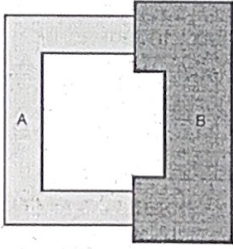




Continuous Assessment Test (CAT) – II - APRIL 2024

Programme	:	BAI, BCE, BCL, BDS, BEC, BEE, BLC, BME, BMH, BMV, BPS, BRS, MTI	Semester	:	Weekend Intra 2023- 24
Course Code & Course Title	:	BEEE102L/IEEE102L-Basic Electrical and Electronics Engineering	Class Number	:	CH2023240503677 CH2023240503746
Faculty	:	Dr. Aravind C K	Slot	:	Y11+Y12+Y21
Duration	:	90 minutes	Max. Mark	:	50

Answer all questions

Q. No	Sub Sec.	Description	Marks
1	(i)	Draw a logic circuit, incorporating any gates of your choice, which will produce an output 1 when its two inputs are different. Also, draw the same logic circuit incorporating only NAND gates.	6
	(ii)	Convert the following 1. $(352)_8$ - Octal number to a decimal equivalent number 2. $(101011)_2$ - Binary number to octal number	4
2		A toroid has a mean radius of 42 mm, an effective cross-sectional area of 3.2 cm^2 , and a relative permeability of 140 is wound with a 920-turn coil that carries a current of 2 A. Calculate, (a) the MMF, (b) the magnetic field strength and (c) the flux and flux density.	10
3		A magnetic circuit consists of two alloy sections A and B as shown in Fig.1. The mean length and cross-sectional area for A section are 25 cm and 11.5 cm^2 , whilst the corresponding values for B are 15 cm and 12 cm^2 respectively. A 1000-turn coil wound on section A produces a circuit flux of 1.5 mWb. Calculate the current in the coil. 	10
4		Use a Karnaugh map to find the minimum SOP expression of the function: $A + B\bar{C} + AB\bar{D} + ABCD$ and implement the real minimal expression in NOR logic	10
5		Two inductors, A and B, are placed nearby within a circuit. Coil A has 13000 turns and coil B has 10000 turns. When a current of 5 amperes flows through coil A, it generates a magnetic flux (ϕ_A) of 0.045 milli Weber (mWb) while the same current in coil B produces a magnetic flux (ϕ_B) of 0.08 milli Weber (mWb). It is also observed that 45% of the flux produced in coil A is linked with coil B. (a) Determine the self-inductance of coil A and coil B. (b) Calculate the mutual inductance (M) between coils A and B. (c) Determine the coupling coefficient (k) between the coils. (d) Briefly discuss how the core material and distance between the coils affect the magnetic coupling between the coils.	10

*****All the best *****