22BIT0018

SLOT:B1+TB1

VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL ENGINEERING

CONTINUOUS ASSESSMENT TEST – II

WINTER SEMESTER 2022-2023 (Freshers)

Programme Name & Branch: BTech (Freshers), BIT **Course Code: BEEE102L**

Course Name: Basic Electrical and Electronics Engineering

Faculty Name(s): Dr. Rani. C, Dr. R.Gnanavignesh, Dr. Mukul Chankaya

Emp.ID(s): 10304, 18893, 19722

Class Number(s): VL2022230500371, 0420, 0390

Exam Duration: 90 minutes **Maximum Marks: 50**

General instruction(s):

Q.No	Question	Marks
1.	Consider a three-phase Star-Star connection of generation and load is given. The phase voltage of phase 'a' of the generator is given as, $V_{an} = 120\angle 10^{\circ}$. The star-connected balanced load is (8+4j)Ω per phase. Calculate the phase and line voltages, and phase and line currents on both the generator and load sides. Assume the phase sequence as 'abc'.	10
2.	Implement the Full adder with minimum numbers of logic gates a) using NAND Gate b) using NOR Gate.	10
3.	a) Expand A+BC'+ABD' to min terms and max terms (5 marks) b) Define Multiplexer, draw the truth table and circuit for 4:1 multiplexer. Make the circuit for a 16:1 multiplexer using a 4:1 multiplexer. (5 marks)	10
4.	a) Calculate the magnetomotive force (MMF), required to produce a flux of 0.015 Wb across an air gap 2.5 mm long, having an area of 200 cm^2 in a toroidal inductor. (6 marks) b) Find the equivalent inductive reactance of the circuit given in fig. 1. (4 marks)	1

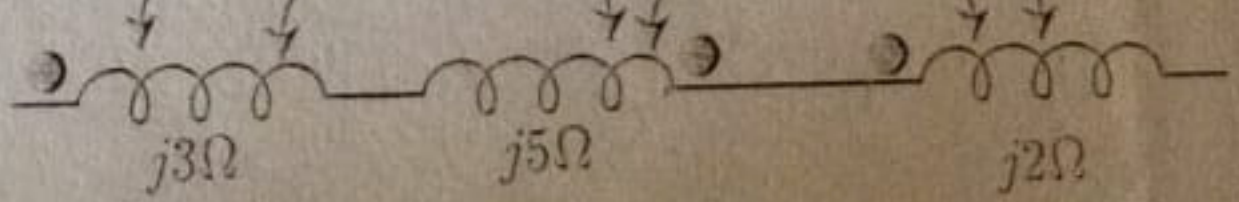

Fig. 1

5. a) Fig. 2 shows the toroidal coil having a cross-sectional area of 50 cm^2 and a mean length of 2 m. The relative permeability of the core is 100. The coil has 250 turns, and the flux produced is 100 μ Wb. Find the reluctance of the magnetic circuit and current flowing through the coil. (6 Marks)

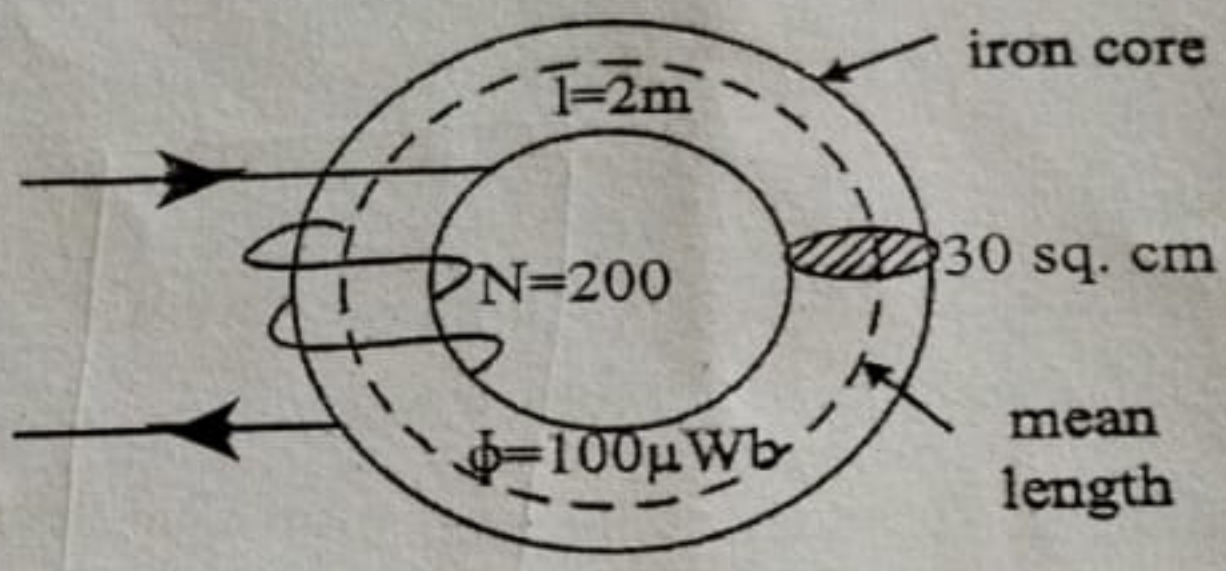

Fig.2

b) Two electromagnetic coils having self-inductance of L_1 = 70 mH and L_2 = 80 mH are placed in such a way that 75% of the first coil is placed upon the second coil. Find the total mutual inductance of these coils. (4 marks)