Hall Ticket Number :										

R-14

Code: 4G242

II B.Tech. II Semester Supplementary Examinations August 2021

Electrical Circuits-II

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

****

UNIT–I

1. a) List out the advantages of three phase system over single phase system. 7M

   b) Explain the two-wattmeter method of 3-Φ power measurement. 7M

OR

2. a) A balanced star connected load has an impedance of (8+j6) Ω/phase and supply voltage is 415 V, 3-Φ supply. Calculate i) line currents ii) PF iii) Total active power 7M

   b) Show that $\Phi = \tan^{-1}[\sqrt{3}\,(W_1-W_2)\,/\,(W_1+W_2)]$ for 3-Φ balanced lagging power factor load. 7M

UNIT–II

3. a) State and Prove Initial value theorem and Final value theorem. 7M

   b) Explain the step response of series RL Circuit using Laplace Transform. 7M

OR

4. a) Determine the Laplace transform of the following functions

   i) $2\cos^2(t)$ ii) $t \sin(2t)$ 7M

   b) Calculate initial & final value of the function $f(t) = 2+e^{-3t}\cos 2t$ 7M

UNIT–III

5. a) Explain the significance of initial conditions. 5M

   b) A series RL circuit with R=50Ω and L=0.2H has a Sinusoidal Voltage source V(t)=150Sin500t. Determine the expression for i(t). 9M

OR

6. Derive the expression for current when series RLC Circuit is excited by sinusoidal voltage source $V(t) = V_m \sin(\omega t+\theta)$ when switch is closed at t=0 14M

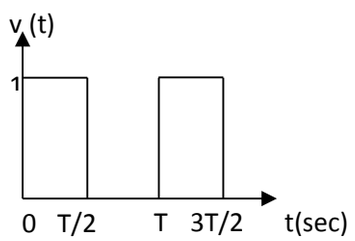
UNIT–IV

7. a) Explain all wave form symmetry by using relevant examples. 7M

   b) Discuss properties of Fourier transforms. 7M

OR

8. a) Illustrate the trigonometric Fourier series expansion of the waveform shown in fig



   7M

   b) Determine Fourier transform of Gaussian function. 7M

UNIT–V

9. a) Explain the necessary conditions for a transfer function 7M

   b) Synthesize the given impedance function using elementary synthesis.

$$Z(S) = \frac{6S^3 + 3S^2 + 6S + 2}{3S^3 + 3S}$$

   7M

OR

10. Determine the Cauer form I and II realizations for $Z(s) = \frac{2(s^2+1)(s^2+9)}{s(s^2+4)}$ 14M

***

Hall Ticket Number :										

R-14

Code: 4G244

II B.Tech. II Semester Supplementary Examinations August 2021

Linear Control Systems

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

****

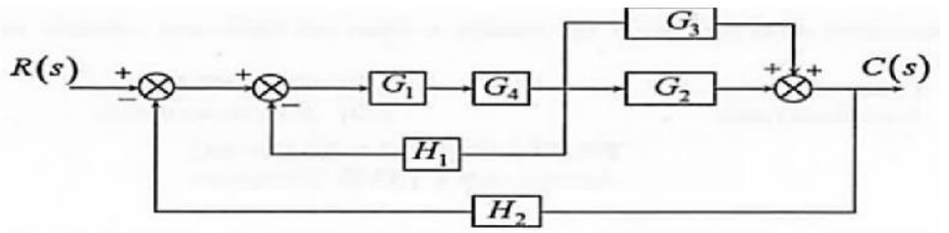
UNIT–I

1. a) Define control system. State the difference between closed loop and open control system with examples 7M

   b) Define transfer function. Find the transfer function of closed loop control system 7M

OR

2. a) Determine the closed loop transfer function of the given system using block reduction technique.



