Printed Pages: 4 **EEE-401**

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID : 121405	**Roll No.**

B. TECH.

Theory Examination (Semester-IV) 2015-16

ELECTROMECHANICAL ENERGY CONVERSION-I

Time : 3 Hours ***Max. Marks : 100***

Section-A

1. Attempt all parts. All parts carry equal marks. Write answer on each part in short. (2×10=20)

   (a) What are the basic role of "Dummy Coils" in D.C. machines ?

   (b) Explain the introduction of "electro-mechanical energy conversion principles."

   (c) Explain the interpole and compesating winding of D.C. Machines.

   (d) Explain the commutation process in D.C. machines.

   (e) Enlist any five applications of D.C. Machines.

   (f) Enlist any five applications of 3 phase transformers.

   (g) What are the basic difference between auto-transformers and 2-wdg transformers ?

(h) Define "Phasor group of 3 phase transformers."

(i) Define open crcuit and short crcuit test of 1 phase transformers.

(j) Explain the all day efficiency of transformers.

Section-B

2. Attempt any 5 questions froms this section. (10×5=50)

(a) Discuss the armature reaction of D.C. machines. What are the advantages and dis advantages of armature reaction in D.C. machines ? Explain in detail.

(b) Write a short notes on the following :

(i) Open delta connection of 3 phase transformers.

(ii) Excitation phenomenon in 3 phase transformers.

(c) Discuss the harmonics in 3 phase transformers. What are the merits and demerits of harmonics in 3 phase transformers.

(d) Discuss the constructional details and working principle of three winding transformers. What are the limitations and significances of ths transformers.

(e) Write a short notes on the parallel operations of 3 phase transformers.

(f) Discuss the ward Lenonard method for speed control D.C. machines working as motoring node.

(g) What do you mean by effeciency and voltage regulation of 1 phase transformers ? Also mention the applications and limitations of 1 phase transformers.

(h) Write a short notes on the following :

(i) 3 phase to 2 phase connection of transforms.

(ii) 3 phase to 6 phase connection of transforms.

Section-C

Attempt any 2 questions from this section. (15×2=30)

3. Consider the equivalent circuit diagram of D.C. machine as shown in Fig-1.

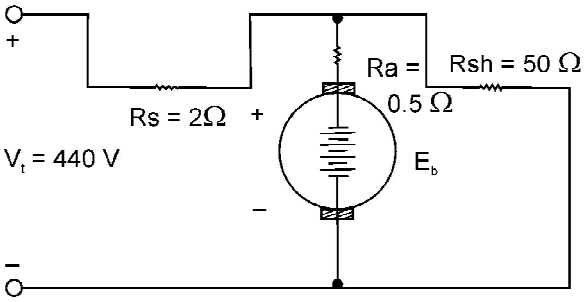

Fig. 1

Given data : - Brush drop = 2V / per brush

Interpole winding drop = 0.5V

Compensating winding drop = 0.25V

(i) What should be the speed of D.C. machine working as motoring mode ?

(ii) What should be the speed of D.C. machine working as gererating mode ?

4. Consider the equivalent circuit diagram of 1 phase transformes as shown in Fig 2.

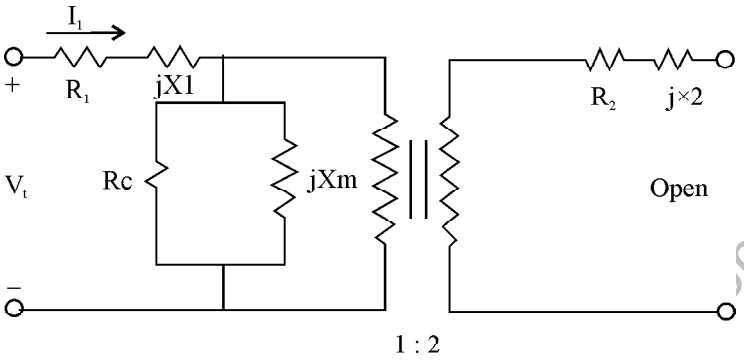

Fig. 2

Given data :

R_1 = 0.50 Ω
R_2 = 0.25 Ω
X_1 = 0.65 Ω
X_2 = 0.55 Ω
Xm = 44 Ω
Rc = 440 Ω
$V_t = \frac{440}{\sqrt{2}}$ Sin (314t–45°) Volts

(i) Determine the ('I_1') primary current

(ii) Determine the ('$\cos\theta_1$') primary power factor.

5. (a) Discuss the following test for D.C. machines :

(i) Hopkinson's and Swin burn's test

(ii) D. C. resistance test.

(b) Discuss the following test on 1 phase transformers :

(i) Sumpner's test (ii) Polarity test