

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics & Communication Engineering
B. Tech. (CSE/ECE/ME) Minor 1 Examination Jul.-Dec. 2018

Entry No: 1 E B E C O 6 6

Total Number of Pages: [01]

Total Number of Questions: [04]

Course Title: Basic Electronics

Course Code: ECL 1010

M.M.: 10

TIME: 1:00 Hours

Instructions / NOTE

- i. Attempt All Questions.
- ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- iii. Assume any missing data to suit the case / derivation / answer.
- iv. Abbreviated terms have their usual meaning.

Q1. Discuss the breakdown mechanisms in pn-junction diode. What are the differences [2.5]
between Zener and Avalanche breakdowns?

Q2. In a certain conductor cross-sectional area of 10^{-7} m^2 and there are $A = 10^{-7}$ [2.5] $n = 10^{23}$
 $10^{23} \text{ electrons/m}^3$ with the mobility of $0.4 \text{ m}^2/\text{V.s}$. Determine the resistivity and
resistance of conductor length of 15 cm. $\rho = 15 \times 10^{-9} \text{ ohm m}$

Q3. Explain the Hall effect with neat sketches and its applications. [2.5]

Q4. A germanium diode carries a current of 10 mA when a forward bias of 0.2 V is [2.5]
applied. Calculate:

(A) The reverse saturation current at room temperature.

(B) Bias voltage needed for diode current of 1 mA.

CO:

1. Basic understanding of semi-conductor physics
2. Basic understanding of semi-conductor diode

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
B. Tech. (ECE/CSE/ME-I) Semester Examination (Minor-II) 2018-19

Entry No: _____

Total Number of Pages: [1]

Date: 13th Oct, 2018

Total Number of Questions: [5]

Course Name: Basic Electronics
Course Code: ECL1010

Time Allowed: 1.5 Hours**Max Marks: [30]****Instructions / NOTE**

- i. Attempt All Questions.
- ii. Support your answer with diagrams / neat freehand sketches, wherever appropriate.
- iii. Assume any missing data to suit the derivation / answer.

Q1. ~~(a)~~ Define RMS current, and derive the RMS value of current and voltage in full-wave diode rectifier. [3] 3

~~(b)~~ Determine I_L and V_{out} in diode circuit of Fig. 1. [3]

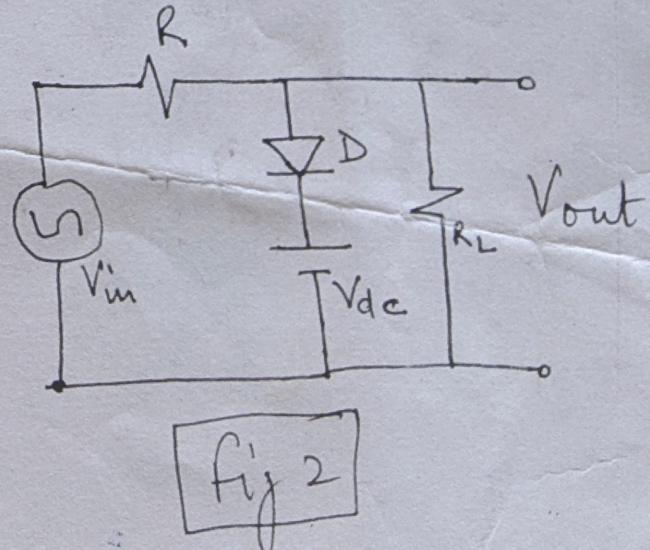
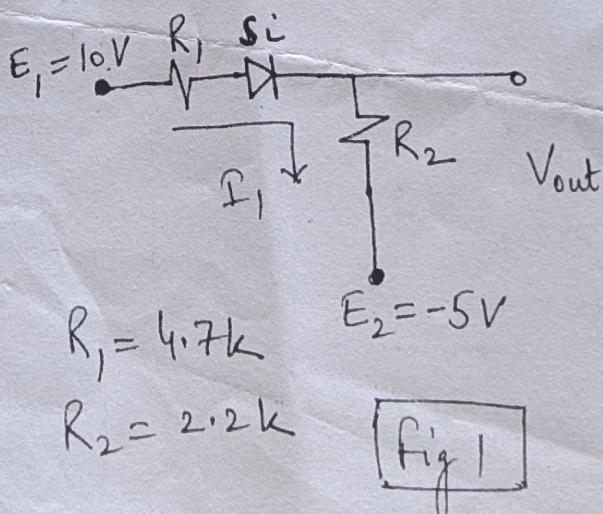
XQ2. A bridge rectifier is applied with input from step-down transformer having turns-ratio of 8:1, and input of 230V, 50 Hz. Forward resistance of diode is 1Ω , series resistance is 10Ω , and load resistance is $2K$. Determine i) DC-output power, ii) PIV across each diode, iii) percentage efficiency, iv) ripple-factor, v) ac-power. [6]

