

4. If a step voltage of magnitude P volts is applied to an R-C circuit, derive expression for charging current and transient voltage across resistor R . Plot these two quantities.

If now, after charging has ceased, the R-C circuit is short circuited, find expression for discharge current. **15**

Unit III

5. (a) Explain the working of a single-phase transformer on no-load and then on full-load. Draw the corresponding phasor diagram also. Consider load to be capacitive. **11**
- (b) State the principle of operation of D.C. shunt motor. **4**
6. (a) What are different types of single-phase induction motors ? Explain the construction and working of any *one*. **13**
- (b) Define Slip. What are its units ? **2**

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B. Tech. EXAMINATION, 2024

(Second Semester)

(C-Scheme) (Main & Re-appear)

(Common for All Branches)

BASIC ELECTRICAL ENGINEERING

EE101C

Time : 3 Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 9 is compulsory. All questions carry equal marks.

Unit I

1. (a) State Thevenin's theorem. Also state the procedure and conditions to find V_{TH} and (Z_{TH} or R_{TH}). 6
- (b) Write the node equations of the electrical network of figure 1 and solve these equations for the node voltage and branch currents. Also calculate the power consumed by the network. 6

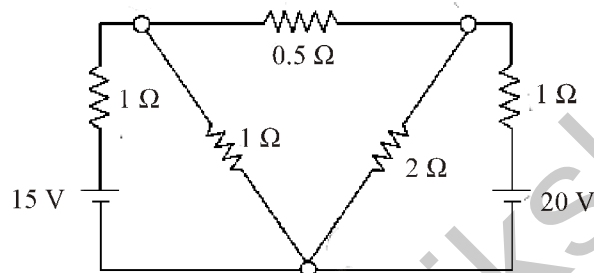


Figure 1

2. Applying Thevenin or any other theorem(s), find the current through the resistor connected between P and Q nodes in the network of figure 2. Different numbers represents ohms. 15

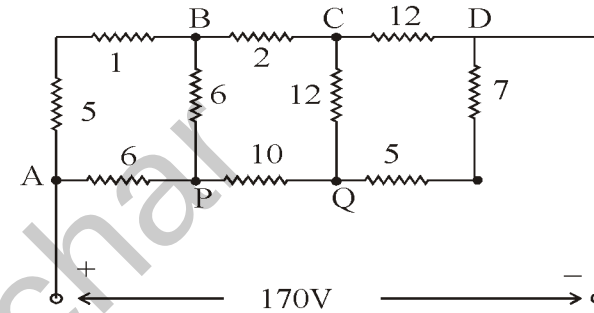


Figure 2

Unit II

3. (a) Define power factor in two different ways. What are its units, if any ? 3
- (b) Two coils A and B are connected in series across a 240 V, 50 Hz a.c. supply. The resistance of A is $5\ \Omega$ and the inductance of B is 0.15 H. If the input from supply is 3 kW and 2 kVAR, find the inductance of A and the resistance of B. Calculate the voltage across each coil too. 12

- (d) If load on a transformer is successively increased, what happens to the level of flux in its core ? 2
- (e) In a D.C. generator or motor, are the poles (or any part of poles) laminated ? Is the armature laminated ? 2
- (f) State the purpose of ELCB. Where is it installed ? 2
- (g) Can an autotransformer produce voltage higher than supply voltage ? If yes, how ? 2

Unit IV

7. (a) Draw a neat diagram showing Switch Fuse Unit. Where is it installed ? What materials are used in it ? 7
- (b) Discuss different types of cables. 8
8. (a) What are different types of batteries ? Write a short note on battery and its charging. What is trickle charging ? 13
- (b) Distinguish between LT and HT. 2

Unit V

(Compulsory Question)

9. (a) If in a 3-phase load, $Z_A = 45\angle 45^\circ \Omega$, $Z_B = 45\angle -95^\circ \Omega$ and $Z_C = 45\angle 165^\circ \Omega$ (consider star connected load) is the load balanced or unbalanced. 2
- (b) State Norton theorem. 2
- (c) Distinguish between Average and RMS values. 3