SLOT: D2+TD2

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)

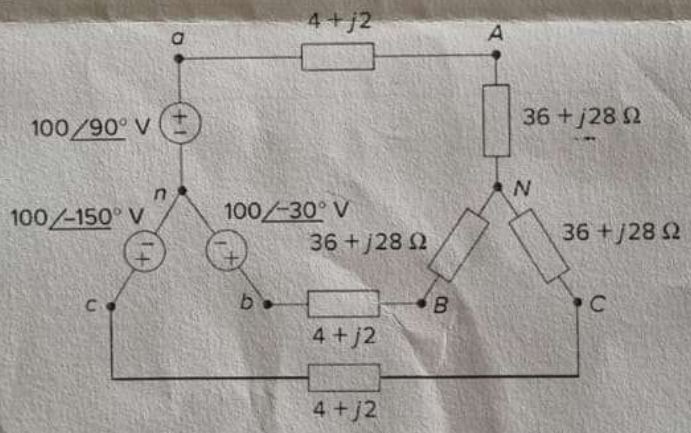
Programme Name & Branch: B.Tech. & FFCS **Course Code:** BEEE 102L

Course Name: Basic Electrical and Electronics Engineering

Faculty Name(s): Dr. Himadri Lala, Dr. Vijaya Priya P, Dr. Raju J, Dr. Subramanian K, Dr. Albert Alexander S, Dr. Chilukurivenkata Mahendra, Dr. Raghuram M, Dr. Thamilmaran A, Dr. Satyajit Das, Dr.Sonam Shrivastava, Dr. Anusuya Bhatacharyya, Dr. Thiruvenkadam S, Dr. Brisilla R M, Dr. Vanishree J

Date: 10.05.2023 **Exam Duration: 90 minutes** **Maximum Marks: 50**

Answer all the questions

Q. No	Questions (5X10 = 50 marks)	Marks
Q1	Find the real power absorbed by the load for the three-phase circuit shown in Fig.1.	[10]
	 Fig.1	
Q2	a) Convert $(384.74)_{10}$ to its equivalent in base 8 and 16. (5 marks)	[10]
	b) Find the minimized expression for implementing the given SOP using Boolean algebra. $F(A, B, C, D) = \Sigma m\,(3, 7, 11, 12, 13, 14, 15)$ (5 marks)	
Q3	Convert the following Boolean expression into standard sum-of-products (SOP) form. $F = A\bar{B}C + \bar{A}\,\bar{B} + AB\bar{C}\bar{D}$ Using K-map, implement the function with maximum 3 input universal gates.	[10]

Q4	a) Two coils are mutually coupled with $L_1 = 50$ mH, $L_2 = 120$ mH and k = 0.5. Calculate the maximum possible equivalent inductance if: (i) the two coils are connected in series and (ii) the coils are connected in parallel. (5 marks)	[10]
	b) A step-down power transformer with a turns ratio of n = 0.1 supplies 12.6 V_{rms} to a resistive load. If the primary current is 2.5 A_{rms}, how much power will be delivered to the load? (5 marks)	
Q5	A section through a magnetic circuit of uniform cross-sectional area 2 cm^2 is shown in Fig.2. The cast steel core has a mean length of 25 cm. The air gap is 1 mm wide and the coil has 5000 turns. Determine the current in the coil to produce a flux density of 0.80 T and H = 750 AT/m in the air gap, assuming that all the flux passes through both parts of the magnetic circuit.	[10]

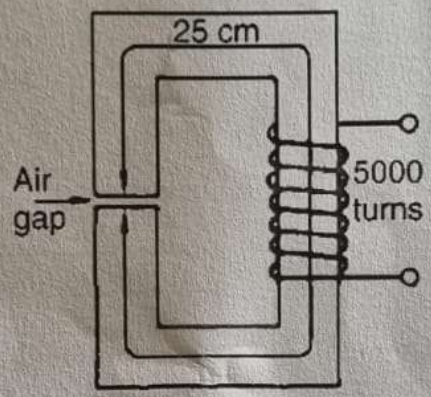


Fig.2