

**B.Tech. AEROSPACE ENGINEERING
(BTAE)****Term-End Examination**

00234

June, 2017

BAS-020 : BASIC CONTROL THEORY*Time : 3 hours**Maximum Marks : 70*

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

1. (a) Distinguish between the following : $3 \times 4 = 12$
 - (i) Open loop and Closed loop feedback control systems
 - (ii) Poles and Zeroes
 - (iii) Stable and Unstable systems
- (b) Explain the importance of Laplace Transforms in control theory. 2
2. Determine whether the characteristic equations given below have stable or unstable roots : $2 \times 7 = 14$
 - (a) $2\lambda^3 + 4\lambda^2 + 4\lambda + 12 = 0$
 - (b) $\lambda^3 + 6\lambda^2 + 12\lambda + 8 = 0$.

3. Explain the following terms in brief : 7×2=14

(a) Maximum Overshoot

(b) Transport Delay

(c) Stability Margin

(d) Gain Margin

(e) Steady State Error

(f) Transfer Function

(g) Compensator

4. (a) Comment upon the application area of Lag Compensator. Give a simple RC circuit to implement it. Derive its transfer function. 8

(b) Explain the procedure for the construction of root locus plot. 6

5. Draw the Bode plot for the transfer function given below : 14

$$G(s) H(s) = \frac{48(s + 10)}{s(s + 20)(s^2 + 2.4s + 16)}$$

6. Write short notes on the following : 2×7=14

(a) Proportional Integral (PI) Controller

(b) Computer Electronic Design Aspects

7. The open loop transfer function of a unity feedback control system is given below :

$$G(s) = \frac{(s + 0.25)}{s^2(s + 1)(s + 0.5)}$$

Determine the closed loop stability by applying Nyquist criterion.

14

