Code No: RR320201 **RR** **Set No. 2**

III B.Tech II Semester Examinations,December 2010
ANALYSIS OF LINEAR SYSTEMS
Electrical And Electronics Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain how the removal of pole at infinity of an impedance Z(s) can realize an element in the network.
   (b) Realize the network with the following driving point impedance function using first Foster form.
   Z(s) = (s+2) / s(2s+5) [8+8]

2. (a) Find the Laplace transform of a periodic waveform shownn in figure 8a

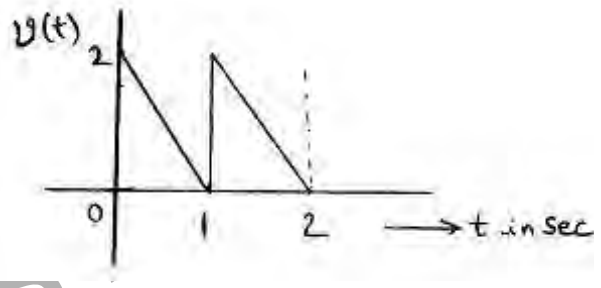

Figure 8a

   (b) Find the inverse Laplace transforms f(t) using convolution integral for the following function $F(s) = \frac{3s}{(s^2+1)(s^2+4)}$ [8+8]

3. (a) Test whether the following polynomial is Hurwitz or not?
   $H(s) = s^6 + 5s^5 + 13s^4 + 21s^3 + 20s^2 + 16s + 8$
   (b) Test whether the following function is positive real or not?
   F(s)= (2s) / (s+1) (s+2) [8+8]

4. Find the Fourier series expansion of the periodic waveform shown in figure 1.

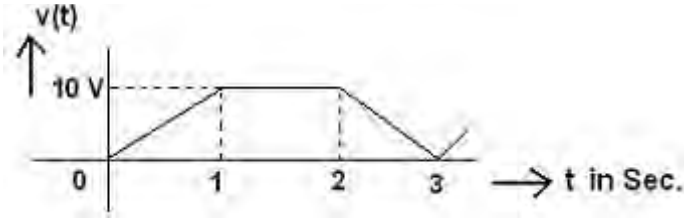

Figure 1

If this voltage is applied to a series R-L circuit with R = 1Ω, L =1H, find the RMS value of the current, Average power and power factor of the load [8+8]

5. For the mechanical systems shown in figure.7.

Code No: RR320201 **RR** **Set No. 2**

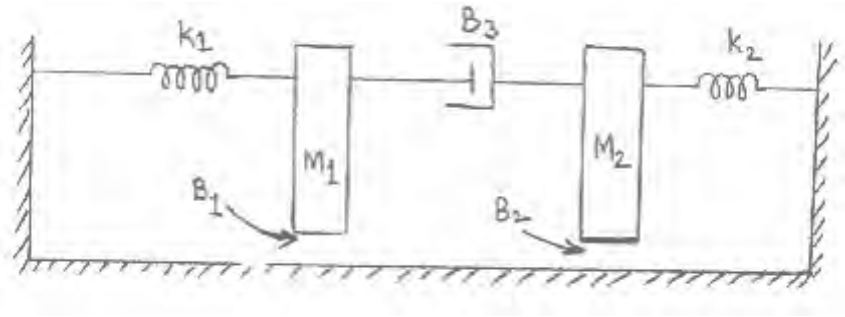

Figure 7

(a) Draw the mechanical network

(b) Draw the Force-voltage and force-current analogous electric circuits

(c) State variable model using force-voltage analogous circuit. [3+8+5]

6. (a) Distinguish between unit impulse function and unit doublet function and hence develop the Laplace transform of these functions.

(b) Find the expressions for the current i(t) in a series R-L-C circuit, with R=5Ω, L=1H, C=$\frac{1}{4}$ F, when it is fed by a ramp voltage of 12 r(t-2). [3+3+10]

7. (a) Obtain the state equations for the network shown in figure 2a. Where $i_1(t)$ *and* i_2 (t) are loop currents.

