VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
FIRST SEMESTER
ANALOG CIRCUITS

Time : Three Hours   Maximum Marks:100 Marks

### Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   List the salient features of hybrid parameters.
2   Draw the hybrid equivalent circuit of a transistor.
3   Define amplifier.
4   Write the hybrid parameter equation for transistor amplifier.
5   List the types of feedback Amplifier.
6   List the general applications of oscillators.
7   Mention any two active devices used in power amplifiers.
8   Define Push pull Class B amplifier.
9   Classify the Types of Filters based on Frequency.
10   Write the formula for L in LPF.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Discuss in detail about Fixed bias circuit with its stability factor.

OR

   b.   Explain in detail source bias with relevant circuit diagram.

12 a.   Illustrate the Hybrid equivalent circuit of CB and CC Amplifiers.

OR

   b.   Determine the upper and lower ends of the DC load line for the circuit shown. Also find the
        Q-point and locate it on the DC load line.
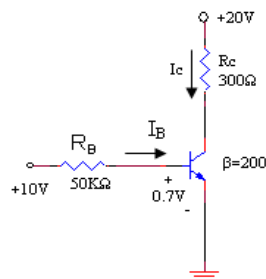
13 a. Illustrate the small signal low frequency model for an FET amplifier.

OR

b. If the common-emitter h –parameters of a transistor are given by hie= 2000, hfe = 49, hre = 5.5x10-4 and hoe = 2.5x10-5, solve for common base h-parameters of the transistor to find Av and Ai.

14 a. Demonstrate the expressions for the following of a small signal transistor CE amplifier in terms of the h-parameters – i) input impedance ii) Output admittance.

OR

b. Explain how Bar -khausen conditions are satisfied in Wein Bridge Oscillator.

15 a. Execute the necessary condition for a Wien bridge oscillator circuit to have sustained oscillations.

OR

b. Distinguish the expression for frequency of oscillation for RC Phase Shift oscillator using BJT with neat sketch.

16 a. Explain the Transformer coupled class a power amplifier and write advantage and disadvantage.

OR

b. Describe the working principle of single tuned amplifier with neat diagram.

17 a. Test that the maximum efficiency of Class A transformer coupled power amplifier is 50% and that of class B type is 78.5%.

OR

b. Derive the Expression for the Characteristic Impedance of T- Section and Pi- Section.

18 a. sketch a first order butter worth LPF circuit for a gain of 10, cut-off frequency of 160 KHz.

OR

b. Design the Band Pass Filter network using Constant k- LPF & HPF.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Determine $Vce_{(cut)}$ and $I_{c(Sat)}$ for AC and DC equivalent circuits of four resistor biasing and justify maximum dynamic range of output.

(P.T.O)

OR

b.   Execute the equations for voltage gain, current gain, input impedance and output admittance for a BJT using low frequency h-parameter model for (a) CE configuration (b) CB-configuration.

20 a.   Examine the voltage gain, input and output resistances of a voltage series feedback amplifier having AV = 300, Ri = 1.5 k, Ro = 50 k and β = 1/15.

OR

b.   Sketch and explain in detail the Low-pass R-C filter and Low-pass R-L filter circuit.

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SL.NO:2218

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
ELECTRICAL AND ELECTRONICS ENGINEERING
FIRST SEMESTER
SEMICONDUCTOR DEVICES AND CIRCUITS

Time : Three Hours   Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

1   Compare CE, CB, CC.
2   Draw the circuit diagram of class C tuned amplifier
3   Define current amplification factor.
4   Define the term threshold voltage
5   Mention the advantages of MOSFETs.
6   List various types of cascaded Small signal tuned amplifiers
7   Define gain bandwidth product of a tuned amplifiers.
8   What is voltage regulator? List some types.
9   What is the meant by operating point Q?
10   What is node sampling?

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.   Derive the expressions for the following of a small signal transistor amplifier in terms of the h-parameters i.   Current gain (4) , ii.Voltage gain (4) , iii.   Input impedance (4) , iv. Output admittance (4)

OR

b.   Explain in detail Half wave rectification with suitable diagram.

12 a.   Draw the crystalline structure of Germanium semiconductor and explain how free electron is generated.

OR

b.   Draw and explain in detail the input and output characteristics of a transistor in CE configuration with neat diagram.

13 a.   Explain the construction and working principle of JFET

OR

b.   Draw and explain Hybrid equivalent model.

