KADI SARVA VISHWAVIDHYALAYA

BE 3ʳᵈ Semester Electronics & Communication Dept.
Examination –April 2015

Sub code: EC- 303   **Sub Name: Basic Electronics**
Date:15/4/2015   **Time:10:30am to 01:30pm**   **Total Marks:70**

Instructions:

1. Answer Each Section in Separate Answer sheet.
2. Use of Scientific Calculator is permitted.
3. All questions are separate
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of supplementary for rough work.

SECTION I

Q.1	(a)	Explain half-wave rectifier and Find out Efficiency.	[05]
	(b)	Write principle and applications of light emitting diode	[05]
	(c)	Explain Diode Capacitance	[05]

OR

	(c)	Explain P-N Diode.	[05]

Q.2	(a)	Explain energy band diagram of insulator, semiconductor and conductor.	[05]
	(b)	Explain Comparison of CE,CB & CC Configuration.	[05]

OR

Q.2	(a)	Explain CC Configuration.	[05]
	(b)	Explain Intrinsic and Extrinsic semiconductor.	[05]
Q-3	(a)	Explain Hall effect. Derive expression of Hall voltage and Applications.	[05]
	(b)	Explain how "P" type & "N" type semi conducting material formed.	[05]

OR

|			
Q-3	(a)	Compare V-I characteristics of silicon and germanium p-n junction diode	[05]
	(b)	full-wave center-tapped rectifier A circuit is shown in **Fig**.1. Assume that for each diode, the cut-in voltage, $V_\gamma = 0.6V$ and the diode forward resistance, r_f is 15Ω. The load resistor, R = 95 Ω. Determine the peak output voltage, V_o across the load, R Sketch the output voltage, V_o and label its peak value.	[05]
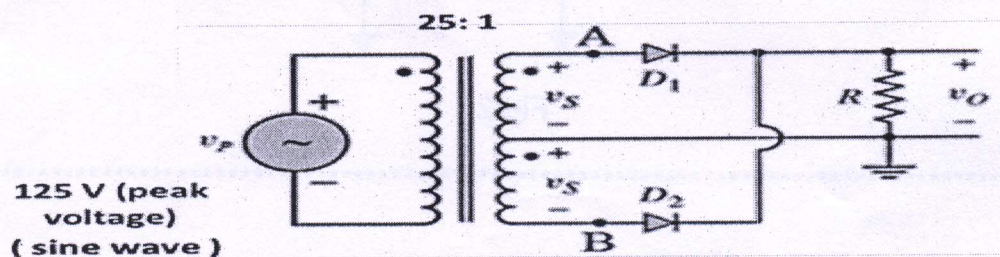
Fig-1

SECTION II

Q.4 (a)   Draw Circuits And Explain.   [05]
      (a) N-channel Depletion type MOSFET   (b) P-channel enhancement MOSEFT

   (b)   Explain N-Channel JEFT   [05]

   (c)   The data sheet of a JFET gives the following information : IDSS = 3 mA, VGS   [05]
      (off) = – 6V and gm (max) = 5000 µS. Determine the transconductance for VGS
      = – 4V and find drain current ID at this point.

<div align="center">OR</div>

   (c)   Classification Of Different Types of Amplifiers   [05]

Q.5 (a)   Hybrid Equivalent Model for Transistor Configuration.   [05]
   (b)   Explain Miller theorem.   [05]

<div align="center">OR</div>

Q.5 (a)   Explain P-channel Depletion type MOSFET.   [05]
   (b)   Explain pinch off condition.   [05]

Q-6 (a)   Explain two stage RC couple Amplifier.   [05]
   (b)   Determine ID and VGS for the JFET with voltage-divider bias in **Fig. 2** given   [05]
      that VD = 7V

<div align="center">OR</div>

Q-6(a)   Explain JFET with Voltage-Divider Bias.   [05]

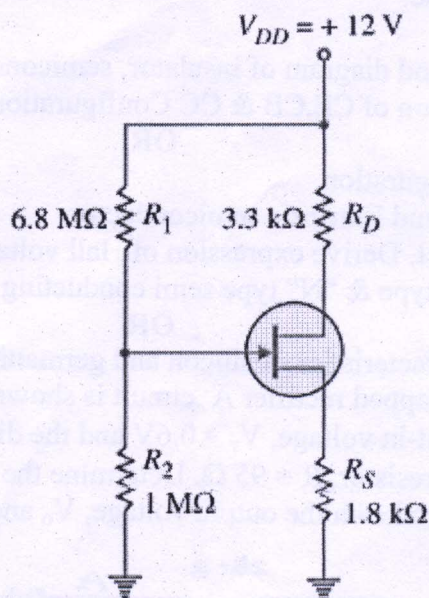   (b)   Analysis of C.E Amplifier With Unbypassed Emitter Resistance in H-parameter.   [05]

$V_{DD} = + 12$ V

6.8 MΩ R_1 3.3 kΩ R_D

R_2 1 MΩ R_S 1.8 kΩ

Fig-2

****

KADI SARVA VISHWAVIDYALAYA
B.E. SEMESTER 3rd EXAMINATION NOVEMBER – 2015

SUBJECT CODE: EC – 303   **SUBJECT NAME**: BASIC ELECTRONICS
DATE: 03/12/2015   **TIME**: 10:30AM To 1:30PM   **TOTAL MARKS**: 70

