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Question Paper Code : 80224

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Second Semester

Electronics and Communication Engineering

BE 3254 — ELECTRICAL AND INSTRUMENTATION ENGINEERING

(Common to Electronics Engineering (VLSI Design and Technology)/Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are the main components of transformer?
2. Define "All Day Efficiency" of a transformer.
3. Specify the function of the commutator in a DC machine.
4. How will you find the direction of force produced using Fleming's left hand rule?
5. State the difference between slip ring rotor and squirrel cage rotor of an induction motor.
6. Write the torque equation of an induction motor.
7. List the static characteristics of an instrument.
8. Differentiate between accuracy and precision.
9. What are the advantages of three phase system?
10. List the methods of earthing.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Explain the constructional details of shell-type and core-type transformers.

Or

- (b) With the help of a neat phasor diagram, describe how the magnetizing current, core flux, and induced EMFs in the primary and secondary windings of a transformer are related in phase.

12. (a) (i) Derive an expression for the EMF generated in the armature winding of a DC machine. (8)
(ii) Describe the Field Diverter Method of speed control of a DC shunt motor. (5)

Or

- (b) Explain the construction and working principle of a Brushless DC motor, and mention its advantages and disadvantages.

13. (a) Describe the construction and principle of operation of a 3-phase induction motor with a neat sketch.

Or

- (b) With neat diagram, explain the working of a Star Delta Starter for a 3-phase induction motor.

14. (a) Explain the functional elements of an instrument with a neat block diagram.

Or

- (b) Explain the working of a Permanent Magnet Moving Coil (PMMC) instrument and mention the errors in PMMC instruments.

15. (a) Explain in detail the transmission and distribution of electrical energy.

Or

- (b) Illustrate the construction and working of a Molded Case Circuit Breaker.

PART C — ($1 \times 15 = 15$ marks)

16. (a) (i) A 25 kVA transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to a 3000 V, 50 Hz supply. Find the full-load primary and secondary currents, the secondary EMF, and the maximum flux in the core, neglecting leakage drops and no-load primary current. (7)
(ii) Explain with the help of a phasor diagram how a transformer behaves under resistive load condition. (8)

Or

- (b) Analyse the circuit breaker and miniature circuit breakers with relevant diagram.