(P.T.O)

14 a. Draw and explain various feedback topologies.

OR

b. Discriminate the operations between LC and RC oscillators.

15 a. With a neat diagram explain LC Oscillator.

OR

b. Draw the circuit diagram of voltage series feedback amplifier & derive the expressions for Rif, Rof.

16 a. Draw a circuit for Class C- amplifier and discuss its working

OR

b. Draw the circuit for a push-pull amplifier and discuss its working.

17 a. Obtain the expression for the 3dB bandwidth of an inductive coupled double tuned amplifier.

OR

b. Enlighten the construction and operation of PNP transistor, with necessary diagrams.

18 a. With a neat sketch explain Enhancement –Type MOSFET

OR

b. Describe the distortion in power amplifier and the methods to eliminate the same

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Derive the expression for the Stability factor and compare the Stability factors of BJT biasing.

OR

b. Explain the Depletion type MOSFET in detail.

20 a. Explain Emitter Bias configuration in detail.

OR

b. Explain the stabilization technique used in tuned amplifier?

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SL.NO:2217

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
FIRST SEMESTER
SEMICONDUCTOR DEVICES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Show the band structure of a PN junction diode.
2   Recall the need for biasing the transistor.
3   Define drain-source saturation current I_{DSS}.
4   Draw and label structure of MESFET.
5   Sketch the V-I characteristics of TRIAC
6   Determine the current flowing in the diode when 0.15v forward bias is applied at room temperature. When a reverse bias is applied to a germanium PN junction diode, the reverse saturation current at temperature is 0.3μA.
7   Discuss the input and output waveform of CE configuration.
8   List out the advantages and disadvantages of tunnel diode
9   Mention any two merits of GaAs diode.
10   Recite Photo transistor

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Illustrate the crystalline structure of Germanium semiconductor and explain how free electron is generated.

OR

b.   Illustrate the operation of half wave rectifier circuit with neat sketch

12 a.   Examine the various methods to test the transistor.

OR

b.   Determine the characteristics of Depletion-type MOSFET.

13 a.   Show the drain characteristics of both n-channel and p-channel JFET.

OR

b.   Show how Schottky diode can be used as a harmonic generator.

14 a.   Compare the Tunnel diode, Schotty diode and Varactor diode

OR

b. Discuss about the construction and operation of LED, with neat diagram.

15 a. Describe the input and output characteristics of CB configuration of NPN transistor.

OR

b. Discuss the operation and characteristics of voltage follower circuit.

16 a. Explain the operation of N-channel JFET and derive its drain characteristics.

OR

b. Explain the construction and operation of DE- MOSFET.

17 a. Draw and explain the characteristics of Zener diode.

OR

b. Sketch and explain the working principle of Varactor diode

18 a. With neat sketch explain the operation of Charged Coupled Devices (CCD)

OR

b. Explain the working principle of VMOS

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Demonstrate the principle and working of LASER diode with neat diagram.

OR

b. Illustrate the drain current, output conductance and Transconductance of N-channel JFET.

20 a. Compare and contrast LED,LCD and CCD

OR

b. Explain the working principle of UJT and mention its advantages.

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SL.NO:2216

VINAYAKA MISSION'S RESEARCH FOUNDATION
(Deemed to be University)
B.E.DEGREE EXAMINATIONS- APRIL - 2022
COMMON TO ALL BRANCHES
PHYSICAL SCIENCES
(Candidates admitted under 2021 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks
PART A - ENGINEERING PHYSICS

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   Recognize the characteristics of laser.
2   Schedule any two applications of holography.
3   Tell about the characteristics of graded index multimode fiber.
4   Express about piezo-electric effect.
5   Schedule the Industrial applications of ultrasonic waves

Answer **Any FIVE** questions
Part-B (2 x12 =24 Marks)

6 a.   Predict the applications of laser in communication, military and chemical fields.
OR
 b.   Express the various types of fibers based on refractive index profile.

7 a.   Practice obtaining the expression for velocity of SONAR.
OR
 b.   Interpret the biological and chemical applications of ultrasonics.

Answer ALL questions
PART-C (1 x 16 = 16)

8 a.   Tell about holography. Illustrate the construction and working of holography with neat diagram.
OR
 b.   Demonstrate piezo- electric effect? Explain with a neat circuit, the generation of ultrasonic using a piezo- electric oscillator.

