Hall Ticket Number :										

R-14

Code: 4G331

II B.Tech. I Semester Supplementary Examinations May 2017

Electronic Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) Consider a single Stage CE Amplifier with R_s=1KΩ, R1=50KΩ, R_2=2KΩ, R_c=2KΩ, h_{fe}=50,h_{ie}=1.1KΩ,h_{oe}=25μA/V and h_{re}= 2.5X10^{-14}.Find $A_i^!$, $R_i^!$, $A_V^!$, $A_i=I_L/I_S$,$A_{VS}=V_O/V_S$ 8M

   b) State millers theorem. Explain its significance in transistor circuit analysis 6M

OR

2. a) Using the h-parameter model, derive expressions for Current gain(A_I), Input impedance(Z_i), Output impedance(Z_o) and Voltage gain(A_V) 8M

   b) A voltage source of internal resistance Rs=600Ω drives a CC amplifier using load resistance R_L=100Ω.The CE h-parameters are h_{ie}=1.2KΩ, h_{re}=2.5X10^{-4}, h_{fe}=60 and hoe=25μA/V. Compute the Current gain (A_I), Input Impedance(Z_i), Voltage gain(A_V) and Output resistance R_O using approximate analysis. 6M

UNIT–II

3. a) Draw the Hybrid π-model for a transistor in the CE Configuration and the significance of every component in this model? 7M

   b) Explain the frequency response of amplifier at Low, Mid and High frequencies 7M

OR

4. a) Derive the Expressions for Output conductance (g_{ce}), transconductance (g_m) and feedback conductance ($g_{b^!c}$) of a CE amplifier at high frequencies in terms of its low frequency h-parameters 8M

   b) A BJT has the following parameters measured at i_c=1mA, h_{ie}=3KΩ, h_{fe}=500, FT=4MH$_z$, C_c=2pF, Ce=18pF. Find $r_{b^!e}$, g_m, r_{ce} and f_H for R_L=1KΩ 6M

UNIT–III

5. a) Explain the concept of feedback with block diagram 7M

   b) Briefly discuss about the effect of feedback on amplifier bandwidth 7M

OR

6. a) Draw the circuit diagram of Voltage series feedback amplifier and derive expressions for input impedance, output impedance and find voltage gain 10M

   b) An amplifier has voltage gain with feedback is 100. If the gain without feedback changes by 20% and the gain without feedback is 2%. Determine the open loop gain and the feedback ratio. 4M

UNIT–IV

7. a) Explain the Working of transistorized wein-bridge oscillator with neat diagram 10M

   b) A wein bridge oscillator has a frequency of 400Hz, if the value of C is 100pF then determine the value of R. 4M

OR

8. a) What is Piezo electric effect? Draw ac equivalent circuit of a crystal and explain its working 10M

   b) What are the features and advantages of crystal oscillator? 4M

UNIT–V

9. a) A Class B Push-Pull amplifier supplies power to a loud speaker of 10Ω.The transformer has a turns ratio of N1:N2 of 4:1 and efficiency is 95%.calculate the following.

      (i) Max power output

      (ii) Max power dissipation in each transistor 8M

   b) Derive the expression for efficiency of series fed Class A power amplifier 6M

OR

10. a) Draw and explain the circuit diagram of a single tuned capacitive coupled amplifier. Also explain its operation 8M

    b) Explain Advantages, disadvantages and applications of tuned amplifiers 6M

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Hall Ticket Number :										

Code: 4GC32

R-14

II B.Tech. I Semester Supplementary Examinations May 2017

Engineering Mathematics

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Prove that if A and B are equivalent matrices, there exist non-singular matrices P and Q such that B=PAQ. 6M

   b) Find the values of ª and « for which the system of equations $3x+2y+z=6$; $3x+4y+3z=14$; $6x+10y+ª z=«$ has (i) unique solution, (ii) no solution and (iii) infinite number of solutions. 8M