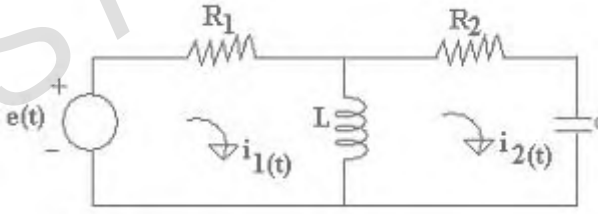

Figure 2a

(b) Evaluate the complete state response of the system characterized by $A = \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ with initial state vector $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ [8+8]

8. (a) Distinguish between Fourier and Laplace transforms and explain the similarities and differences between them.

(b) Find the Fourier Transform of the signal shown in figure 5b [8+8]

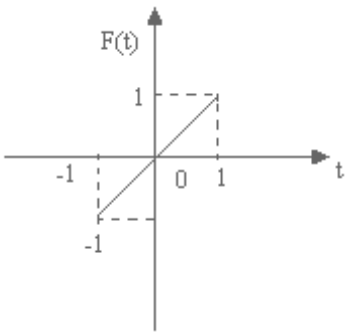

Figure 5b

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Code No: RR320201 **RR** **Set No. 4**

III B.Tech II Semester Examinations,December 2010
ANALYSIS OF LINEAR SYSTEMS
Electrical And Electronics Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Distinguish between unit impulse function and unit doublet function and hence develop the Laplace transform of these functions.
   (b) Find the expressions for the current i(t) in a series R-L-C circuit, with R=5Ω, L=1H, C=$\frac{1}{4}$ F, when it is fed by a ramp voltage of 12 r(t-2). [3+3+10]

2. (a) Find the Laplace transform of a periodic waveform shown in figure 8a

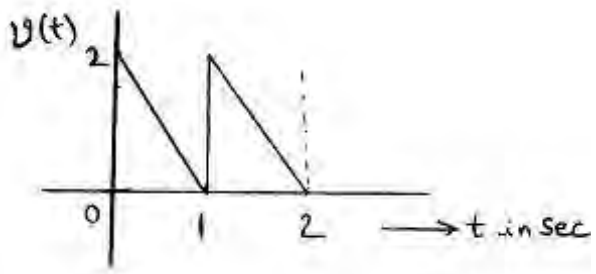

Figure 8a

   (b) Find the inverse Laplace transforms f(t) using convolution integral for the following function $F(s) = \frac{3s}{(s^2+1)(s^2+4)}$ [8+8]

3. Find the Fourier series expansion of the periodic waveform shown in figure 1.

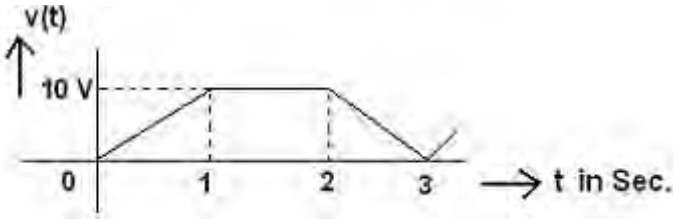

Figure 1

If this voltage is applied to a series R-L circuit with R = 1Ω, L =1H, find the RMS value of the current, Average power and power factor of the load [8+8]

4. (a) Test whether the following polynomial is Hurwitz or not?
   $H(s) = s^6 + 5s^5 + 13s^4 + 21s^3 + 20s^2 + 16s + 8$
   (b) Test whether the following function is positive real or not?
   F(s)= (2s) / (s+1) (s+2) [8+8]

5. For the mechanical systems shown in figure.7.

Code No: RR320201 **RR** **Set No. 4**

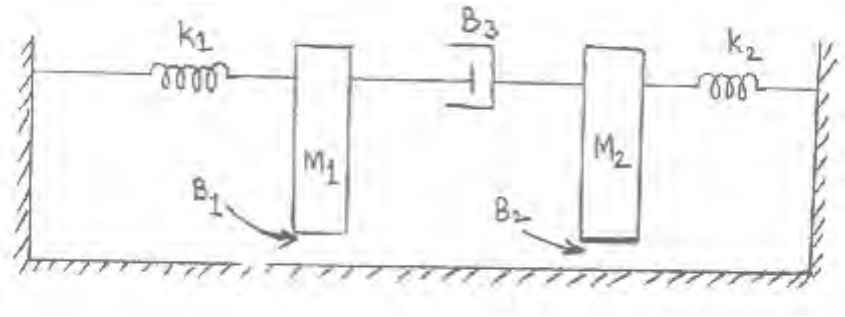

Figure 7

(a) Draw the mechanical network

(b) Draw the Force-voltage and force-current analogous electric circuits

(c) State variable model using force-voltage analogous circuit. [3+8+5]

