Printed Pages : 2 **Roll No.** | | | | | | | | | | | **EEC604**

B.TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

INTRODUCTION TO ELECTRIC DRIVES

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

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) What are the necessary conditions for turning-on of an SCR?

(b) Are the turn-on and turn-off times of a thyristor constant? On what factors do these depend?

(c) Discuss why the method of power flow control is called phase controlled converter method when power flow from a 1-phase source to load *R* can be controlled through the use of a thyristor.

(d) What are the advantages of single phase bridge converter over single phase mid-point converter?

(e) What is meant by TRC?

(f) Why diodes should be connected in anti parallel with the thyristors in inverter circuits?

(g) Write few advantages of using cyclo converter for synchronous motor speed control.

(h) What are the main disadvantages of armature resistance control?

(i) Define dynamic breaking.

(j) Write methods of starting of synchronous motor.

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) Explain turn off characteristics of thyristors. List out the name of Thyristor triggering methods.

(b) Explain the V-I characteristics of Thyristor. Also explain Latching current and Holding Current.

(c) Justify the statement "free wheeling diode improves the power factor of the system."

(d) Derive the expressions of a 1-Ø full wave bridge rectifier fully controlled for *R-L-E* load for: (i) Continous load current (ii) Discontinous load current. Also draw suitable waveforms.

(e) Explian the operation of 3-Ø half wave controlled full wave rectifier with desired waveforms.

(f) What is chopper? Explain the working and control strategies of chopper with suitable waveforms.

(g) Enumerate the various methods of speed control of 3-Ø induction motor when fed through semiconductor devices.

(h) Describe the slip recovery control scheme.

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3 Explain the working of 120^0 mode of 3-Ø inverter with relevant waveforms of phase and line voltages and compare it with 180^0 mode inverter.

4 Define the priciple of operation of cycloconverter. Explain the working of 1-Ø:

(i) Step down,

(ii) Step up cycloconverter.

5 An armature of a seperately excited dc motor is fed from 1-Ø full wave fully controlled converter. The supply ac voltage V = 220Volts, R_a=*0.5Ω* and motor constant is K = *0.4 V-s/rad.* For load torque of 20 Nm at 1500 rpm and for constant armature current, calculate;

(i) Firing angle of the converter,

(ii) Rms value of thyristor current,

(iii) Input power factor of the motor.