OR

2. a) Define Rank of a Matrix. Reduce the matrix $\begin{bmatrix} 3 & 2 & -1 \\ 4 & 2 & 6 \\ 7 & 4 & 5 \end{bmatrix}$ to the normal form and hence find its rank. 8M

   b) Prove that the characteristic roots of a Hermitian matrix are real. 6M

UNIT–II

3. a) Find the order of convergence of Newton-Raphson method. 6M

   b) Given $\frac{dy}{dx}=\frac{y-x}{y+x}$ with initial condition $y=1$ at $x=0$. Find y for $x=0.1$ by Euler's method. 8M

OR

4. a) Use Milne's method to find $y(0.3)$ from $y'=x^2+y^2$, $y(0)=1$. Find the initial values $y(-0.1)$, $y(0.1)$, $y(0.2)$ from the Taylor's series method. 7M

   b) Find a real root of the equation $x\log_{10}x=1.2$ by Regula-Falsi method correct to four decimal places. 7M

UNIT–III

5. a) Find the missing term in the table

x	2	3	4	5	6
y	45	49.2	54.1	--	67.4

   7M

   b) Velocity V of a particle at distances from a point on its linear path is given by the following table. Estimate the time taken by the particle to traverse the distance of 20 meters.

S(m)	0	2.5	5.0	7.5	10.0	12.5	15	17.5	20
V(m/sec)	16	19	21	22	20	17	3	11	9

   7M

OR

6. a) From the following table, find $e^{1.02}$, using Newton's forward formula

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
e^x	2.7183	2.8577	3.0042	3.1582	3.3201	3.4903	3.6693

   7M

   b) Find $f'(7.5)$ from the following table:

x	7.47	7.48	7.49	7.50	7.51	7.52	7.53
$f(x)$	0.193	0.195	0.198	0.201	0.203	0.206	0.208

   7M

UNIT–IV

7. a) Fit a second degree parabola to the following data

x	1989	1990	1991	1992	1993	1994	1995	1996	1997
y	352	356	357	358	360	361	361	360	359

7M

b) Solve the partial differential equations $4\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=3u$, given $u=3e^{-y}-e^{-5y}$ when $x = 0$. 7M

OR

8. a) Solve by Charpit's method $z=p^2x+q^2y$. 7M

b) An experiment data of the relation $V=at^b$ is given by

V (ft/min)	350	400	500	600
t (min)	61	26	7	2.7

Find the best possible values of *a* and *b*. 7M

UNIT–V

9. a) Expand $f(x)=\sqrt{1-\cos x},\ 0<x<2®$ in a Fourier series. Hence evaluate $\frac{1}{1.3}+\frac{1}{3.5}+\frac{1}{5.7}+\cdots\cdots$ 7M

b) If $f, tf, t^2f, \cdots\cdot t^nf$ are absolutely integrable and *F(ω)* is Fourier transform of *f*, then prove that $\frac{d^n}{d\mu^n}(F(\mu))=(-i)^n F\{t^n f(t)\},\ n=1,2,\cdots\cdots$ 7M

OR

10. a) Find the Fourier series expansion of $f(x)=2x-x^2$ in $(0, 3)$ and hence deduce that $\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\cdots\cdots\infty=\frac{®}{12}$ 7M

b) Show that the inverse finite Fourier sine transform of $F_S(x)=\frac{1}{®}\left\{1+\cos n®-2\cos\frac{n®}{2}\right\}$ is $f(x)=\begin{cases}1, & 0<x<®/2\\ -1, & ®/2<x<®\end{cases}$ 7M

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Hall Ticket Number :										

R-14

Code: 4GC34

II B.Tech. I Semester Supplementary Examinations May 2017

Environmental Science

(Common to ECE & IT)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Mention few institutions involved and role played by them in protecting the environment. 7M
   b) What are the reasons for the decline of ecosystem globally? 7M