6. (a) Distinguish between Fourier and Laplace transforms and explain the similarities and differences between them.

(b) Find the Fourier Transform of the signal shown in figure 5b [8+8]

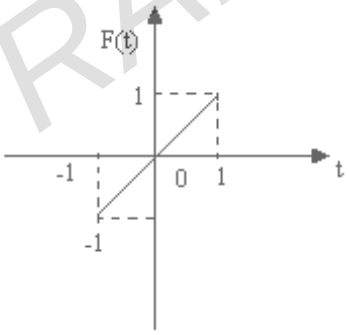

Figure 5b

7. (a) Obtain the state equations for the network shown in figure 2a. Where $i_1(t)$ *and* i_2 (t) are loop currents.

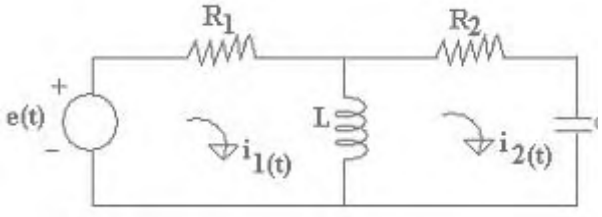

Figure 2a

(b) Evaluate the complete state response of the system characterized by $A = \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ with initial state vector $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ [8+8]

8. (a) Explain how the removal of pole at infinity of an impedance Z(s) can realize an element in the network.

(b) Realize the network with the following driving point impedance function using first Foster form.
Z(s) = (s+2) / s(2s+5) [8+8]

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Code No: RR320201 **RR** **Set No. 1**

III B.Tech II Semester Examinations,December 2010
ANALYSIS OF LINEAR SYSTEMS
Electrical And Electronics Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Distinguish between unit impulse function and unit doublet function and hence develop the Laplace transform of these functions.
   (b) Find the expressions for the current i(t) in a series R-L-C circuit, with R=5Ω, L=1H, C=$\frac{1}{4}$ F, when it is fed by a ramp voltage of 12 r(t-2). [3+3+10]

2. Find the Fourier series expansion of the periodic waveform shown in figure 1.

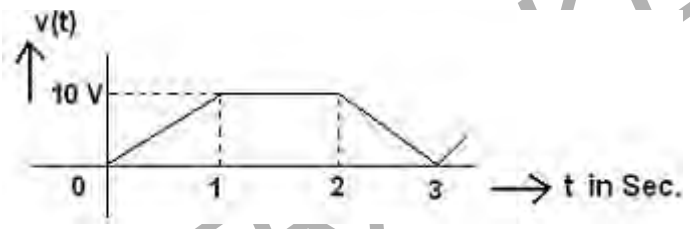

Figure 1

If this voltage is applied to a series R-L circuit with R = 1Ω, L =1H, find the RMS value of the current, Average power and power factor of the load [8+8]

3. (a) Find the Laplace transform of a periodic waveform shownn in figure 8a

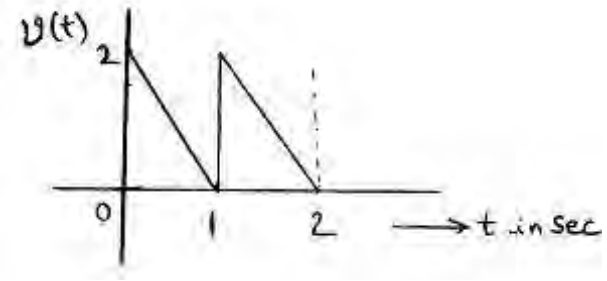

Figure 8a

   (b) Find the inverse Laplace transforms f(t) using convolution integral for the following function $F(s) = \frac{3s}{(s^2+1)(s^2+4)}$ [8+8]

