

C 31827

(Pages 2)

Name: _____

Reg. No. _____

**FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, JUNE 2007**

EE 04 406—LINEAR SYSTEM ANALYSIS

(2004 Admissions)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

- I. (a) Explain what is meant by static and dynamic systems.
(b) State and explain Kirchoff's laws.
(c) What is thermal resistance? Explain.
(d) List the relation between mechanical rotational system electrical system.
(e) Define and explain Fourier series representation for symmetric waveforms.
(f) Explain harmonic components in 3-phase source.
(g) State and prove integration property of Fourier transform.
(h) Find the Fourier transform of $x(t) = 1, |t| \leq 1$
 $= 0$ otherwise

(8 × 5 = 40 marks)

Part B

- II. (a) (i) Explain what is meant by stochastic and deterministic systems. (6 marks)
(ii) State the reduction rules for block diagram and explain. (9 marks)

Or

- (b) Draw the signal flow graph for the block diagram shown below and hence find the transfer function.

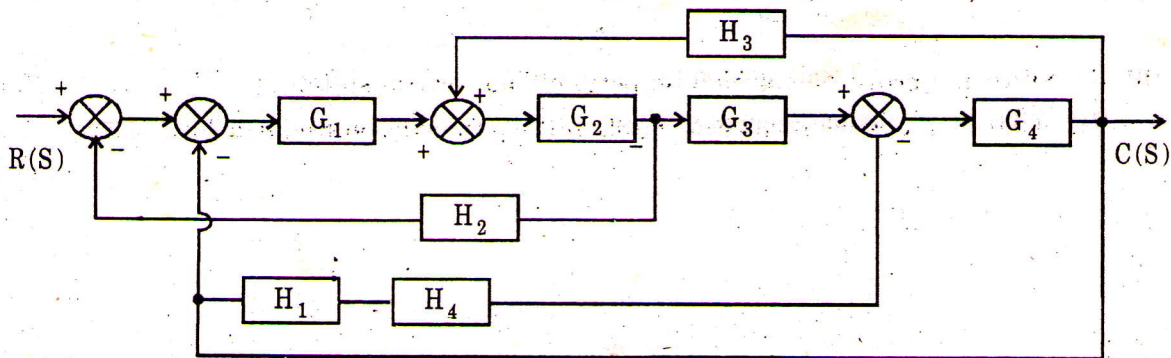


Fig. 1.

Turn over

- III. (a) (i) State D'Alembert's principle and explain the procedure for writing the models of mechanical system. (6 marks)
- (ii) Write the differential equations describing the dynamics of the system shown below and find the ratio $X_2(S)/F(S)$.

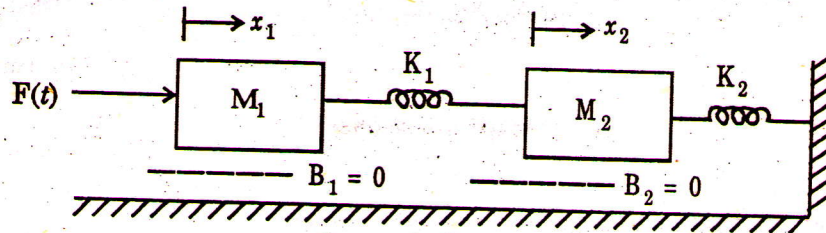


Fig. 2.

(9 marks)

Or

- (b) (i) What are the basic elements of hydraulic system? Explain. (8 marks)
- (ii) Compare electrical and electromechanical systems. (7 marks)
- IV. (a) Find the Fourier series representation of the following wave form and plot its spectra.

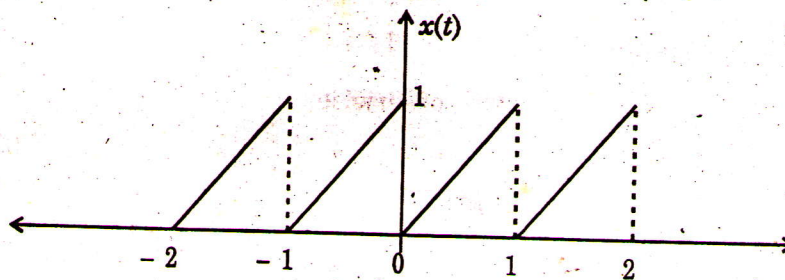


Fig. 3.

Or

- (b) Derive harmonic currents in star connected non-linear loads.
- V. (a) Verify Parseval's theorem for the following signals $x(t) = 2 e^{-|t|}$.
- (b) (i) State and prove convolution property of Fourier transform. (8 marks)
- (ii) What is frequency response? Explain the properties of frequency response. (7 marks)

[4 × 15 = 60 marks]