OR

2. a) Outline the role of an individual in the prevention of pollution 7M
   b) Write on the need for public awareness of environment and its importance. 7M

UNIT–II

3. a) What is over grazing? Write a note on the impact of over grazing. 7M
   b) How soil erosion occurs. Mention few remedial measures to prevent soil erosion. 7M

OR

4. a) Enumerate few conflicts over water that you have known. 7M
   b) Write a note on alternate energy resources and their usage. 7M

UNIT–III

5. a) What are the characteristic features of aquatic ecosystem? 7M
   b) Summarize the threats to biodiversity. 7M

OR

6. a) Write on cycling of nutrients and energy in Nitrogen system. 7M
   b) Describe the values of biodiversity. 7M

UNIT–IV

7. a) Explain the effects caused by water pollution and how it will be controlled. 7M
   b) Write short notes on (i) Thermal pollution and (ii) Marine pollution 7M

OR

8. a) What are nuclear hazards? Mention few nuclear hazards occurred in recent years. 7M
   b) Describe the best practices of solid waste management. 7M

UNIT–V

9. a) How acid rains occurs. Explain. 7M
   b) Enumerate the human rights with respect to environment protection. 7M

OR

10. a) What is Air pollution Act? Mention the postulates of Air pollution Act? 7M
    b) Write notes on the impact of environment on human health. 7M

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Hall Ticket Number :										

R-14

Code: 4G332

II B.Tech. I Semester Supplementary Examinations May 2017

Pulse and Digital Circuits

(Electronics & Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Obtain the response of high pass RC circuit for a ramp input wave form. 7M

   b) A pulse of amplitude 5 V and duration 20 μ sec is applied to High pass RC circuit having R= 10 k Ω and C = 1000 pf. Calculate the output V_0 (t) Sketch the output waveform. Calculate the tilt and undershoot. 7M

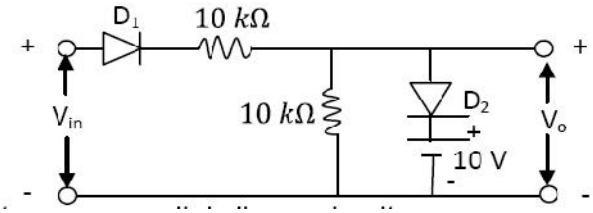
OR

2. a) Derive the expression for rise time of integrating circuit and prove that it is proportional to time constant and inversely proportional to upper 3 dB frequency. 7M

   b) An ideal 1 μ -Sec pulse is fed to a low pass circuit. Calculate and plot the output waveform under the following conditions: The upper 3-dB frequency is
      i. 10 MHz
      ii. 1 MHz
      iii. 0.1 MHz. 7M

UNIT–II

3. a) For the clipper circuit shown below, the input is 50sinwt. Draw the transfer characteristics and input – output waveforms, assuming ideal diode.



   7M

   b) Explain the operation of two level slicer. 7M

OR

4. a) State and prove clamping circuit Theorem. 7M

   b) What is meant by comparator and explain diode differentiator comparator operation with the help of ramp input signal is applied. 7M

UNIT–III

5. a) Explain the linearity connection in current sweep circuit 7M

   b) With the help of a circuit diagram and waveforms explain frequency division of an astable multivibrator with pulse signals. 7M

OR

6. a) Explain about frequency division in the sweep circuit. 7M

   b) What is relaxation oscillator? Name some negative resistance devices used as relaxation oscillators and give its applications. 7M

UNIT–IV

7. a) Derive an expression for the o/p gate width of a transistor monostable multivibrator. 7M

   b) Consider an astable multi using NPN transistor. The circuit and device parameters are V_{cc}, Rc = 560 Ω, R = 5.6kΩ, C = 50pF, h_{FE} = 40 and r_{bb} = 200 Ω. Calculate and plot to scale the o/p waveforms at the base and collector of any one transistor. 7M