4. For the mechanical systems shown in figure.7.

Code No: RR320201 **RR** **Set No. 1**

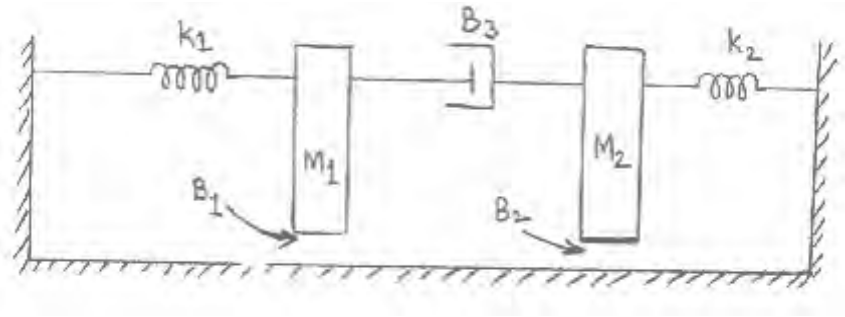

Figure 7

(a) Draw the mechanical network

(b) Draw the Force-voltage and force-current analogous electric circuits

(c) State variable model using force-voltage analogous circuit. [3+8+5]

5. (a) Test whether the following polynomial is Hurwitz or not?
$H(s) = s^6 + 5s^5 + 13s^4 + 21s^3 + 20s^2 + 16s + 8$

(b) Test whether the following function is positive real or not?
F(s)= (2s) / (s+1) (s+2) [8+8]

6. (a) Explain how the removal of pole at infinity of an impedance Z(s) can realize an element in the network.

(b) Realize the network with the following driving point impedance function using first Foster form.
Z(s) = (s+2) / s(2s+5) [8+8]

7. (a) Obtain the state equations for the network shown in figure 2a. Where $i_1(t)$ *and* i_2 (t) are loop currents.

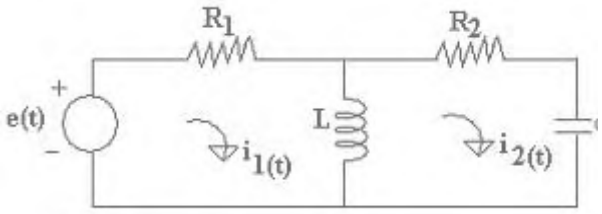

Figure 2a

(b) Evaluate the complete state response of the system characterized by $A = \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ with initial state vector $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ [8+8]

8. (a) Distinguish between Fourier and Laplace transforms and explain the similarities and differences between them.

(b) Find the Fourier Transform of the signal shown in figure 5b [8+8]

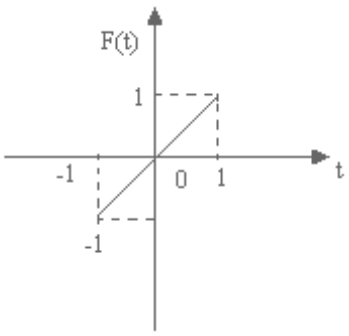

Figure 5b

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Code No: RR320201 **RR** **Set No. 3**

III B.Tech II Semester Examinations,December 2010
ANALYSIS OF LINEAR SYSTEMS
Electrical And Electronics Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Find the Fourier series expansion of the periodic waveform shown in figure 1.

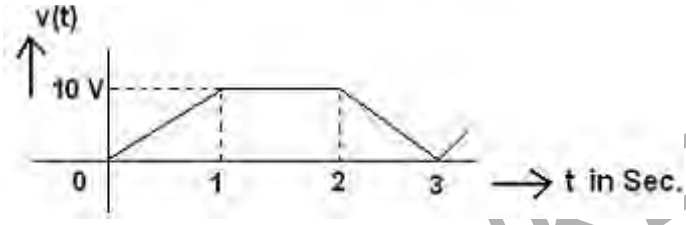

Figure 1

If this voltage is applied to a series R-L circuit with R = 1Ω, L =1H, find the RMS value of the current, Average power and power factor of the load [8+8]

2. (a) Obtain the state equations for the network shown in figure 2a. Where $i_1(t)$ *and* i_2 (t) are loop currents.