Q3. ~~(a)~~ Draw the complete output waveform for the circuit shown in Fig. 2, for the input as shown in figure. Mention the values in output waveform clearly. [3] 1.6

~~(b)~~ Draw the basic structure of a Bipolar Junction Transistor. [3] 6

Q4. ~~(a)~~ Draw input and output characteristics with circuit diagrams for npn-BJT in Common-base and Common Emitter configuration. Mention advantages and limitations of both configurations in tabular form. [6] 3

Q5. In an NPN transistor with $\alpha=0.995$, I_E is 10mA and the collector-to-base leakage current is 0.5 μ A. Determine the values of I_C , I_B . [6] 1.5 0.7

**Course Outcomes (CO):**

1. Electronic Circuits and applications of semiconductor diodes [15]
2. Theory and electronic circuit design of Bipolar Junction Transistors [15]

$\frac{1}{10m} \frac{1}{100m} \frac{1}{1m}$

$V = IR$ $\frac{10}{100m} = 100$

$T_{imo} = 0$

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
B. Tech. (ECE/CSE/ME-I) Semester Examination (Major) 2018-19

Entry No: **1 8 3 M E 0 2 9**

Total Number of Pages: [1]

Date: 1st Dec, 2018

Total Number of Questions: [5]

Course Name: Basic Electronics

Course Code: ECL1010

Time Allowed: 3 Hours

Max Marks: [50]

Instructions / NOTE

- i. Attempt All Questions.
- ii. Support your answer with diagrams / neat freehand sketches, wherever appropriate.
- iii. Assume any missing data to suit the derivation / answer.

- Q1.** (a) A potential difference of 10V is applied longitudinally in a rectangular specimen of intrinsic Ge of length 25mm, width 4mm, and thickness 1.5mm. Determine at room temperature (i) electron and hole drift velocities, (ii) the conductivity of intrinsic Ge if intrinsic carrier density is $2.5 \times 10^{19}/m^3$, and total current. [5] CO1
 (b) The reverse saturation current of silicon diode is 5 mA at room temperature. Find the diode current at (i) 40 °C and forward voltage of 0.3V, (ii) 60 °C and forward voltage of 0.5V. [5] CO1
- Q2.** (a) For BJT, explain current amplification factor, α and current gain factor, β , determine the relation between these. [4] CO2
 (b) Describe BJT as two-port network. Determine its h-parameters for Common-Emitter configuration. Support your answer with neat diagrams and equations. [6] CO3
- Q3.** (a) A BJT is connected in common emitter configuration in which V_{CC} is 8V, and voltage drop across R_C is 0.5V. $R_C = 80\Omega$. If $\alpha=0.96$. Determine V_{CE} and I_B . [5] CO2
 (b) For a voltage divider bias circuit shown in Fig.1. Find I_C , V_{CE} , I_B , I_E , V_E , if $\beta=150$. [5] CO3
- Q4.** (a) Describe the construction, operation and characteristics of n-channel E-MOSFET. [5] CO4
 (b) Tabulate at-least 6 differences between BJT and FET. [3] CO4
 (c) Tabulate 4 differences between n-channel and p-channel JFET. [2] CO4
- Q5.** (a) Describe using neat-diagrams, the construction, operation and I-V characteristics of Silicon Controlled Rectifier. [5] CO5
 (b) What is an oscillator? Describe in few words, a Hartley and Colpitts Oscillator with neat circuit diagrams. [5] CO5

