Printed pages: 2 **Sub Code: EEE401**
Paper Id: 120404 **Roll No.** | | | | | | | | | | |

B.TECH
(SEM IV THEORY EXAMINATION 2017-18
ELECTRO-MECHANICAL ENERGY CONVERSION-I

Time: 3 Hours **Total Marks: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. **2 x10 = 20**

a) Explain the concept of co energy.
b) Write a short note on doubly excited system
c) Give advantages and disadvantages of resistance commutation
d) Which part of dc machine is laminated and why?
e) What is the significance of back EMF in dc motor?
f) Draw a power flow diagram of dc generator.
g) What happened if transformer is supplied by dc supply?
h) What do you mean by all day efficiency of a transformer?
i) What do you mean by open delta connection in three-phase transformer?
j) Write a short note on T-T connection.

SECTION B

2. Attempt any three of the following: **10 x 3 = 30**

a) Explain energy and coenergy and derive the relation between magnetic field energy and co energy in a singly excited system.
b) Explain the concept of armature reaction in dc generator. How can it be minimized?
c) What is the need of starter in dc motor? Explain four point starter with suitable diagram and compare it with three point starter.
d) Derive the condition of maximum efficiency of single phase transformer and relation for KVA loading at maximum efficiency.
e) Describe in brief parallel operation of three phase transformer.

SECTION C

3. Attempt any one part of the following: **10 x 1 = 10**

(a) Explain the principle of energy conversion also draw general block diagram representation of an electromechanical energy conversion device.
(b) Derive the torque developed in a doubly excited system having salient pole type rotor and stator.

4. Attempt any one part of the following: **10 x 1 = 10**

(a) Draw the external load characteristic of various dc generator and explain the voltage build up process in dc shunt generator.
(b) Explain process of commutation in dc machines and describe the cause of sparking at the commutator surface.

5. Attempt any one part of the following: **10 x 1 = 10**

(a) What are the methods of speed control of dc motor? Explain Ward Leonard method and rehostatic control method for the speed control of dc motor.
(b) Explain different losses in dc machine and also describe the Swinburne's test performs on dc machine in detail.

6. Attempt any one part of the following: 10 x 1 = 10

(a) Explain back-to-back test perform on single phase transformer in detail.

(b) Explain the construction and working of an autotransformer, give its advantages, limitations and applications.

7. Attempt any one part of the following: 10 x 1 = 10

(a) Explain with the help of phasor diagram how 2-phase supply can be obtained from 3-phase supply using Scott connection**.**

(b) Explain Principle of working of three-phase transformer and its application. What is the difference between three single-phase transformer bank and three-phase transformer?