

Roll No. ....

**23293**

**M.Tech 3rd Semester (Electrical  
Engg.) (Specialization : Electrical  
Power Systems) (Elective-III)  
Examination-May, 2014**

**DIGITAL CONTROL SYSTEMS**

**Paper MTEPS-301(i)**

**Time : 3 hours**

**Max. Marks : 100**

---

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

---

**Note :** Attempt any five questions.

1. (a) Explain advantages and disadvantages of digital control system. 10  
(b) Derive Transfer function of Zero Order Hold. 10
2. (a) Derive properties of ROC. 10  
(b) Define and explain Z-transform with its properties. 10

3. A discrete time system is represented by 20

$$x(k+1) = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix} x(k) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} \mu k$$

$$y(k) = [1 \ 0] x(k)$$

Show that this system is completely state controllable and completely state observable.

4. (a) Explain steady state error analysis. 10

(b) Explain Transient response specifications. 10

5. Explain in detail  $\mu$ p(microprocessor) control of control systems with example. 20

6. (a) Explain Jury's stability analysis for discrete data. 10

(b) Explain Routh Horwitz method for discrete data. 10

**7. Find inverse Z-transform of** **20**

$$F(z) = \frac{z(z+1)}{(z-1)(z^2-z+1)} \text{ using}$$

- (a) inversion formula
- (b) Partial Fraction method

**8. Write short notes on :**

- (a) State observer 10
  - (b) Concept of state space method 10
-