Hall Ticket Number :										

R-14

Code: 4G331

II B.Tech. I Semester Supplementary Examinations November 2019

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 = 70 Marks)

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UNIT–I

1. Explain the four h-parameters of a transistor. How these parameters are found from the characteristics of the transistor amplifier?

   Show that the voltage gain of CE amplifier with an emitter resistor R_E is

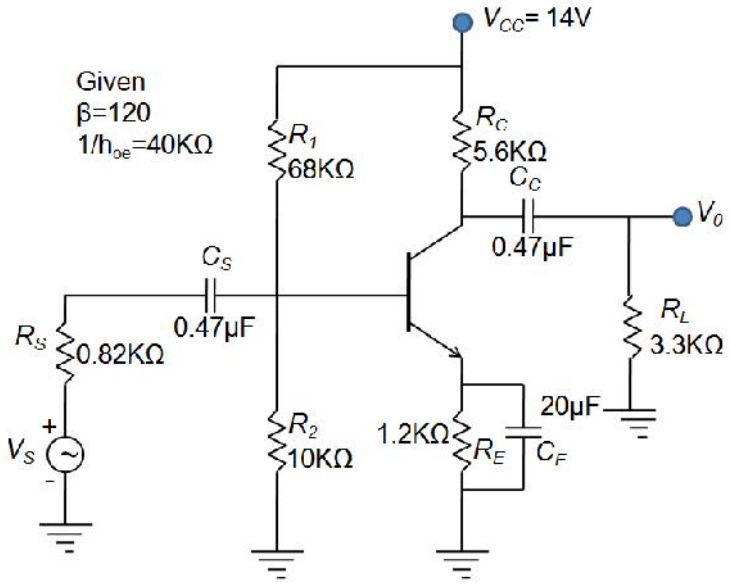
   $\frac{-h_{fe}R_L}{R_S + h_{ie} + h_{fe}R_L}$ by assuming hfe>>1. Neglect h_{re} and h_{oe}. 14M

OR

2. Draw the equivalent circuit of a CE amplifier using Millers theorem. What is the upper 3-dB frequency of such circuit? 14M

UNIT–II

3. Given β=120, 1/hoe=40KΩ.Obtain the cutoff frequencies associated with C_S, C_C, and C_E.



14M

OR

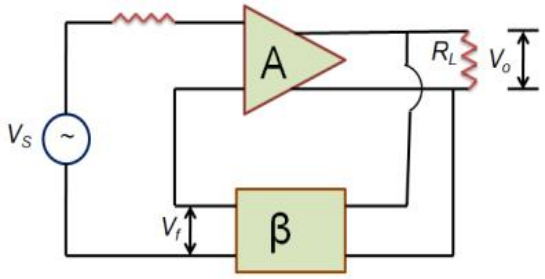
4. Consider a single stage CE transistor amplifier with the load resistor "R_L". Find out an approximation expression for the gain factor of this amplifier. 14M

UNIT–III

5. Derive the input impedance (Zi) and output impedance (Zo) of a voltage series –ve feedback amplifier in terms of its open loop parameters. 14M

OR

6. What are the advantages of providing negative feedback to an amplifier? A series shunt feedback amplifier represented by figure using a basic voltage amplifier operates with V_S=100mV and Vo=10V. What are the values of A and β?



14M

UNIT–IV

7. Why +ve feedback is generally used in oscillator circuits? Derive the oscillation frequency of a RC Phase Shift Oscillator. 14M

OR

8. What are the primary requirements to obtain steady oscillation at a fixed frequency? Sketch the topology of a generalized resonant circuit oscillator, using impedance Z_1, Z_2, Z_3. Reduce this circuit to Hartley and Colpitts oscillator choosing components suitably? At what frequency will this circuit oscillate? 14M

