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BAS-020

B.Tech. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

December, 2015

BAS-020 : BASIC CONTROL THEORY

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. (a) Explain the importance of Laplace transform in control theory. *4*

(b) Distinguish between open loop and closed loop system with the help of a sketch. *6*

2. Explain the following terms : *5×2=10*

(i) Steady state error

(ii) Stability margin

(iii) Classical control theory

(iv) Transport delay

(v) Transfer function

3. What is root locus method ? What is locus equation ? Explain the properties and rules for sketching root locus plot. *10*

4. (a) How do you illustrate phase margin and gain margin ? *4*

   (b) Discuss the dynamics of stable and unstable systems. *6*

5. Explain the following with respect to system design :

   (i) Signal conversion and processing *5*

   (ii) Electronic design aspects *5*

6. (a) How does addition of poles and zeroes affect the root locus plot ? *5*

   (b) Describe in brief the proportional integral control with the help of an example. *5*

7. Determine whether the characteristic equations given below have stable or unstable roots :

   (a) $2\lambda^3 + 6\lambda^2 + 12\lambda + 8 = 0$ *5*

   (b) $2\lambda^3 + 8\lambda^2 + 4\lambda + 12 = 0$ *5*

8. Write a descriptive note on 'The BODE Magnitude Plot'. *10*

9. (a) Explain the characteristics of a basic feedback loop. *5*

   (b) What is 'Nyquist stability criterion' ? *5*