Instructions:

1. Answer each section in separate answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly**, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

Section – 1

Que. 1 (All Compulsory)

    (A)   Answer Following Questions.   **(5)**

1) Which type of transformer is required to create a 180 degree input to a rectifier?
a) center-tapped secondary   b) step-down secondary
c) stepped-up secondary   d) split winding primary

2) The dc current through each diode in a bridge rectifier equals:
a) the load current   b) half the dc load current
c) twice the dc load current   d) one-fourth the dc load current

3) The primary function of the bias circuit is to
a) hold the circuit stable at V_{CC} b) hold the circuit stable at V_{in}
c) ensure proper gain is achieved   d) hold the circuit stable at the designed Q-point

4) Ionization within a P-N junction causes a layer on each side of the barrier called the:
a) junction   b) depletion region
c) barrier voltage   d) forward voltage

5) A "U" shaped, opposite-polarity material built near a JFET-channel center is called the:
a) gate   b) block
c) drain   d) heat sink

    (B)   Explain in detail the energy band diagram of Insulator, Semiconductor and Conductor.   **(5)**
    (C)   Write a short note on Filters used in Rectifier Circuits.   **(5)**

OR

    (C)   State and prove Miller's theorem and its dual.   **(5)**
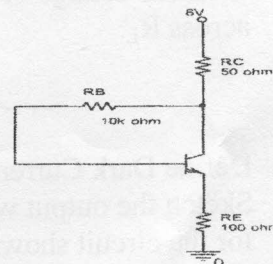
Que. 2   Answer the following questions.

    (A)   Explain peace wise linear diode model.   **(5)**
    (B)   For circuit of Fig. 1, calculate the minimum & maximum value of emitter current when β of transistor varies from 75 to 150. Also calculate the corresponding values of collector to emitter voltage. Take VBE = 0.3V, R_b=10kΩ, R_c= 50 Ω, R_e = 100 Ω, V_{cc}= +6V.   **(5)**

OR

    (A)   Justify BJT is a Current Controlled Device and FET is a Voltage Controlled Device.   **(2)**
    (B)   For a Full wave centre tap rectifier maximum voltage across half secondary winding is 50V. Find 1) average load voltage 2) peak inverse voltage 3) Output frequency. Assume diodes are ideal.   **(3)**
    (C)   Explain working of N channel JFET with O/P characteristics.   **(5)**

1

Que. 3 **Answer the following questions.**

    (A)   Explain Hall effect with its application.   (5)

    (B)   Draw & Explain DC load line & operating point in Common Emitter Amplifier.   (5)
          Parameters are given below. V_{BB} = 10V, R_i=0.5MΩ, R_L=6kΩ, V_{CC}=12V, β=50.

OR

    (A)   Explain two stages R-C Coupled Amplifier with necessary Diagrams.   (5)

    (B)   Explain Voltage Divider Bias stabilization technique with circuit diagram.   (5)

Section – 2

Que. 4 **(All Compulsory)**

    (A)   Define Following Terms.   (5)
          1) Pinch Off Voltage   2) Mobility   3) Mean life time of a carrier
          4) Barrier potential   5) Peak Inverse Voltage

    (B)   Write a short note on base-width modulation (Early effect) for Transistor.   (5)

    (C)   Define h-parameters, and draw h-parameter equivalent circuit for Common Emitter   (5)
          Configuration and give significance of h parameter model.

OR

    (C)   Write a short note on Thermal Runaway for Transistor.   (5)

**Que. 5** **Answer the following questions.**

    (A)   Draw diode V-I characteristic and explain diode Static and Dynamic Resistances.   (5)

    (B)   State the use of clipping circuits. Discuss with neat sketch working of a biased parallel   (5)
          clipper.

OR

    (A)   Sketch the full-wave Bridge rectifier circuit and explain its operation with necessary   (5)
          waveforms.

    (B)   Justify Following statements.   (5)
          1) While Operating in Reverse Breakdown region PN junction Diode is damaged but
          Zener is not.
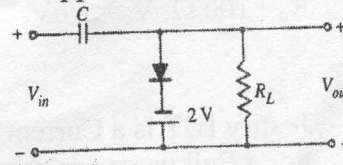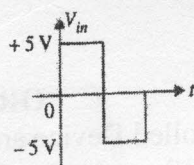   2) Si and Ge have negative temperature co-efficient of resistance.

Que. 6 **Answer the following questions.**

    (A)   Explain the operation of Emitter follower amplifier. Why is it named as emitter   (5)
          follower?

    (B)   For Given Circuit Determine   (5)
          range of R_L that will result in
          constant voltage of 10 V
          across R_L.
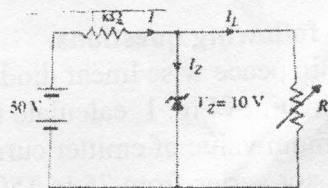
OR

    (A)   Define Dark Current and explain about Photodiode with Applications.   (5)

    (B)   Sketch the output waveforms   (5)
          for the circuit shown in
          Figure.

--------------- **ALL THE BEST** ---------------

2