8M

   b) Describe the block diagram reduction rules with figures. 6M

UNIT–II

3. Derive the time domain specifications of a second order system 14M

OR

4. a) Derive the response first order system with unit ramp input 7M

   b) Determine the step, ramp and parabolic error constant of unity feedback control system whose forward path transfer function is given as $G(s)=\frac{K(1+2S)(1+4S)}{S^2(S^2+S+1)}$ .Also determine steady state error. 7M

UNIT–III

5. a) Define stability, asymptotic stability and relative stability. 7M

   b) What are the difficulties in forming Routh array? Explain how to overcome. 7M

OR

6. The characteristic polynomial of a system is $s^7+9s^6+24s^5+24s^4+24s^3+24\ s^2+23s+15=0$. Determine the location of the roots in s-plane and hence stability of the system. 14M

UNIT–IV

7. a) Derive the frequency domain specifications of a second order system 10M

   b) List the advantages and disadvantages of Frequency response 4M

OR

8. a) Define GM & PM. 4M

   b) Explain the procedure to determine the Gain margin and Phase margin from Polar plot. 10M

UNIT–V

9. a) Derive the expression for the transfer function of a lag-lead compensator. 6M

   b) Define lag compensator and draw the Pole Zero Plot .Also state it's effects. 8M

OR

10. The open-loop transfer function of a unity feedback control system is given by $G(s)H(S)=\frac{K}{S(1+0.2S)}$. Design a suitable compensator such that the system will have Kv=2 and PM = 50^0 14M

***

Hall Ticket Number :										

R-14

Code: 4GC41

II B.Tech. II Semester Supplementary Examinations August 2021

Mathematics-III

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

****

UNIT–I

1. a) Symmetry of Beta function B(m, n)=B(n, m) 7M

   b) Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x^5}}dx$ in terms of B function 7M

OR

2. a) Find real and imaginary parts $\cot z$ 7M

   b) Find all the roots of $\sin z = 2$ 7M

UNIT–II

3. Determine P such that the function $f(z)=\frac{1}{2}\log\left(x^2+y^2\right)+i\,Tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function 14M

OR

4. Find an analytic function whose real part is $e^{-x}\left[x\sin y - y\cos y\right]$ 14M

UNIT–III

5. Evaluate $\int_c \left(y^2+2xy\right)dx+\left(x^2-2xy\right)dy$ where c is the boundary of the region by $y=x^2$ *and* $x=y^2$ 14M

OR

6. Expand $Log\, z$ by Taylor's series about z=1. 14M

UNIT–IV

7. a) Find the poles and Residues at each pole $\frac{ze^z}{(z-1)^3}$ 7M

   b) Use Residue theorem to find the number of zeros of the polynomial $z^{10}-6z^7+3z^3+1$ if $|z|<1$ 7M

OR

8. Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}dz$ where c is the circle $|z|=3$ 14M

UNIT–V

9. Find the bilinear Transformation which maps the point (-1, 0, 1) into the points (0, i, 3i). 14M

OR

10. Find the image of the region in the z-plane between the lines y=0 and $y=\frac{®}{2}$ under the Transformation $w=e^z$. 14M

***

Hall Ticket Number :										

R-14

Code: 4G346

II B.Tech. II Semester Supplementary Examinations August 2021

Pulse and Digital Circuits

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

****

UNIT–I

1. a) Discuss the application of Attenuator as a CRO probe 8M

   b) Define the following:

   i) Linear wave Shaping ii) Lower cutoff frequency iii) Rise time 6M

OR

2. A 10 Hz square wave is fed to an amplifier. Calculate and plot the output waveform under the following conditions. The lower 3-dB frequency is a) 0.3 Hz b) 3 Hz c) 30Hz 14M

UNIT–II

3. a) State and Prove the clamping circuit theorem. 8M

   b) Explain the operation of a two level diode clipper with the help of circuit diagram? 6M

OR

4. a) Explain the diode switching times with their neat diagrams 10M

   b) Explain piecewise linear characteristics of the diode 4M

UNIT–III

5. Draw the circuit diagram of Fixed Bias Bistable Multivibrator and explain its operation with the help of wave forms at base and collector 14M

OR

6. Find the Lower and Upper Threshold voltage for Schmitt trigger circuits with following data. Assume transistors with h_{fe}=30, V_{cc}=12V, R_{c1}=4K, R_{c2}=1K, R_1=2K, R_s=1K, R_2=6K, R_e=3K 14M

UNIT–IV

7. a) How is linearity corrected through adjustment of the driving waveform for a Current Time Base Generator 8M

   b) What are the applications of Time Base Generators 6M

OR

8. a) Illustrate the working principle of Bootstrap time base generator 7M

   b) Explain transistor Miller time base generator with neat diagram 7M

UNIT–V

9. a) Explain about unidirectional sampling gate with neat sketch 8M

   b) Discuss the advantages and disadvantages of Unidirectional sampling gate 6M

OR

10. a) Verify the truth table of CMOS NOR gate with neat sketches 10M

    b) What are the applications of sampling gates? 4M

***