

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

B.Tech (Electronics and Telecommunication Engineering) SEMESTER - 2 Summer 2026 (Regular)

Course :Bachelor of Technology (Electronics and Telecommunication Engineering) Branch : Engineering and Technology

Semester : SEMESTER - 2

Subject Code & Name: 24AF1000ES206A - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time : 3 Hours]

[Total Marks : 60

Instructions to the Students:

1. Each question carries 12 marks.
 2. Question No. 1 will be compulsory and include objective-type questions.
 3. Candidates are required to attempt any four questions from Question No. 2 to Question No. 6
 4. Use of non-programmable scientific calculators is allowed.
 5. Assume suitable data wherever necessary and mention it clearly.
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Q1. Objective type questions. (Compulsory Question) 12

1 According to Kirchhoff's Current Law (KCL), the algebraic sum of currents at a node is:

- A) Maximum
- B) Minimum
- C) Zero
- D) Equal to voltage

2 The power factor of a purely resistive circuit is:

- A) 0
- B) 0.5
- C) 1
- D) Infinity

3 Which transformation is useful for simplifying bridge networks?

- A) Fourier Transformation
- B) Laplace Transformation
- C) Star-Delta Transformation
- D) Clarke Transformation

4 Which of the following is the primary function of a generator?

- A) Converts electrical energy into mechanical energy
- B) Converts mechanical energy into electrical energy
- C) Stores electrical energy
- D) Converts AC into DC

5 An induction motor operates on the principle of:

- A) Electrostatic induction
- B) Electromagnetic induction
- C) Mutual capacitance
- D) Piezoelectric effect

- 6 **A PN junction diode conducts current when it is:**
 A) Reverse biased
 B) Forward biased
 C) Unbiased
 D) Short-circuited
- 7 **The current flowing through a PN junction diode is governed by:**
 A) Ohm's Law
 B) Shockley Diode Equation
 C) Faraday's Law
 D) Kirchhoff's Law
- 8 **The main purpose of a capacitor filter in a power supply is to:**
 A) Increase frequency
 B) Reduce ripple voltage
 C) Increase current
 D) Increase voltage
- 9 **The 79xx series IC voltage regulators provide:**
 A) Positive regulated voltage
 B) Negative regulated voltage
 C) Variable voltage
 D) AC voltage
- 10 **In an NPN transistor, the majority charge carriers are:**
 A) Holes
 B) Electrons
 C) Ions
 D) Protons
- 11 **Which transistor configuration provides the highest current gain?**
 A) Common Base (CB)
 B) Common Emitter (CE)
 C) Common Collector (CC)
 D) None of the above
- 12 **A Moving Iron (MI) instrument can measure:**
 A) DC only
 B) AC only
 C) Both AC and DC
 D) Power factor only
- Q2. Solve the following.
- A) State and explain Ohm's Law, Kirchhoff's Current Law (KCL), and Kirchhoff's Voltage Law (KVL) with suitable examples. 6
- B) A resistor of **10 Ω** carries a current of **5 A**. Calculate: 6
 i. Voltage
 ii. Power
 iii. Energy consumed in 10 minutes using Ohm's law.
- Q3. Solve the following.
- A) Explain the construction and working principle of a three-phase induction motor. 6
- B) Explain the construction, operating principle and applications of DC Series, Shunt, and Compound motors. 6

- Q4. Solve Any Two of the following.
- A) Explain the working principle of a Full-Wave Bridge Rectifier with neat circuit diagram and waveforms. 6
 - B) Describe the working of a Zener diode as a voltage regulator with a neat circuit diagram. 6
 - C) Explain the construction and working principle of the 78xx series positive voltage regulator ICs with neat diagrams. 6
- Q5. Solve Any Two of the following.
- A) Draw and explain the input and output characteristics of a Common Emitter (CE) transistor configuration. 6
 - B) Derive the relationship between Emitter Current (I_E), Base Current (I_B), and Collector Current (I_C) in a transistor. 6
 - C) A transistor has $\beta = 100$ and Base Current = $50 \mu A$. Calculate: 6
 - i. Collector Current
 - ii. Emitter Current
- Q6. Solve Any Two of the following.
- A) Explain the classification of electrical measuring instruments. 6
 - B) Explain the construction and operation of an ammeter and voltmeter. 6
 - C) Draw the block diagram of a Digital Multimeter and explain how it measures voltage, current, and resistance. 6

*** End ***