LIB
31/12/15 AN

Reg. No. : | | | | | | | | | | |

Question Paper Code : 21451

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Electronics and Communication Engineering

EC 2255/EC 46/EE 1256 A/080290023/10144 EC 406 — CONTROL SYSTEMS

(Regulations 2008/2010)

(Common to 10144 EC 406 — Control Systems for B.E. (Part – Time)
Third Semester ECE — Regulations 2010)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the main advantages of closed loop system over open loop systems?

2. Write the mathematical expressions for step input and impulse input.

3. Mention few applications of Bode plot.

4. State Routh Hurwitz criterion.

5. Define State space.

6. What is meant by sample and hold?

7. Define Mason's gain formula.

8. Define rise time and peak overshoot.

9. Define Nyquist stability criterion.

10. What is gain margin and phase margin?

PART B — (5 × 16 = 80 marks)

11. (a) Derive the transfer function of a RLC series circuit.

Or

(b) With a neat diagram, derive the transfer function of a field controlled dc motor.

12. (a) Derive an expression for unit step response of a second order control system.

Or

(b) Write explanatory notes on PI and PD controllers.

13. (a) Define all the frequency domain specifications of a second order control system after plotting the response.

Or

(b) Describe the procedure for obtaining the polar plot for a system whose loop transfer function is $\frac{4}{(s+2)(s+4)}$.

14. (a) Describe the procedure for obtaining the root locus for a system.

Or

(b) Determine the closed loop stability of the system using Nyquist stability criterion $G(s)=\frac{2}{s^2(s+2)}$.

15. (a) Explain how controllability and observability for a system can be tested, with an example.

Or

(b) Write the explanatory notes on open loop and closed loop sampled data systems.