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B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019

Third Semester

EE16303 – ELECTRICAL MACHINES - I*(Electrical and Electronics Engineering)***(Regulation 2016)****Time: Three Hours****Maximum : 100 Marks**

Answer ALL questions

PART A - (10 X 2 = 20 Marks)

	CO	RBT
1. Define magnetic reluctance.	1	R
2. What is flux fringing effect?	1	U
3. Why transformer rated in KVA?	2	U
4. Full load copper loss in a transformer is 1600 W, What will be the loss at half load?	2	AN
5. Distinguish statically induced emf and dynamically induced emf.	3	U
6. What are the three basic principles of electro-mechanical energy conversion?	3	R
7. Define the term pole pitch and coil pitch.	4	U
8. What is the purpose of yoke in DC machine ?	4	U
9. State Fleming's left hand rule.	5	R
10. Why DC series motor is called as a variable speed motor ?	5	U

PART B - (5 X16 = 80 Marks)

11. (a) The magnetic circuit of figure 11 a) has dimension $A_c = 4 \times 4 \text{ cm}^2$, (16) 1 AN
 $l_g = 0.06 \text{ cm}$, $l_c = 40 \text{ cm}$; $N = 600$ turns, Assume the value of $\mu_r = 6000$
 for iron. Find the exciting current for $B_c = 1.2 \text{ T}$ and the corresponding
 flux and flux linkages.

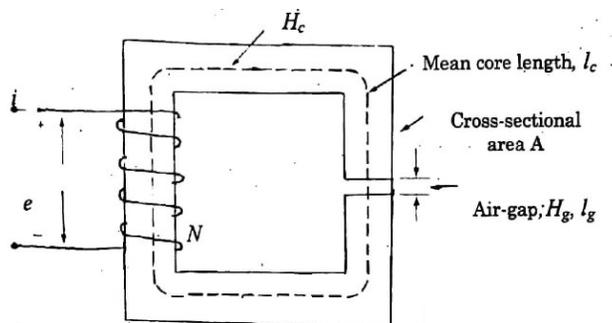


Figure 11 (a). Magnetic circuit

(OR)

(b) Explain clearly about statically and dynamically induced emf. (16) 1 U

12. (a) Draw and explain the phasor diagram of transformer when it is operating under load. (16) 2 AN

(OR)

(b) The following data were obtained on a 20 KVA, 50 HZ, 2000/200 V distribution transformer: (16) 2 AN

	Voltage (V)	Current (A)	Power (W)
OC test with HV open - circuited	200	4	120
SC test with LV short - circuited	60	10	300

Determine the equivalent circuit parameters and draw the approximate equivalent circuit of the transformer referred to the HV and LV sides respectively.

13. (a) Obtain an expression for the mechanical force of field origin in a typical attracted armature relay. (16) 3 AN

(OR)

(b) Derive an expression for emf generated in synchronous machine. (16) 3 AN

14. (a) Explain in detail about armature reaction and commutation in a DC Machine. (16) 4 U

(OR)

(b) (i) A Separately excited generator when running at 1000 rpm supplied 200 A at 125 V. What will be the load current when the speed drop to 800 rpm if I_f is unchanged? Given that armature resistance = 0.04 ohm and brush drop = 2 V. Derive the necessary equations. (8) 4 AN

(ii) Explain OCC and load characteristics of DC compound generator in detail. (8) 4 U

15. (a) (i) Why starters are necessary? Explain the construction and working operation of 4 point starter. (10) 5 U

(ii) Derive the condition for maximum efficiency of DC machine. (6) 5 AN

(OR)

(b) Explain the different methods of speed control of a dc shunt motor with neat circuit diagrams. (16) 5 U