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 | 6 | B | E | C | 0 | 6 | 6 | | |

Total Number of Pages: [01]
Total Number of Questions: [04]

Course Title: Basic Electronics
Course Code: ECL 1010

TIME: 1:00 Hours M.M: 10

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 between Zener and Avalanche breakdowns? [2.5]

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

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 applied. Calculate: [2.5]

(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]**

(b) Determine I_1 and V_{out} in diode circuit of Fig. 1. **[3]**

Q2. 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]**

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

Q4. 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]**

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

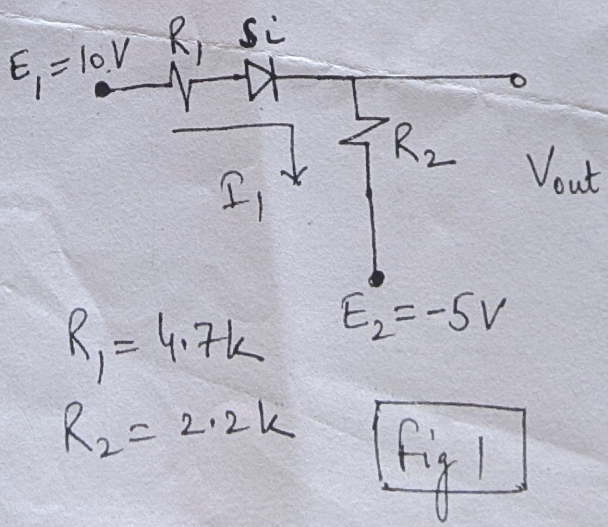

Fig 1

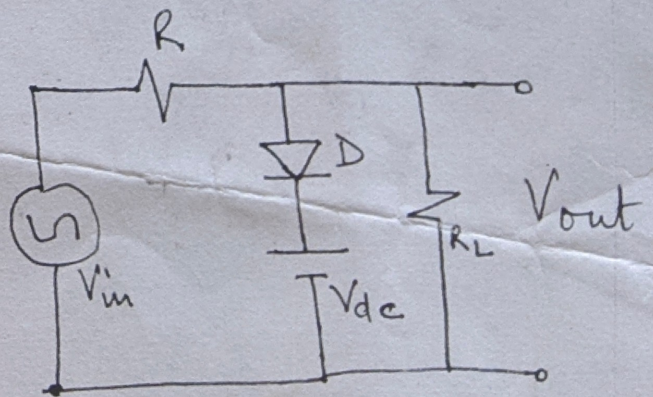

Fig 2

Course Outcomes (CO):

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

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

B. Tech. (ECE/CSE/ME-I) Semester Examination **(Major) 2018-19**

Entry No: 1 8 B 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 of intrinsic carrier density is $2.5 \times 10^{19}/m^2$, 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**

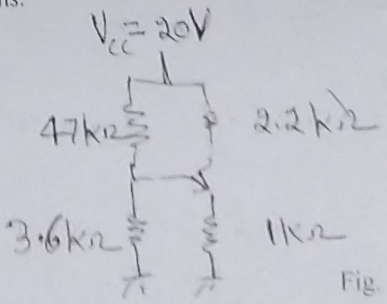

Fig. 1

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: | 1 | 9 | B | C | S | 0 | 5 | 1 |

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
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. 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 5.8×10^7 *s/m* and electron mobility of $0.0032\ m^2/V.s$ is subjected to an electric field of *20mV/m*. Find (A) Charge density of free electrons (B) Current density (C) Current flowing in the wire (D) Electron drift velocity. [5]

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 $2.5\mu A$ at room temperature. Find the forward bias voltage for a forward bias current of *10mA*. [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:
1. Basic understanding of semi-conductor physics
2. Basic understanding of semi-conductor diode

श्री माता वैष्णो देवी विश्वविद्यालय

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

SCHOOL OF ELECTRICAL ENGINEERING

विज्ञान ग्रह

B. Tech. (EE – 2nd Sem.) **Minor-I Examination** (Even Sem.), 2018-19

Entry No: 2 8 B E E 0 0 6

Date:

Total Number of Pages: 01

Total Number of Questions: 05

Time: 1.5 Hours

Course Title: Basic Electronics
Course Code: ECL 1010

MM: 20

Instructions:

i. *All questions are compulsory.*
ii. ***Question 4 has a choice.***
iii. *Assume any data if required and Support your answer with neat freehand sketches/diagrams, wherever appropriate.*
iv. *Sharing of calculator and stationery items is not permitted.*

Q. 1. A) What PIV rating must a diode have to be used in a centre tap rectifier with a peak output voltage of 50 V? *(1)* CO2

B) Express 5 electron-volts in joules. *(1)* CO1

C) Describe the Hall Effect. *(2)* CO1

Q. 2. A) Classified the solids on the basic of energy band. *(2)* CO1

B) Explain the behavior of Extrinsic material at high temperature, with example. *(1)* CO1

Q. 3. A germanium diode carries a current of 1 mA at room temperature (20°C) when a forward bias of 0.15 V is applied. (a) Estimate the reverse saturation current at room temperature and 20°C above room temperature. (b) How much forward bias is to be changed for 100-times increase in current at room temperature? *(5)* CO1

Q. 4. Define the working principle of Bridge type full wave rectifier with wave form. Formulate the expression for efficiency and ripple factor of full wave rectifier. *(2+2+1)* CO2

OR

A crystal diode having internal resistance r_d=*20* ohms is used for half wave rectification as shown in Fig. 1. If the applied voltage $v=50\sin\omega t$ and a load resistance R_L=800 ohms, find:
(i) I_m, I_{dc}, and *Irms*
(ii) ac-power input and de-power output
(iii) dc-output voltage
(iv) efficiency of rectification
(v) ripple factor.

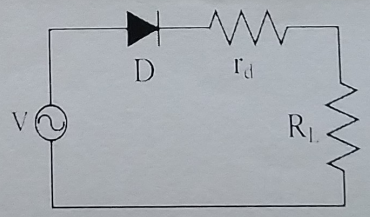

Fig. 1.

Q. 5. A) What is the diode limiter? *(1)* CO2

B) Determine V_0 with wave form for the network of Fig. 2 for the input indicated. *(2)* CO2

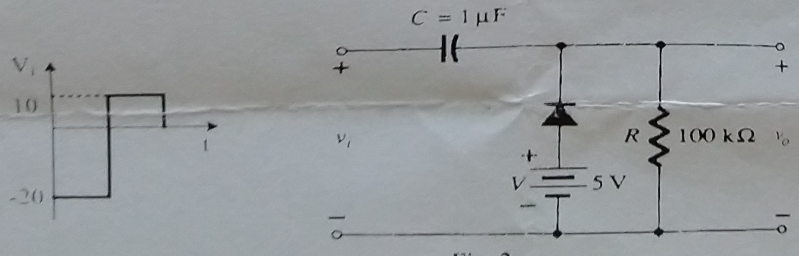

Fig. 2.

CO	Course Outcomes	Question Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	To learn basic concepts of semiconductor devices.	1(B), 1(C), 2(A), 2(B), 3	11	35
CO2	To analyse and design rectifiers.	1(A), 4, 5(A), 5(B)	09	
		TOTAL	20	