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BAS-020

B.Tech. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

00088

June, 2016

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. Distinguish between the following :

(a) Open and Closed loop control systems *5*

(b) PI controller and PID controller *5*

2. Explain the modelling of DC motors and servo systems with the help of examples. *10*

3. Explain the role of the following with respect to signal conversion and processing during system design : *10*

(a) Servo Components

(b) Synchros

(c) Sensors

(d) Actuators

(e) Computers

4. Write short notes on the following :

(a) Routh's Criterion *5*

(b) Root Locus Method *5*

5. (a) Explain phase margin and gain margin with the help of an example. *5*

(b) Explain transient response to an input with the help of an example. *5*

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

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

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

7. Discuss briefly the dynamics of stable and unstable systems. Derive a transfer function for long period or phugoid dynamics. *5+5=10*

8. What is BODE magnitude plot ? What are stability margins on the BODE plot ? Explain with the help of examples. *10*

9. Write notes on the following :

   (a) Effect of poles and zeroes on root locus plot *5*

   (b) Importance of Fourier transforms in control theory *5*