

## FACULTY OF ENGINEERING

B.E. (ECE/M/P/AE/AI&DS/AI&ML/IoT/IT) I - Semester (AICTE) (Backlog) (New) Examination,  
September /October 2023

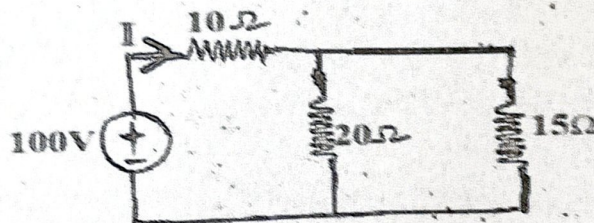
Subject: Basic Electrical Engineering

Time: 3 Hours

Max. Marks: 70

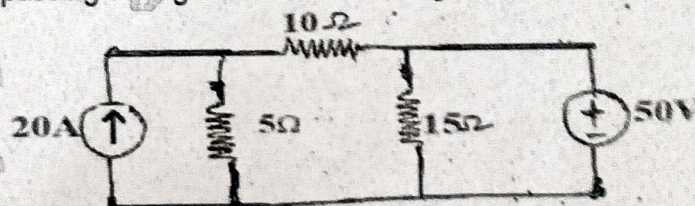
- Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each questions carries 14 Marks.  
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.  
(iii) Missing data, if any, may be suitably assumed.

1. a) Define (i) linear element & non-linear element  
(ii) active element & passive element  
b) Find 'I'.

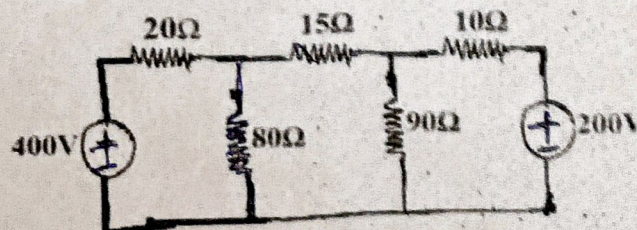


- c) A series circuit having the  $R = 10\Omega$  and  $X_L = 15\Omega$ . Determine the impedance & p.f. of the circuit.  
d) What are the conditions for Ideal transformer?  
e) A 6-pole, 3- $\phi$  Induction motor is connected to 50Hz supply. If it is running at 970rpm, find the slip.  
f) Define dynamically induced emf & statically induced emf.  
g) What are the parts of MCB?

2. a) Find the current passing through  $10\Omega$  resistor using Thevenin's Theorem.



- b) Find the current in  $15\Omega$  resistor using Nodal Analysis.





3. a) A circuit is composite of a resistance of  $6\Omega$  and a series capacitive reactance of  $80\Omega$ , a voltage  $v(t) = 240\sin 314t$  is applied to the circuit, Determine
- (i) Complex Impedance
  - (ii) Effective & instantaneous values of current
  - (iii) The value of capacitance in Farads
  - (iv) Average value & RMS value
- b) A balanced star connected load of  $(3+j4)\Omega$  per phase is connected to a balanced three phase 415V(line) supply. Determine (i) phase current (ii) power factor (iii) Power consumed.
4. a) A single-phase transformer has 350 primary and 1050 secondary turns. The primary is connected to 400 V, 50 Hz ac supply. If the net cross-sectional area of the core is  $50\text{ cm}^2$ , determine (i) transformation ratio (ii) the maximum value of the flux density in the core, (iii) the induced emf in the secondary winding.
- b) Explain principle of operation of 3- $\Phi$  induction motor with neat diagram.
5. a) Explain the construction, working & characteristics of capacitor start-run induction Motor.
- b) A 4 pole, 500V dc shunt motor has 720 wave connected conductors in the armature. The full load armature current is 60A and the flux per pole is 0.03wb. The armature resistance is  $0.2\Omega$ . Calculate the full load speed of the motor.
6. a) What are the causes for low p.f.? What are the disadvantages of low p.f. and explain how to improve the power factor using "static capacitor" method.
- b) Write short notes on battery backup with neat block diagram.
7. a) Derive the emf equation of dc generator.
- b) Write short notes on B-H curve (Hysteresis loop) with neat diagram.