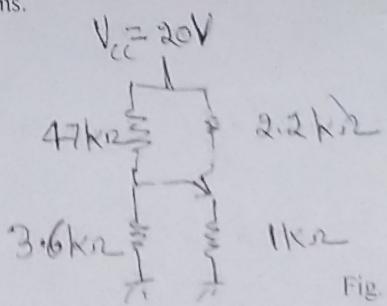
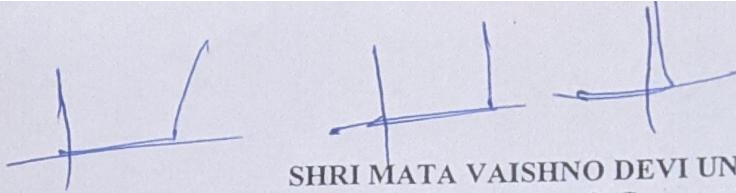


Fig. 1

Course Outcomes (CO):

1. Electronic Circuits and applications of semiconductor diodes
2. Theory and electronic circuit design of Bipolar Junction Transistors
3. Describe DC load line and bias point. List, explain, and design and analyze the different biasing circuits, introducing h-parameters
4. Theory, structure of Field Effect Transistor. Explain the operation of each type of this device
5. Sketch, explain the oscillator, discuss the principles, and oscillator types



SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics & Communication Engineering
B. Tech. (CSE/ECE/ME) Minor Examination Jul.-Dec. 2019

Entry No: 19BCS051

Total Number of Pages: [01]
Total Number of Questions: [06]

Course Title: Basic Electronics
Course Code: ECL 1010

Time Allowed: 1:30 Hours

Max Marks: [30]

Instructions / NOTE

- Attempt All Questions.
- Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- Assume any missing data to suit the case / derivation / answer.
- Abbreviated terms have their usual meaning.

$$\sigma = nev$$

$$J = \frac{nev}{\tau}$$

$$I = neA Vd$$

$$V = e \mu$$

$$J = IA$$

$$I = \rho A Vd$$

Q1. Explain the Hall effect and its applications. Derive the formula for Hall Voltage. [2+3]

Q2. A copper wire of 2 mm diameter with conductivity of $5.8 \times 10^7 \text{ S/m}$ and electron mobility of $0.0032 \text{ m}^2/\text{V.s}$ is subjected to an electric field of 20 mV/m . Find (A)

Charge density of free electrons (B) Current density (C) Current flowing in the wire (D) Electron drift velocity.

$$V = 20 \times 10^{-3} \text{ mV}$$

Q3. Discuss the forward and reverse bias operation of *pn* junction diode with VI characteristics. [5]

Q4. A Silicon diode has reverse saturation current of $2.5 \mu\text{A}$ at room temperature. Find the forward bias voltage for a forward bias current of 10 mA . [5]

Q5. Derive the DC and RMS values of voltage for half wave rectifier circuit. [5]

Q6. Explain the different diode equivalent circuits with neat and clean diagrams. [5]

CO:

$$\sin \omega t$$

$$\rightarrow \cos \omega t / \omega$$

$$\frac{\pi}{2}$$

1. Basic understanding of semi-conductor physics

2. Basic understanding of semi-conductor diode

$$V = Ed$$

$$BV = E$$

$$ne \mu$$

$$nev$$

$$J =$$

$$\sqrt{4 \pi \epsilon_0} \frac{A}{\lambda} \sin(\omega t) \propto I$$

$$I = neAvd$$

$$J = IA$$

$$f = \frac{Ne}{V}$$

$$\mu e = V$$

$$I = neAvd$$