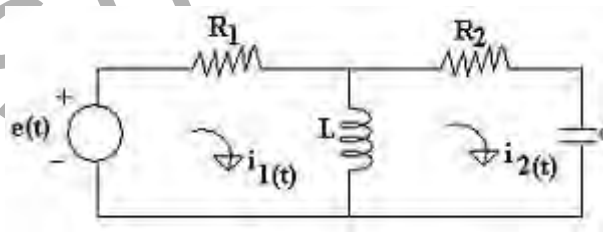

Figure 2a

(b) Evaluate the complete state response of the system characterized by $A = \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ with initial state vector $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ [8+8]

3. (a) Distinguish between unit impulse function and unit doublet function and hence develop the Laplace transform of these functions.

(b) Find the expressions for the current i(t) in a series R-L-C circuit, with R=5Ω, L=1H, C=$\frac{1}{4}$ F, when it is fed by a ramp voltage of 12 r(t-2). [3+3+10]

4. (a) Test whether the following polynomial is Hurwitz or not?
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(b) Test whether the following function is positive real or not?
F(s)= (2s) / (s+1) (s+2) [8+8]

5. (a) Distinguish between Fourier and Laplace transforms and explain the similarities and differences between them.

(b) Find the Fourier Transform of the signal shown in figure 5b [8+8]

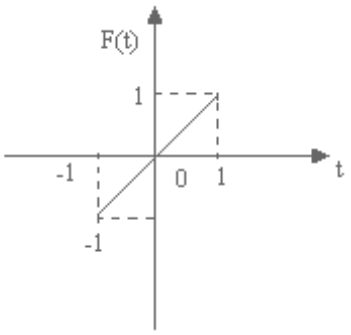

Figure 5b

6. (a) Explain how the removal of pole at infinity of an impedance Z(s) can realize an element in the network.

   (b) Realize the network with the following driving point impedance function using first Foster form.
   Z(s) = (s+2) / s(2s+5) [8+8]

7. For the mechanical systems shown in figure.7.

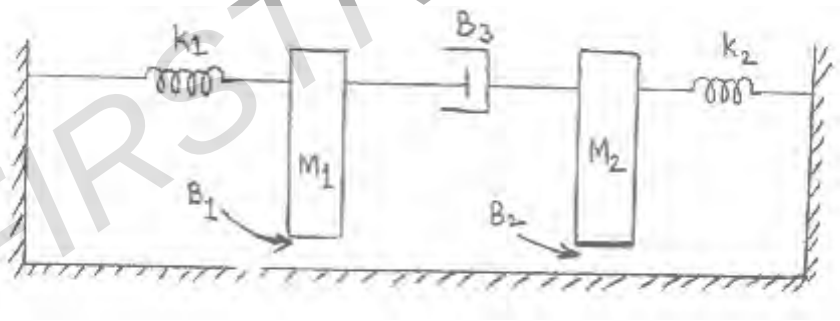

Figure 7

   (a) Draw the mechanical network

   (b) Draw the Force-voltage and force-current analogous electric circuits

   (c) State variable model using force-voltage analogous circuit. [3+8+5]

8. (a) Find the Laplace transform of a periodic waveform shownn in figure 8a

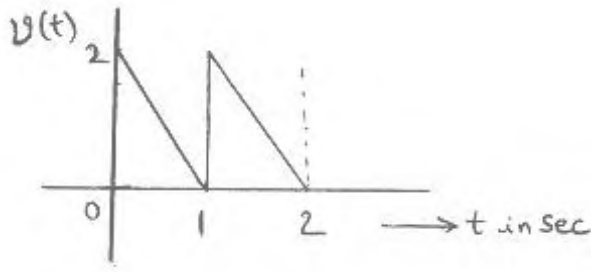

Figure 8a

(b) Find the inverse Laplace transforms f(t) using convolution integral for the following function $F(s) = \frac{3s}{(s^2+1)(s^2+4)}$ [8+8]

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