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PART B - ENGINEERING CHEMISTRY
(Candidates admitted under 2021 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   What is EDTA? Write its structure?
2   How calgon conditioning is superior than other methods?
3   Define electrochemical series.
4   State pilling bed worth rule.
5   Recall cetane number.

Answer **Any FIVE** questions
Part-B (2 x12 =24 Marks)

6 a.   How is exhausted resin regenerated in an ion-exchanger? What are merits and demerits of ion-exchange method?

OR

   b.   List out the various water quality parameters for the drinking water.

7 a.   Discuss about electrochemical series and their applications.

OR

   b.   What is power alcohol? Explain its manufacture, properties of power alcohol.

Answer ALL questions
PART-C (1 x 16 = 16)

8 a.   How is internal treatment of boiler water carried out using phosphate, Carbonate, Sodium aluminate and calgon conditioning?

OR

   b.   Explain Otto-Hoffman's by product oven method for manufacture of metallurgical coal.

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S.No.2005

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
FIRST SEMESTER
SIGNALS AND SYSTEMS
(Candidates admitted under 2021 Regulations-SCBCS)

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define CT delta function.
2   Prove that

$$u(n) = \sum_{k=0}^{\infty} \delta(n-k)$$

3   Define Nyquist rate and Nyquist Interval.
4   List the cause of Aliasing.
5   Determine the convolution of the following sequence
        x(n)= {1,1} h(n)={2,2}

6   Identify when a LTI-CT system is said to be dynamic.
7   State the Differentiation and Integration properties of Fourier Transform.
8   State Polar Fourier series.
9   List out the methods of obtaining inverse Z transform.
10   State the time reversal properties of z transform.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Show the following signals
        i. u(-t+1)
        ii. -2u(t-1)
        iii. 3r(t-1)
        iv. -2r(t)
        v. r(-t+2)

OR

 b.   Determine the classification of CT signals with examples.

(P.T.O)

12 a.   Illustrate the odd and even components of the following signal.
        x[n]= {-2,1,2, -1,3}

OR

b.   Determine the convolution sum between x(n) = [1, 4, 3, 2] and h(n) = [1, 3, 2, 1].

13 a.   Determine the z-transform of
        x(n)= | an for 0≤ n ≤N-1
              | 0 otherwise

OR

b.   Explain in detail about an ideal interpolator.

14 a.   Explain about modulation techniques used in communication.

OR

b.   Discuss sampling with an example.

15 a.   Calculate the system function & unit sample response of the system described by the difference
        equation
          y(n)-1/2y(n-1)=2x(n), y(-1)=0.

OR

b.   Determine the frequency response of the system having differential equation,

$$\frac{d^2y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 6\,y(t) = -\frac{dx(t)}{dt}$$

16 a.   Examine the following systems are stable and causal.
        i) h(t)=e-2t u(t-1)
        ii) h(t)=e-4t u(t+10)

OR

b.   Solve the following signals to obtain continuous time Fourier transform.
        i. coswct u(t)
        ii. sinwct u(t)

17 a.   Interpret the relationship between Fourier series and Fourier Transform

(P.T.O)

OR

b. Examine and prove
i. Linear property of Fourier Transform
ii. Shifting property of Fourier Transform

18 a. Determine the natural response for the following system
y(n)-1/4y(n-1)-1/8y(n-2) = x(n)+x(n-1) with y(-1)=0,y(-2)=1.

OR

b. Determine z-transform using its properties.
i. x(n)=u(-n)
ii. x(n)=n(n+1)u(n)

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Calculate the frequency response and the impulse response of an LTI System with the differential equation

$$\frac{\partial^2 y(t)}{\partial t^2} + 4\frac{\partial y(t)}{\partial t} + 3y(t) = \frac{\partial x(t)}{\partial t} + 2x(t)$$

OR

b. Calculate the range of values of 'a' and 'b' for which the LTI system with impulse response

$$h(n) = a^n ; n \geq 0$$

$$= bn; n<0 \text{ is stable}$$

20 a. Determine complex exponential Fourier coefficient for the signal x(t)=4+2cos3t+3sin4t. Also calculate the total power of x(t).

OR

b. Determine the inverse Z transform of the following function

$$X(z) = \frac{(1/4)Z^{-1}}{(1-(1/2)Z^{-1})(1-(1/4)Z^{-1})}$$

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