



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## ELECTRICAL AND ELECTRONICS ENGINEERING

### ASSIGNMENT

Course Name	:	ELECTRONIC DEVICES AND CIRCUITS
Course Code	:	A30404
Class	:	II B. Tech I Semester
Branch	:	Electrical and Electronics Engineering
Year	:	2016 - 2017
Course Faculty	:	Mr. B. Naresh, Assistant Professor

### OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
<b>UNIT - I</b> <b>P-N JUNCTION DIODE</b>			
<b>Part – A (Short Answer Questions)</b>			
1	Write the differences between avalanche and zener breakdown mechanisms?	Remember	1
2	Sketch the V-I characteristics of p-n junction diode for forward bias voltages. Distinguish between the incremental resistance and the apparent resistance of the diode?	Evaluate	2
3	Distinguish between drift and diffusion current in a semiconductor. State continuity equation?	Analyze	1
4	Define forbidden energy gap?	Remember	1
5	With appropriate circuit diagram explain the DC load line analysis of semiconductor diode?	Analyze	2
<b>Part – B (Long Answer Questions)</b>			
6	Explain the V-I characteristics of Zener diode and distinguish between Avalanche and Zener Break downs?	Understand	1
7	Define static resistance & dynamic resistance?	Remember	1
8	Define Fermi level?	Remember	1
9	Explain why a SCR is operated only in the forward biased condition?	Understand	2
10	List the applications of Varactor diode?	Analyze	2
11	What is the principle of operation of photodiode?	Remember	1
12	Define DIAC?	Remember	1
13	Explain in detail, the variation of following semiconductor parameters with temperature,	Understand	1

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
	i) Energy gap      ii) Conductivity.		
<b>UNIT - II</b> <b>RECTIFIERS AND FILTERS</b>			
<b>Part – A (Short Answer Questions)</b>			
1	Compare the rectifier and regulator?	Understand	3
2	Draw the circuit of a half-wave-rectifier and find out the ripple factor, % regulation? Efficiency and PIV?	Remember	4
3	Draw the circuit diagram of full wave rectifier? What are the merits of full wave rectifier?	Evaluate	4
4	Draw the circuit of bridge rectifier and explain its operation with the help of input and output waveforms?	Remember	3
5	Draw the block diagram of shunt and serial voltage regulator?	Remember	3
<b>Part – B (Long Answer Questions)</b>			
6	Give the advantages and disadvantages of HWR and FWR?	Remember	3
7	What is the need for voltage regulators? What are the drawbacks of unregulated power supply?	Remember	3
8	Explain the necessity of a bleeder resistor in an L – section filter used with a Full Wave filter?	Understand	4
9	Explain about multiple L-section and multiple $\pi$ -section filters?	Understand	4
10	Explain the operation of L-section filter and derive expression for ripple factor?(FWR)	Understand	4
11	Explain about zener regulator?	Understand	3
12	Compare the performance of Inductor filter and capacitor filter?	Understand	3
<b>UNIT - III</b> <b>BIPOLAR JUNCTION TRANSISTOR AND UJT</b>			
<b>Part – A (Short Answer Questions)</b>			
1	With a neat diagram explain the various current components in an NPN bipolar junction transistor & hence derive general equation for collector current, $I_C$ ?	Understand	5
2	Define Early-effect; explain why it is called as base-width modulation? Discuss its consequences in transistors in detail?	Remember	6
3	Draw the input and output characteristics of a transistor in common emitter configurations?	Understand	5
4	What is meant by operating point Q?	Understand	5
5	Explain the operation of BJT and its types?	Understand	5
<b>Part – B (Long Answer Questions)</b>			
6	Explain the breakdown in transistor?	Understand	5
7	Explain about transistor amplifier?	Understand	6
8	Explain about the various regions in a transistor?	Understand	5
9	Define $h_{ie}$ and $h_{fe}$ in CE configuration?	Remember	6
10	Draw the hybrid model of a CB configuration?	Remember	6
11	What is thermal runaway in transistors? Obtain the condition for thermal stability in transistors?	Remember	5
12	What are the differences between BJT and UJT?	Understand	5
13	Draw the V-I characteristics of UJT?	Understand	6
<b>UNIT - IV</b> <b>TRANSISTOR BIASING AND STABILIZATION</b>			
<b>Part – A (Short Answer Questions)</b>			
1	Why biasing is necessary in BJT amplifiers?	Remember	7
2	Draw and explain the ac load line?	Evaluate	9

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
3	Compare the advantages and disadvantages of biasing schemes?	Remember	7
4	Draw the collector-emitter feedback bias circuit and obtain the expression for the stability factor?	Understand	10
5	Define 'Thermal Runaway' in transistors? Derive the condition to prevent 'Thermal Runaway' in Bipolar Junction Transistors?	Remember	8
<b>Part – B (Long Answer Questions)</b>			
6	Draw the circuit diagram of CC amplifier using hybrid parameters and derive expressions for $A_i$ , $A_v$ , $R_i$ , $R_o$ ?	Apply	9
7	Determine the significance of operating point, DC and AC load lines to ensure active region operation of a BJT in CE amplifier application?	Evaluate	8
8	Differentiate bias stabilization and compensation techniques?	Evaluate	7
9	Write down advantages of fixed bias circuitry?	Understand	7
<b>UNIT - V</b>			
<b>FIELD EFFECT TRANSISTOR AND FET AMPLIFIERS</b>			
<b>Part – A (Short Answer Questions)</b>			
1	List the important features of FET?	Remember	11
2	Define pinch off voltage?	Understand	12
3	Explain the operation of FET with its characteristics and explain the different regions in transfer characteristics?	Understand	11
4	Explain how a FET can be made to act as a switch?	apply	12
<b>Part – B (Long Answer Questions)</b>			
5	Explain the construction & operation of a P-channel MOSFET in enhancement and depletion modes with the help of static drain characteristics and transfer characteristics?	Understand	11
6	Discuss the high frequency response of CD Configuration?	Understand	13
7	Draw the small-signal model of common source FET amplifier. Derive expressions for voltage gain and output resistance?	Understand	14
8	Compare enhancement and depletion modes of a MOSFET with the help of its characteristics and construction?	Analyze	11
9	Explain the significance of threshold voltage of a MOSFET. Discuss the methods to reduce threshold voltage, $V_T$ ?	Understand	12

**Prepared By: Mr. B. Naresh, Assistant Professor**

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