

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER– II(Old course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 1720301**Date: 09/12/2015****Subject Name: Digital Control****Time: 2:30 pm to 5:00 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) Discuss about 2-DOF PID controller with $T_c(1)=S_c(1)$. **07**
 (b) Design a 2-DOF pole placement controller for the plant with transfer function **07**

$$G(Z) = Z^{-1} \frac{1-3Z^{-1}}{(1-2Z^{-1})(1+4Z^{-1})}$$
; such that the following transient requirements are met. (a) Rise time should be less than or equal to ten samples . (b) overshoot should be less than or equal to 10%.
- Q.2** (a) Discuss about Internal Model Principle for Robustness. **07**
 (b) Discuss about importance of redefining good and bad polynomials in pole placement controller design with necessary example. **07**
- OR**
- (b) Give comparisons of 1-DOF and 2-DOF controllers. **07**
- Q.3** (a) Discuss about Anti Windup controller design. **07**
 (b) Discuss about PID tuning through pole placement control **07**
- OR**
- Q.3** (a) Draw the schematic of smith predictor and discuss in detail. **07**
 (b) Discuss about PID tuning through Internal Model Control. **07**
- Q.4** (a) Discuss about interpretation of the prediction error model. **07**
 (b) Discuss about minimum variance controller for ARIMAX systems. **07**
- OR**
- Q.4** (a) Discuss about PID tuning through GMVC. **07**
 (b) Discuss about GPC for ARIX model. **07**
- Q.5** (a) Discuss about separation principle in Regulator design with state space approach. **07**
 (b) Discuss about Linear quadratic Regulator in brief. **07**
- OR**
- Q.5** (a) Discuss about Kalman filter in brief. **07**
 (b) Discuss about discretization techniques for PID controller. **07**