OR

8. a) Explain the working of a Bistable multivibrator circuit with the help of neat waveforms. What are its applications? 7M

   b) Design a collector coupled one-shot multivibrator circuit using n-p-n transistors. Neglect ICBO. Assume VCE(sat) to be 0v., hFE(min) = 20. In the stable state, the OFF transistor has VBE = -1v. The on transistor has base current I_B which is 50% in area of the IB(min) value. Vcc = 6v, IC(sat) = 2 mA. Delay time is 3000 μsec. Choose R1 = R2. 7M

UNIT–V

9. a) What is pedestal? How it effects the output of a sampling gates? 7M

   b) Explain about DTL NOR gate. 7M

OR

10. a) Draw and explain a sampling diode whose response is not sensitive to the upper level of the control voltage. 7M

    b) Draw and explain a unidirectional gate which delivers an output only at a coincidence of a number of control voltages. 7M

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Hall Ticket Number :										

R-14

Code: 4G333

II B.Tech. I Semester Supplementary Examinations May 2017

Signals and systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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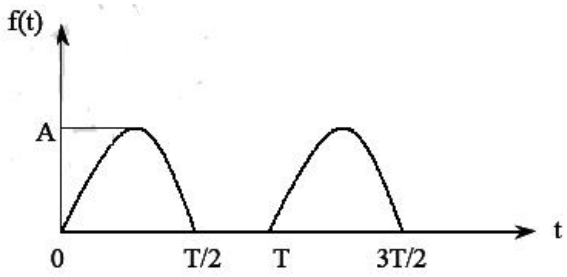
UNIT–I

1. a) Obtain the trigonometric Fourier series for the half wave rectified sine wave shown in figure below.



10M

b) Derive equations to find even and odd parts of a given function f(t). 4M

OR

2. a) Draw a signal f(t) = 1 for 0<t<1

2 for 1<t<2. Determine

i) f(2t)

ii) f(t-1) and iii) f(2t+1) 8M

b) Compare Fourier series and Fourier Transform. 6M

UNIT–II

3. a) Find the inverse Fourier Transform of the following signals

i) $2\pi\delta(\omega)$

ii) $\frac{j\omega+12}{(j\omega)^2+5j\omega+6}$ 8M

b) Determine the Fourier Transform of f(t) = u(t+0.5) – u(t-0.5) 6M

OR

4. a) Find the Fourier Transform of double sided real function $e^{-a|t|}$. Also draw the magnitude and phase response. 8M

b) State any three properties of Fourier Transform 6M

UNIT–III

5. a) Consider an LTI system with input x(t) = $e^{-t}u(t)$ and impulse response h(t) = $e^{-2t}u(t)$. Find the output response y(t). 7M

b) Explain about system properties causality and time invariance. 7M

OR

6. a) Obtain the relationship between bandwidth and rise time. 7M

b) Show that the autocorrelation function and power spectral density are Fourier Transform pair 7M

UNIT–IV

7. a) Evaluate the following integral using Parseval's theorem

$$\int_{-\infty}^{\infty} e^{-2t}\, u(t)dt$$ 9M

b) What is meant by aliasing? How to overcome it? 5M

OR

8. a) Compare different types of sampling techniques 8M

b) Consider the signal x(t) = 10cos(2000 πt) + 20 sin(1000 πt) + 8cos(5000 πt)

i) Determine the Nyquist rate of the signal

ii) What is the discrete time signal after sampling if the signal is sampled at 5000 samples per second? 6M

UNIT–V

9. a) State and verify initial value theorem and final value theorem of Laplace Transforms 10M

b) Find the system function of the following linear time invariant discrete system. $y(n)-2y(n-1)=x(n-1)+2x(n-2)$. 4M

OR

10. a) Find the inverse Laplace transform of $X(s)=\dfrac{2s^2+9s-47}{(s+1)\left(s^2+6s+25\right)}$. 8M

b) Define ROC for Z Transforms. Draw the ROC for left side and right side sequences. 6M

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