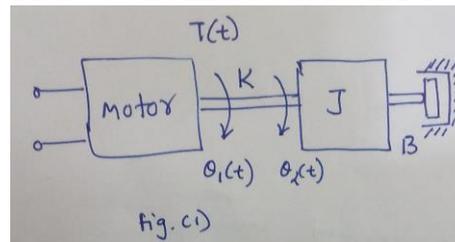


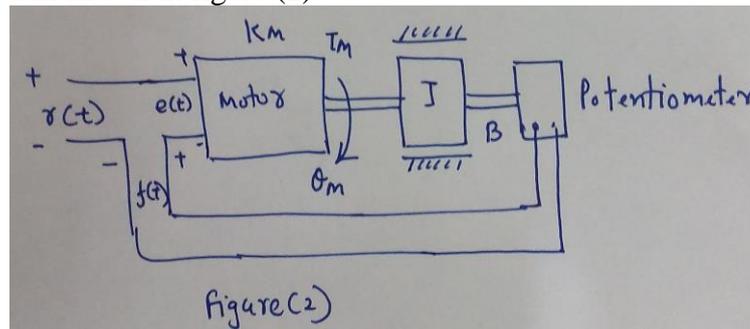
GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (old) - EXAMINATION – SUMMER 2017****Subject Code:181702****Date:29/04/2017****Subject Name: Motion Control****Time:10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Draw and describe block diagram of Incremental Motion system. Justify the need of position sensors. **07**
- (b) Obtain $\theta_2(t)$ for following Incremental feedback control system shown in figure (1) by considering $\theta_1=1$ for $t>0$ and initial condition zero. **07**



- Q.2** (a) Explain the working of potentiometer as error detector in position servo system with logical justification. **07**
- (b) Obtain Transfer function $r(t)$ to $\theta_m(t)$ for following Incremental feedback control system shown in figure (2). **07**

**OR**

- (b) Discuss the reasons which make DC Motor as popular Incremental Motion control actuator? Compare its operation with step motor. **07**
- Q.3** (a) Obtain transfer function $\Omega_1(s)/T_g(s)$ of three body structure. Draw pole-zero representation of three body structure. **07**
- (b) Draw and describe the function of bipolar PWM Amplifier. **07**

OR

- Q.3** (a) Explain Torsional Resonance? How it will be eliminated from Motion control system? Describe it with proper explanation. **07**
- (b) Describe the working of Phase locked servo system with block diagram for continuous phase detection. **07**
- Q.4** (a) Explain any two electrical step motor in details **07**
- (i) Variable reluctance Step Motor (ii) Permanent magnet Step Motor (iii) Hybrid Step Motor.
- (b) How will the stability of Position control system without velocity feedback improved? Give engineering notes on it. **07**

OR

- Q.4** (a) List the types of step motor and explain its at least five performance characteristic. **07**
(b) Discuss the need of drive circuit for stem motor. Draw and describe Bidirectional 4 phase logic circuit. **07**
- Q.5** (a) Explain Power drive requirement in Step motor drive. Draw and describe bipolar driver circuit for 4 phase PM step Motor. **07**
(b) Make proper step motor selection by considering its all aspects in motion control application. **07**

OR

- Q.5** (a) How will encoder useful to make closed loop control system for Step motor? Describe it in details. **07**
(b) Explain the block diagram of step motor speed controller using time delay. **07**
