

Introduction to Electrical Engineering (BESC104B)

QUESTION BANK

Module 1: DC Circuits and AC Fundamentals

1. Compare conventional and non-conventional energy resources.
2. Explain the general structure of electrical power system using single line diagram
3. With neat layout explain the working of Nuclear power plant?
4. With a neat sketch, explain the operation of a hydro-electric power station.
5. With a neat sketch, explain the operation of wind power generation.
6. State and explain Ohm's law. List out its limitations.
7. State and explain Kirchhoff's laws, as applied to DC circuit.
8. Define average and rms value of a sinusoidal quantity.
9. Define form factor and peak factor Obtain their values for a sinusoid voltage.
10. Numericals on Ohm's law, Kirchhoff's laws

Module 2: Single Phase AC Circuits and Domestic Wiring

1. Show that voltage and current in pure resistive circuit are in phase and power consumed in the circuit is equal to product of rms voltage and current. The circuit is excited by the a.c. source.
2. Show that in a pure inductor the current lags behind the voltage by 90° . Also draw the voltage and current waveforms.
3. Derive an expression for power in pure capacitor/ pure inductor circuit and draw voltage, current and power waveforms.
4. Derive an expression for impedance, phase angle and power for series R-L/R-C circuit supplied with AC.
5. What is meant by power factor in AC circuits? What is its significance in AC circuits?
6. Define active power, reactive power and apparent power.
7. Numericals

Module 3: DC Generator and DC Motor

1. With a neat diagram, explain the constructional details of DC Generator.
2. Derive an emf equation of DC generator.
3. Give the classification of DC generators with their equivalent circuit diagrams.
4. Derive an equation of torque of DC motor.
5. Brief on characteristics of a DC shunt motor and series motor with neat diagrams.
6. List the applications of shunt and series motor.
7. Numericals on DC generator and DC motor.

Module 4: Single phase Transformers and Three phase induction motors

1. Explain the construction of a single phase transformer. State the principle of operation of transformer.
2. Derive an expression for emf induced in Transformer.
3. List different types of loss in a transformer and explain each one in brief.
4. Derive the condition for which the efficiency of a transformer is maximum.
5. Explain the types of transformer. (Shell type and core type)
6. Explain the constructional details of 3-phase induction motor. Draw relevant sketches.
7. Compare squirrel cage and slip ring types of rotors of an Induction motor.
8. Explain the concept of rotating magnetic field and show that resultant flux remains same at different instants of time.
9. Explain the operating principle of three phase induction motor.

10. Numericals on transformer and 3 phase induction motor.

Module 5: Domestic Wiring

1. Explain the various factors considered in selecting types of wiring.
2. Briefly explain (1) Concealed wiring (ii) Casing and capping
3. Explain the operation of 2-way and 3-way control of lamp with the help of diagram and functional table.
4. Write short notes on: (i) Fuse (ii) MCB.
5. Explain electrical shock, its causes and precautions to be taken to prevent them.
6. What is earthing? Why earthing is required? With the help of sketch explain pipe and plate earthing.
7. Numericals on electricity bill.