagram.
- c) Derive an EMF equation of single phase transformer.

## SECTION B

**Q.4) Attempt any FIVE of the following.**

**10 Marks**

- a) List different types of electronic components with example.
- b) Define PIV and ripple factor.
- c) State the applications of BJT.
- d) List different types of resistor and capacitor.
- e) Define filter and state its type.
- f) Draw the diagram showing the operating regions of transistor.

**Q.5) Attempt any THREE of the following.**

**12 Marks**

- a) Explain ideal and practical current source with suitable diagram.
- b) (i) Explain the construction of LED.  
(ii) List different types of diode and draw its symbol.
- c) Explain Zener diode with V-I characteristics.
- d) Find the value of resistor from the given color code:
  - (i) Orange, Red, Brown, Silver
  - (ii) Green, Orange, Orange, Silver

**Q.6) Attempt any TWO of the following.**

**12 Marks**

- a) (i) Differentiate between analog and digital ICs.  
(ii) List different types of registers and capacitors.
- b) Explain half wave and full wave rectifier with suitable diagram.
- c) (i) Derive the relationship between alpha ( $\alpha$ ) and beta ( $\beta$ ).  
(ii) State the different types of transistors and draw the symbols of NPN and PNP transistor.

**Scheme - I**  
**Sample Test Paper - I**

**Program Name** : Mechanical & Automobile Engineering  
**Program Code** : ME / AE  
**Semester** : Third  
**Course Title** : Basic Electrical & Electronics Engineering  
**Marks** : 20

**22310**

**Time: 1 Hour**

**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**SECTION A**

**Q.1) Attempt any TWO of the following.** **04 Marks**

- a) Define Power and Energy.
- b) State Lenz's law.
- c) Define RMS value and average value with respect to sinusoidal ac waveform.

**Q.2) Attempt any TWO of the following.** **06 Marks**

- a) Compare electric circuit and magnetic circuit on any three points.
- b) Explain statically and dynamically induced emf.
- c) A sinusoidal voltage with equation  $v=70.7 \sin 314t$  Volt is applied to a load.  
Calculate: (i) Maximum Voltage (ii) RMS Voltage (iii) Frequency

**SECTION B**

**Q.3) Attempt any TWO of the following.** **04 Marks**

- a) List the different types of electronic components with example.
- b) State the different types of resistors and capacitors.
- c) Define PIV and ripple factor.

**Q.4) Attempt any TWO of the following.** **06 Marks**

- a) Find the resistor value from the given color code:
  - (i) Orange, Red, Brown, Gold
  - (ii) Brown, Black, Brown, Gold
- b) Compare analog and digital ICs.
- c) Explain Zener diode with V-I characteristics.

## Scheme – I

### Sample Test Paper - II

**Program Name** : Mechanical & Automobile Engineering  
**Program Code** : ME / AE  
**Semester** : Third  
**Course Title** : Basic Electrical & Electronics Engineering  
**Marks** : 20

**22310**

**Time: 1 Hour**

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#### **Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

#### **SECTION A**

**Q.1) Attempt any TWO of the following.** **04 Marks**

- a) Draw power triangle and show various quantities on it.
- b) State the working principle of transformer.
- c) List the various types of single phase motors.

**Q.2) Attempt any TWO of the following.** **06 Marks**

- a) Draw and explain series R-L circuit.
- b) Derive an EMF equation of single phase transformer.
- c) Explain the working of single phase AC motor.

#### **SECTION B**

**Q.3) Attempt any TWO of the following.** **04 Marks**

- a) Draw the symbol of LED and State any two applications of it.
- b) Draw the symbol of BJT and write the working principle of it.
- c) Show the various operating regions with suitable diagram.

**Q.4) Attempt any TWO of the following.** **06 Marks**

- a) Compare of half wave and full wave rectifier on any three points.
- b) Explain the transistor as switch.
- c) Derive the relation between alpha and beta of transistor.