Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 152404 **Date: 20-05-2013**

Subject Name: Electro Mechanical Energy Conversion-II

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Write merits and demerits of a three phase transformer over a single phase transformer. **07**

(b) Write a short note on shaded pole induction motor. **07**

Q.2 **(a)** List and discuss advantages of Permanent Magnet brushless DC machine over conventional DC machine. **07**

(b) Explain working of capacitor start capacitor run single phase induction motor. **07**

OR

(b) List and explain conditions for parallel operation of a 3-phase transformer. **07**

Q.3 **(a)** Discuss effect of change of excitation on constant load of a synchronous motor. **07**

(b) Derive the equation of power developed by a synchronous motor. **07**

OR

Q.3 **(a)** Explain effects of excitation on armature current and power factor of a synchronous motor. **07**

(b) Write a short note on construction of V-curves. **07**

Q.4 **(a)** Explain operation of an induction motor on non sinusoidal voltage. **07**

(b) The magnetic circuit shown in Fig.-1 has dimensions $A_c = A_g = 9$ cm^2, $g = 0.050$ cm, $l_c = 30$ cm, and $N = 500$ turns. Assume the value $\mu_r = 70{,}000$ for core material. (a) Find the reluctances R_c and R_g. For the condition that the magnetic circuit is operating with $B_c = 1.0$ T, find (b) the flux ὲ and (c) the current i. **07**

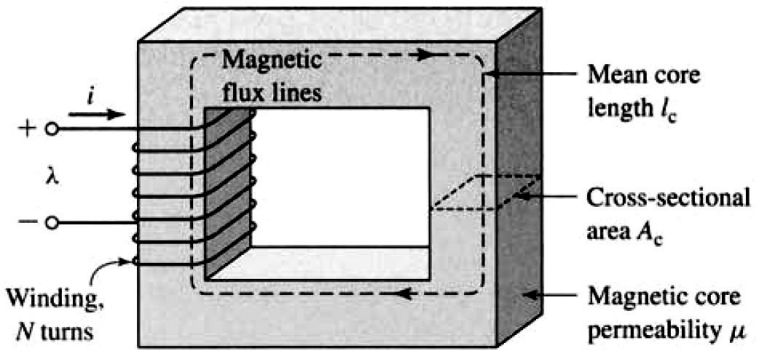

Fig-1

OR

Q.4 (a) Write a short note on: **07**

i. No load test

ii. Blocked rotor test

Q.4 (b) Find the minimum magnet volume required to achieve an air-gap flux density of 0.8 T in magnetic circuit shown in Fig-2. Take B_m=1 T and H_m= - 40 kA/m. **07**

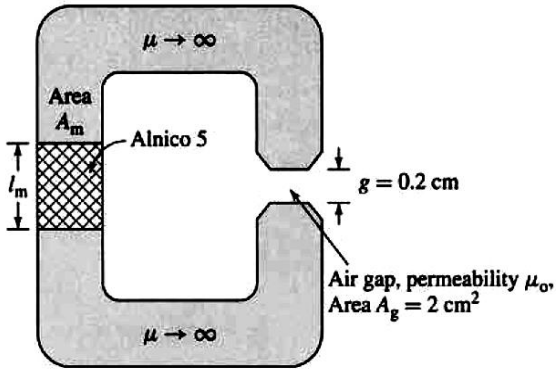

Fig.-2

Q.5 (a) Why single phase induction motor is not self-starting? Explain with the help of double-field revolving theory in brief. **07**

(b) Draw construction and explain working of Switched Reluctance Motor (SRM). **07**

OR

Q.5 (a) Write a short note on stepper motor. **07**

(b) Draw construction and explain working of Linear Induction Machine. **07**

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