Hall Ticket Number :										

R-11 / R-13

Code: 1G244

II B.Tech. II Semester Supplementary Examinations October 2020

Linear Control Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

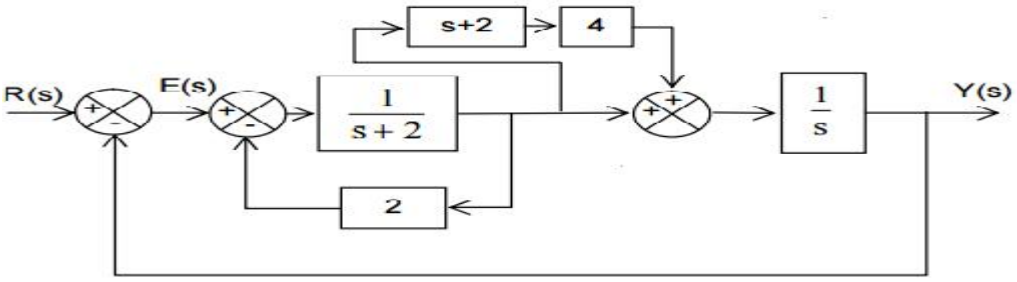
Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

****

1. Explain in detail about the classification Systems. 14M

2. Use the Block diagram reduction technique to find the transfer function Y(S)/R(S)



14M

3. Determine the step, ramp and parabolic error constants of unity feedback control system whose forward path transfer function is given as

$G(s)=\frac{K(1+2S)(1+4S)}{S^2(S^2+S+1)}$. 14M

4. Construct the root locus for the unity feed back system whose open loop transfer function is $G(s)=\frac{K(2+S^2)}{(S+3)(S+4)}$. Give the values for all critical points of interest. Is the system ever unstable? If so for what range of K? 14M

5. a) Explain about the Frequency domain specifications. 7M
   b) Derive the expression for Resonant peak. 7M

6. a) Explain about Nyquist stability criterion. 2M
   b) Construct Nyquist plot for the feedback system whose OLTF is $G(s)=\frac{K(S+3)}{S(S^2+2S2)}$. Find also the range of K for stability. 12M

7. Explain the procedure for the design of lead compensator in Frequency Domain. 147M

8. a) Define State transition Matrix and write the properties of STM. 7M
   b) Consider the following Matrix $A=\begin{bmatrix}0 & 1\\ 0 & -2\end{bmatrix}$ Compute e^{AT} by use of two methods. 7M

***

Hall Ticket Number :										

R-11 / R-13

Code: 1GC41

II B.Tech. II Semester Supplementary Examinations October 2020

Mathematics-III

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

****

1. a) Prove that B(m,n)=$\int_0^\infty \frac{x^{m-1}}{(1+x)^{m+n}}\,dx$ 7M

   b) Evaluate $\int_0^{\frac{\pi}{2}} \sqrt{\cot\theta}\, d\theta$ 7M

2. a) Prove that $(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2})$I Real f(z) I^2 = 2I f^l(z)I^2,Where f(z)=w is analytic. 7M

   b) If f(z)= u+iv is an analytic function and u – v =$\frac{\cos x+\sin x-e^{-y}}{2\cos x-e^{-y}-e^{y}}$,Find f(z) subject to the condition f($\frac{\pi}{2}$)=0. 7M

3. a) Separate the real and imaginary parts of (i) tan z, (ii) sechz 7M

   b) Find all roots of the equation tanhz + 3 =0 7M

4. a) Evaluate $\int_0^{3+i} z^2\, dz$, along

   (i)The line y=$\frac{x}{3}$

   (ii) The parabola x=3y^2. 7M

   b) State and prove Cauchy's theorem. 7M

5. a) State and prove Laurent's theorem. 7M

   b) Expand f(z) = sinz in Taylors series about z= $\frac{\pi}{2}$ 7M

6. a) State and prove Cauchy's Residue theorem 7M

   b) Show that $\int_0^{\pi} \frac{cos2\theta}{1-2acos\theta+a^2}\, d\theta = \frac{\pi a^2}{1-a^2}$ $(a^2<1)$ *Using residue theorem* 7M

7. a) State and prove Rouche's theorem. 7M

   b) Prove that the polynomial z^5+z^3+2z+3 has just one zero in the first quadrant of the complex plane. 7M

8. a) Show that the transformation w=z^2 maps the circle I z- 1 I = 1 into the cardioid r=2(1+cosθ) where w = r$e^{i\theta}$ in the w- plane. 7M

   b) Find the Bilinear transformation that maps the points 1,i,-1 into the points 2,i,-2 7M

***

Hall Ticket Number :										

R-11/R-13

Code : 1G341

II B.Tech. II Semester Supplementary Examinations October 2020

Signals and Systems

(Electronics & Communication Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

****

1. a) Explain the following terms
   a) Impulse function b) Unit step function 6M
   b) Explain the analogy of vectors and signals in terms of orthogonality and evaluation of constant 8M

2. a) Write down the trigonometric form of the Fourier series representation of a periodic signal. 7M
   b) Explain the concept of generalized Fourier series representation of signal f(t) 7M

3. Obtain the Fourier transform of the following functions.
   i. Impulse function
   ii. DC Signal
   iii. Unit Step function

4. a) Differentiate between LTI and LTV systems & Causal and Non-Causal systems. 8M
   b) Explain the criterion that has to be satisfied for a system to be physically realizable? 6M

5. a) State and prove Parseval's theorem 7M
   b) State and prove the properties of Auto Correlation function 7M

6. a) Explain Natural and Flat top sampling and effects of under sampling 7M
   b) Describe
   i) what is aliasing effect ii) What is impulse sampling 7M

7. a) State and prove initial value theorem of Laplace transform 8M
   b) Find the Inverse Laplace transform of the functions
   1)$Y(s) = 10s/(s+2)^3(s+8)$ 2) $Y(s) = 2s^2+6s+6/(s+2)(s^2+2s+2)$ 6M

8. a) State the properties of Z-transform 6M
   b) Derive relationship between z and Laplace Transform. 8M

***

Hall Ticket Number :										

R-11 / R-13

Code: 1G342

II B.Tech. II Semester Supplementary Examinations October 2020

Electromagnetic Waves and Transmission Lines

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

****

1. a) State and explain the coulomb's law with suitable equations and diagram
   b) Point charges of 1mC and -2mC are located at (3,2,-1) and (-1,-1,4) respectively. Calculate the electric force on a 10nC charge located at (0,3,1).
2. a) Explain the properties of materials and Dielectric Constant & strength
   b) Define Linear, Isotropic and Homogeneous Dielectrics
3. a) State and explain Biot savart law
   b) List Maxwell's Equations for Static EM Fields
4. a) Outline the importance of Faradays law with suitable equations
   b) Determine the transformer emf for the stationary loop in the time varying B field
5. Summarize waves in general with neat wave diagrams
6. Define and explain Poynting theorem and pointing Vector
7. a) What is a Transmission Line? Define different types of transmission lines
   b) Explain transmission line primary parameters
8. a) Explain about the Smith chart
   b) Relate input impedance in terms of exponential form

***