Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2024

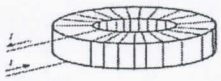
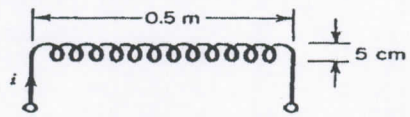
Electronics and Communication Engineering
Second Semester
EE5201 & Basics of Electrical and Measurement Engineering
(Regulation 2019)

Time:3 hrs | Max. Marks: 100

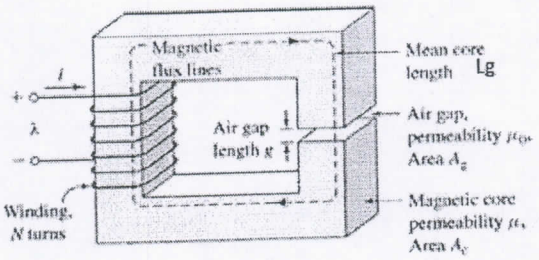
CO1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world.
CO2	Describe magnetic circuits, principles of operation of transformers, DC machines.
CO3	Explain the working of AC machines and special electrical machines.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

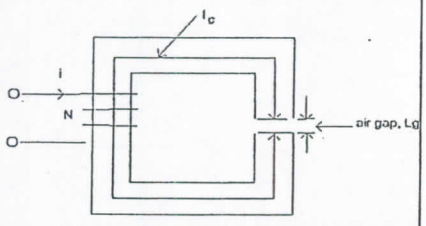
PART- A (10x2=20Marks)
(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	The coil has 200 turns and is wound on a silicon sheet steel (B=1.225T).The inner and outer radii are 25 and 35 cm respectively and toroidal core has a circular cross section. For a coil current of 3A, find H at mean radius (R) of toroid and inductance of coil by assuming uniform density within the core and equal to mean radius 	2	1	3
2	Explain about B-H relationship with a neat magnetization curve	2	1	2
3	Derive the EMF equation of the transformer.	2	2	2
4	The Long solenoid coil shown in Fig.2 has 250 turns. As its length is much greater than its diameter, the field inside the coil may be considered uniform. Neglect the field outside. **a)** Determine the field intensity (H) and flux density (B) inside the solenoid (i=100A). **b)** Determine the inductance of the solenoid coil 	2	2	3
5	1. A 2200/200V transformer takes a no load current of 0.6A and absorbs 400W. Find **a)** The magnetizing current **b)** Iron loss current.	2	2	3
6	Derive the EMF equation of the DC Generator	2	2	2
7	Derive the Torque equation of the DC Motor.	2	2	2
8	A short-shunt compound generator delivers a load current of 30 A at 220 V, and has armature, series-field and shunt-field resistances of 0.05Ω, 0.30Ω and 200Ω respectively. Calculate the induced e.m.f. and the armature current. Allow 1.0 V per brush for contact drop.	2	2	3
9	i) What is the all day efficiency of the transformer? Explain with formula. ii) Define Lap and Wave winding of the armature	2	2	1
10	List out the applications of a) DC series motor b) Dc shunt motor c) Cumulative and differential compound motor.	2	2	1

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	i) Distinguish between Electrical circuit and Magnetic circuit ii)The magnetic circuit of Fig.4 has dimensions : Ac=4x4 cm^2, L_g =0.06cm, L_c=40 cm, N=600 turns. Assume the value of μ_r=6000 for iron. Find the exciting current for B_c=1.2T and the corresponding flux and flux linkages  	15	2	6

PART- B (5x 13=65Marks)

Q. No.	Questions	Marks	CO	BL
11 (a)	Define hysteresis loop with a neat diagram and explain about hysteresis and eddy current losses with derivation.	13	1	2
	OR			
11 (b)	For the magnetic circuit of figure N=400 turns, has a mean core length (L_g) 50c and air gap length 1mm with cross sectional areas $A_c=A_g=15cm^2$.Find the a)flux inair gap(μ_r=4000, Input current =2A) 	13	1	2
12 (a)	Explain & derive the equations for magnetic circuit with air gap	13	2	2
	OR			
12 (b)	With a neat diagram, explain and derive the equations for the magnetic equivalent circuit.	13	2	2
13 (a)	An ideal 25KVA transformer has 500 turns on the primary and 40 turns on thesecondary. Primary is connected to 3000V, 50 Hz supply. Calculate i) Primary and secondary currents on full load ii) Secondary Emf E_2 and iii) Maximum core flux.	13	3	3
	OR			
13 (b)	A Single Phase 3200/250V, 60 Hz transformer has a net core area of $35cm^2$ and maximum flux density of 8 wb/m^2. Calculate the number of turns in the primary and secondary.	13	3	3
14 (a)	Explain briefly about the cases of practical transformer on NO load and ON load with respect to the core loss, resistances and reactance's and draw the necessary phasor diagrams for each cases.	13	2	3
	OR			
14 (b)	1. i) A 40 KVA transformer has a iron loss of 450 W and full load copper loss of 850 W. if the power factor of the load is 0.8 lagging. Calculate a) full load efficiency b) load in KVA at which the maximum efficiency occurs c) the maximum efficiency. ii) Draw and explain about the construction and working principle of the three-phase induction motor.	13	2	3
15 (a)	Draw & Explain about the characteristics of DC generators with neat equivalent circuit a) Open circuit characteristics b) internal and external.	13	3	3
	OR			
15 (b)	An 8-pole DC shunt generator with 775 wave-connected armature conductors and running at 450 r.p.m. supplies a load of 12.5 Ω resistances at terminal voltage of 50 V. The armature resistance is 0.24 Ω and the field resistance is 250 Ω. Find the armature current, the induced e.m.f. and the flux per pole.	13	3	3