UNIT–V

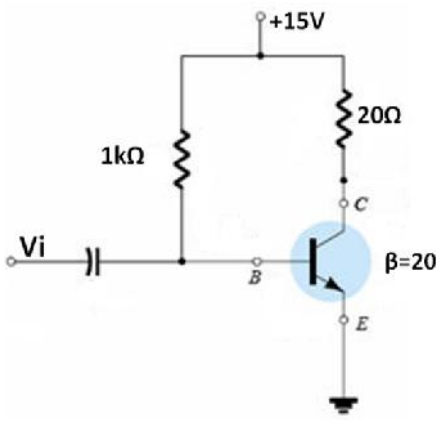
9. Explain the working principle of a push pull power amplifier. Justify your answer mathematically

   For a class-B Power Amplifier providing a 22V Peak signal to an 8Ω load and a power supply of VCC=25V. determine:

   (a) Input Power, Pi(dc)
   (b) Output Power, Po(ac) and
   (c) Circuit efficiency, %η. 14M

OR

10. a) Derive the maximum efficiency of a series fed class A Power amplifier.
    b) For the circuit shown, calculate the input power, the output power and efficiency of the amplifier for an input voltage resulting in a base current of 10mA peak.



14M

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Hall Ticket Number :										

R-14

Code: 4G333

II B.Tech. I Semester Supplementary Examinations November 2019

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

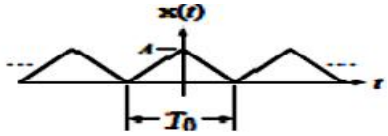
1. a) Explain how a function can be approximated by a set of orthogonal functions. 6M

   b) State and prove any four properties of Fourier Series 8M

OR

2. a) A rectangular function f(t) is defined by f(t) = 1 for 0 < t <π and -1 for π<t<2π. Approximate this function by a waveform sint over the interval (0, 2π) such that the mean square error is minimum 7M

   b) Obtain the trigonometric Fourier series for the signal x(t)



7M

UNIT–II

3. a) State and prove Differentiation and integration properties of Fourier Transform. 7M

   b) Discuss about Hilbert transform with required equations 7M

OR

4. a) Analyze how Fourier transform is derived from Fourier series. 7M

   b) State and prove time convolution and time differentiation properties of Fourier Transform. 7M

UNIT–III

5. a) State and derive the relationship between bandwidth and rise time. 7M

   b) Discuss about distortion less transmission to a system with an example. 7M

OR

6. a) State and prove sampling theorem for band limited signals using graphical approach. 7M

   b) Determine output of an LTI system whose input and unit sample response are given as follows: $x(n) = b^n u(n)$ and $h(n) = a^n u(n)$. 7M

UNIT–IV

7. a) Determine the cross correlation between the two sequences x(n) = {1,0,0,1} and h(n) = { 4,3,2,1} 7M

   b) Graphically convolve the signals

$$X_1(t) = \begin{cases} 1 & for -T \le t \le T \\ 0 & else\ where \end{cases}$$ and

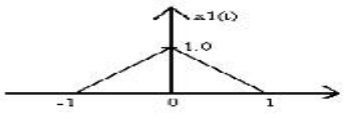
$$X_2(t) = \begin{cases} 1 & for -2T \le t \le 2T \\ 0 & else\ where \end{cases}$$

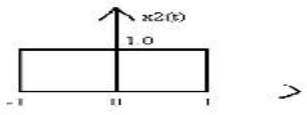
7M

OR

8 a) A system with impulse response e^{-t} u (t) is excited by a signal x(t) = e^{-2t} u(t) Find the output of the system using convolution in time property of Fourier transform. 7M

b) Find the Cross correlation between triangular and gate function as shown in below figure.





7M

UNIT–V

9 a) Find the inverse z-transform of $x(z) = (z^2 + z)/(z-1)(z-3), ROC: z > 3$ using i) Partial fraction method, ii) Residue method 7M

b) State and prove initial value and final value theorems of Laplace transform 7M

OR

10 a) Find the inverse z-transform of $x(z) = (z^2 + z)/(z-1)(z-3), ROC: z > 3$ using i) Partial fraction method, ii) Residue method and iii) Convolution method 9M

b) Find the inverse Laplace transform of F(s) = (s + 4) / (s+3) (s+2); -3 < Re(s) < –2. 5M

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