Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name : Motion Control

Subject Code : 4TE08MCN1 Branch: B.Tech (IC)

Semester : 8 Date : 15/04/2017 Time : 02:30 To 05:30 Marks : 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: **(14)**

a) Which of the following Amplifier used to drive dc motor consumes maximum power? 01
a) Linear bridge amplifier b) PWM amplifier
c) Both a) & b) d) None of the these

b) When a motor is using H-bridge amplifier which device can be used to measure the current across the motor. 01
a) V/I converter b) I/V converter c) Both a) & b) d) None of the above

c) The maximum power that a transistor can safely dissipate is given by _____. 01
a) P_{max}=Vcc×Ic b) P_{max}=Vce×Ic c) P_{max}=Vce×Ie d) P_{max}=Vcc×Ie

d) Which of the following Lorentz force equation is correct? 01
a) F=IBL b) F=MA c) F=Wd d) F=BAL

e) The d.c. series motor should always be started with load because 01
a) at no load, it will rotate at dangerously high speed b) it will fail to start
c) it will not develop high starting torque d) all are true.

f) Cross-Over distortion occurs in power amplifier under following condition. 01
a) if Vin<Vbe b) if Vbe<Vin
c) Both a) & b) are true d) None of the above

g) Which of the following is not a Mechanical matching device? 01
a) Gear train b) Timing Conveyor belt c) Lever d) Spring

h) What do you mean by Torsional resonance? 01

i) Give the differences between servomotor and stepper motor? 01

j) When do we need an amplifier to drive dc motor? 01

k) What is the difference between Linear power amplifier and PWM amplifier? 01

l)	Define holding torque.	01
m)	Define detent torque.	01
n)	Draw the torque vs speed curve of a stepper motor.	01

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

a)	Give the selection criterion for incremental motion applications.	05
b)	Explain cross over distortion in power amplifiers.	05
c)	Explain the analysis of the incremental motion control system with inertia as a mechanical load.	04

Q-3 **Attempt all questions** **(14)**

a)	Explain dc motor position control system with potentiometer as an error sensor with suitable diagram.	05
b)	Explain the velocity control system with the voltage amplifier.	05
c)	Differentiate absolute versus incremental encoder. Explain linear incremental encoder	04

Q-4 **Attempt all questions** **(14)**

a)	Explain different operating modes of a linear power amplifier.	05
b)	Which points are considered for power amplifier design? Explain it.	05
c)	Explain different operating modes of a DC motor.	04

Q-5 **Attempt all questions** **(14)**

a)	Enlist all the selection criteria for stepper motor? Explain them briefly.	05
b)	Explain the techniques for minimizing torsional resonance effect	05
c)	Explain briefly PWM amplifier.	04

Q-6 **Attempt all questions** **(14)**

a)	Explain the block diagram of Phase Lock Servo system (PLS). Give the difference between PLL & PLS.	07
b)	With suitable waveform and circuit diagram explain Unidirectional three phase logic sequencer for stepper motor.	07

Q-7 **Attempt all questions** **(14)**

a) Enlist different types of Stepper Motors and explain any one with suitable diagram. 07

b) Write short note on bidirectional servo amplifiers. 07

Q-8 **Attempt all questions** **(14)**

a) Explain different types of stepping in a stepper motor with suitable diagram. 07

b) Write short note on Optical encoder. 07