

FACULTY OF ENGINEERING

B.E I Semester (AICTE) (Main & Backlog) Examination,

December 2019 / January 2020

Subject: Basic Electrical Engineering

Time: 3 Hours

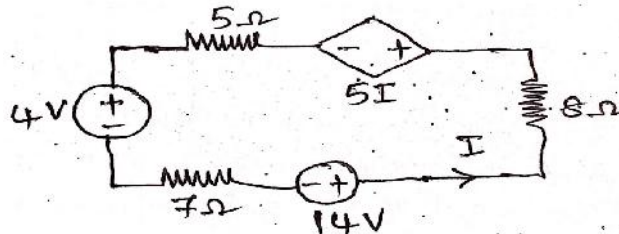
Max. Marks: 70

Note: Answer all questions from Part-A & any Five questions from Part-B

PART – A (20 Marks)

1 Give the V-I relationship for electrical circuit elements R, L and C. [2]

2 In the single loop circuit of figure. Find current I. [2]



3 Derive an expression for RMS value of an alternating current. [2]

4 Define active and reactive power. Write the expression for them. [2]

5 Draw the B-H characteristics for magnetic material and give the importance of it. [2]

6 A 3-phase, 50Hz induction motor has 4 poles. If the slip is 3% at a certain load. Determine speed of the rotor and frequency of the induced emf in the rotor. [2]

7 List out the essential parts in a DC machine. [2]

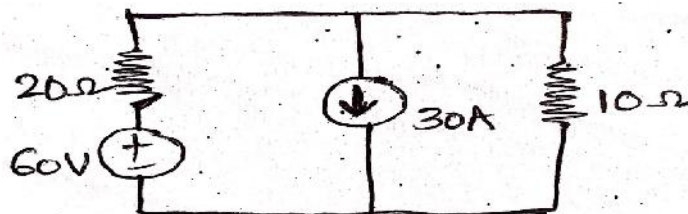
8 A 230V DC series motor is taking 50A. Resistances of armature and series field windings are 0.2Ω and 0.1Ω respectively. Calculate brush voltage and back emf. [2]

9 What are the disadvantages of low power factor? [2]

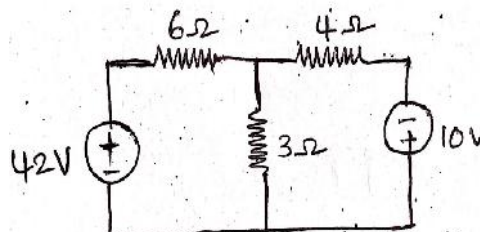
10 Write the specifications for wires used for domestic wiring. [2]

PART-B (50 Marks)

11. a) Find the current flowing through 10Ω resistance in the following circuit using Norton's theorem. [5]



b) Evaluate current flow in 3Ω resistance by using Thevenin's theorem in the circuit of figure. [5]



12. a) Show that the current lags voltage by 90° in a pure inductive circuit. Draw the necessary waveforms. [5]
b) A balanced 3- star connected load has an impedance of $(5-j10)$ per phase and is supplied from a balanced 3- , 400V, 50Hz a.c supply. Calculate the line currents, phase currents, total power consumption and power factor. [5]
- 13 a) Explain construction details and principle of operation of 3- induction motor. [5]
b) In a 25kVA, 2000/200V transformer, the iron and copper losses are 350W and 400W respectively. Calculate the efficiency on unity power factor at
(i) full load
(ii) half full load and determine the load for maximum efficiency. [5]
- 14 a) A 4 pole DC shunt generator with lap connected armature having field and armature resistances of 50 and 0.1 respectively supplies sixty 100V, 40W lamps. Calculate the total armature current, the current per armature path and generated emf. Allow a contact drop of 2V. [5]
b) Explain the principle of operation of capacitor startmotor. [5]
- 15 a) List the components of LT switchgear and explain briefly about each component. [5]
b) Explain improvement of power factor by using static capacitors. [5]
- 16 a) State and explain superposition theorem. [5]
b) Deduce the expression for power in a 3- balanced circuit. [5]
- 17 a) Write the causes and disadvantages of low power factor. [5]
b) Describe the different types of wires and cables used for domestic wiring. [5]
