M.Sc. (BIOMEDICAL INSTRUMENTATION) DEGREE EXAMINATION FEBRUARY 2024

First Semester

BMI 103—ELECTRICAL TECHNOLOGY

(2023 Admissions – Regular / 2020–22 Admissions – Supplementary / 2019 Admissions – First Mercy Chance / 2018 Admissions – Second Mercy Chance / 2017 Admissions – Final Mercy Chance)
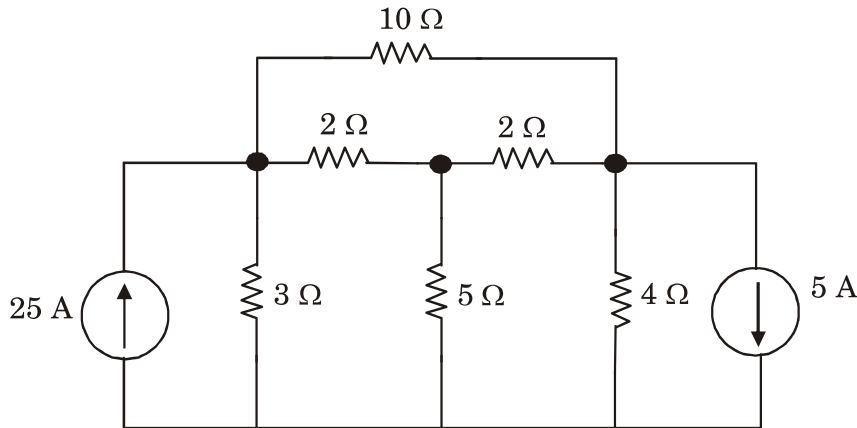
Time : Three Hours   Maximum Marks : 100

Part A

Answer any **five** *questions.*
Each question carries 10 *marks.*

1. Using nodal analysis find currents in various resistors in the network shown in figure.

2. A series RLC circuit has $100\,\Omega$ register 0.318 H inductor and C. $v = 230 \times \sqrt{2}\sin wt$ V ; $i = 2.3\sqrt{2}\sin wt.$ A Given $w = 314.15\,\text{rad/sec}$. Find (i) C, (ii) V_L and (iii) power.

3. Derive the equation for voltage regulation of $1\,\phi$ transformer at capacitive load by drawing the phasor diagram.

4. Explain the methods of speed control of dc motors.

5. Explain the principle of operation of a synchronous motor with diagrams.

6. Explain with diagrams the working and applications of current and potential transformers.

(5 × 10 = 50 marks)

Turn over

Part B

Answer any **ten** *questions.*
Each question carries 5 marks.

1. State and explain Kirchoff's laws.

2. Explain star-delta transformations.

3. Compare parallel and series resonance of RLC circuits.

4. Define self inductance, mutual inductances and co-efficient of coupling. What are their significance.

5. Explain the two wattmeter method of 3ϕ power measurement.

6. Explain the construction and working of auto transformer.

7. Compare the characteristics of series and shunt d.c. generators.

8. Explain the need of starters for d.c. motors.

9. Explain how an induction motor is working.

10. Write a note on star-delta starter.

11. With diagrams explain the working of an a.c. servomotor.

12. Explain with block diagram the principle of an off-line UPS.

(10 × 5 = 50 marks)