

Total No. of Questions : 8]

SEAT No. :

**P5345**

[Total No. of Pages : 2

**[5562]-201**

**M.E. (Electrical) (Control Systems)**

**OPTIMIZATION TECHNIQUES IN CONTROL SYSTEM**

**(2017 Course) (503101) (Semester-I)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Use of algorithmic tables slide rule, Mollier charts, and electronic pocket calculator and steam table is allowed.*
- 5) *Assume suitable data if necessary.*

**Q1) a)** State whether function is convex, concave or neither  $F(x) = x^4 + 6x^2 + 12x$ . **[4]**

b) Find the Maxima & Minima if any of the function  $F(x) = 4x^3 + 18x^2 + 27x - 1$  **[5]**

OR

**Q2)** Explain the method of obtaining extremum point of multivariable optimization with equality constraints. **[9]**

**Q3)** Use analytical method to investigate for extremum points. **[9]**

$$F(x) = X_1^3 + X_2^3 + X_3^3 + 2X_1^2 + 6X_2^2 + 9X_3^2$$

OR

**P.T.O.**

**Q4)** Write the steepest descent method of optimization of a problem. [9]

**Q5)** Explain the multistage Decision process in Dynamic Programming. [16]

OR

**Q6)** Explain method of conversion of non-serial system to serial system problem. [16]

**Q7) a)** Explain the Gomory's cutting plane method. [8]

b) Explain the integer nonlinear programming. [8]

OR

**Q8)** Explain Stochastic Linear Programming. [16]

