Paper Code: EEC-604	Roll No.									

B.Tech.

SIXTH SEMESTER *Back Paper* EXAMINATION 2015-16

INTRODUCTION TO ELECTRIC DRIVES

[Time: 2 Hrs.] **[Max. Marks: 50]**

Note- Attempt All Questions. All Questions carry equal marks.

Q.1 Attempt any *four* parts of the following:- (2.5x4=10)

(a) Draw the turn-off characteristic of an SCR and explain it.

(b)Explain the working of an oscillator employing an UJT. Derive an expression for the frequency of triggering.

(c) Draw and explain the equivalent circuit and V-I characteristic of the UJT in detail.

(d) Justify the statement "Freewheeling diode improves the power factor of the system".

(e) Describe the working of single-phase fully controlled bridge converter in the rectifying mode.

(f) Draw and explain the simple SCR series inverter circuit employing class- A type commutation.

Q.2 Attempt any *two* parts of the following:- (5x2=10)

(a) With the circuit diagram and output voltage waveforms, explain the working of Jones chopper.

(b) A chopper is operating on TRC principle at a frequency of 2 KHz on a 220 V d.c. supply. If the load voltage is 170V, compute the conduction and blocking period of thyristor in each cycle.

(c) Describe the basic principle of working of a single-phase to single-phase cycloconverter for continuous conduction for bridge type cyclo-converter.

Q.3 Attempt any *two* parts of the following- (5x2=10)

(a) Explain briefly the following methods of braking of a d.c. motor (i) Regenerative braking (ii) Dynamic braking.

(b) Draw and explain the operation of a speed control of a d.c. series motor by a single-phase semi-converter. Draw also the associated voltage and current waveforms.

(c) With the help of waveform, explain how improvement in power factor can be achieved by an asymmetrical triggering.

Q.4 Attempt any *two* parts of the following:- (5x2=10)

(a) Discuss the stator voltage control scheme of induction motor. Also, draw and explain speed-torque curves.

(b) Explain the following terms with respect to synchronous motor (i) Pull-out torque (ii) E-curves.

(c) An inverter supplies a 4-pole, 3-phase cage induction motor rated at 220 V,50 Hz. Determine the output required of the inverter for motor speeds of (i) 900 rpm (ii) 1500 rpm.

Q.5 Attempt any *two* parts of the following:- (5x2=10)

(a) Explain the induction motor operation when the V/f ratio is held constant. Also, derive the expression for the maximum torque.

(b) State and discuss any one method of speed control of induction motor.

(c) A 80 kW, 440 V, 800 rpm d.c. motor is operating at 600 rpm and developing 75% rated torque is controlled by 3-phase, six pulse thyristors converter. If back emf at rated speed is 410 V, determine the triggering angle of the converter. The input to the converter is 3-phase, 415 V, 50 Hz a.c. Supply.