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Roll No.	Total No. of Pages : 02
Total No. of Questions:09	
B.Tech. (Aerospace Engineer CONTROL Subject Co Paper I	ring) (2012 Onwards) (Sem.–5) ENGINEERING ode : ASPE-304 D : [A2930]
Time:3 Hrs.	Max. Marks:60

## **INSTRUCTIONS TO CANDIDATES :**

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks 1. each.
- SECTION-B contains FIVE questions carrying FIVE marks each and students 2. has to attempt any FOUR questions.
- SECTION-C contains THREE questions carrying TEN marks each and students 3. has to attempt any TWO questions.

## **SECTION-A**

- 1. Write briefly :

  - Impensator
    (c) Concept of automatic control
    (d) PI controller
    (e) Phase margin
    (f) Closed loer

  - (g) Modern control theory
  - (h) Relative stability
  - (i) Mason's Gain formula
  - (j) Polar plot



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## **SECTION-B**

2. Applying Routh's criterion, find the range of K for stability for a system whose characteristic equation is given by

 $\lambda^4 + 20 \ K \lambda^3 + 5 \lambda^2 + 10 \ \lambda + 15 = 0$ 

- 3. How addition of poles and zeros affect the stability characteristics of a closed loop system?
- 4. Illustrate the first order system response to step, ramp and impulse input with the help of examples.
- 5. Discuss the physical devices used for system compensation.
- 6. Write short note on 'M & N Circles'.

## **SECTION-C**

- 7. Write short notes on following:
  - (a) Nyquist stability criterion
  - (b) PID controller
- 8. Determine whether the characteristic equation given below has stable or unstable roots. Comment on the location of the roots. (5,5)

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- (a)  $\lambda^3 + 20\lambda^2 + 9\lambda + 100 = 0$ (b)  $\lambda^4 + 6\lambda^3 + 21\lambda^2 + 36\lambda + 20 = 0$
- 9. What are transfer function models? Explain models for mechanical and electrical systems with the help of examples. (2,4,4)

(5,5)