Code No: 113AU

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November - 2015
ELECTRONIC DEVICES AND CIRCUITS
(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM)

Time: 3 Hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A   (25 Marks)

1.a)	Define Static and Dynamic Resistances.	[2M]
b)	Draw V-I characteristics curve of photo diode.	[3M]
c)	Explain how PN junction diode acts as a Rectifier.	[2M]
d)	Explain the regulation characteristics of Zener diode.	[3M]
e)	What is a transistor? Explain about its operation.	[2M]
f)	Explain how transistor works as an amplifier.	[3M]
g)	Describe the need of biasing.	[2M]
h)	Explain thermal Runaway.	[3M]
i)	Differences between FET and MOSFET.	[2M]
j)	Why we call FET as a Voltage Controlled Device.	[3M]

PART-B   (50 Marks)

2.a)   What is Tunnel diode? Explain its characteristics with the help of energy band diagrams.
b)   Derive the expression for transition capacitance of a diode.   [5+5]

OR

3.a)   Explain about Avalanche and Zener Breakdowns in PN junction diode.
b)   Draw the equivalent circuit of a varactor diode.   [6+4]

4.a)   A sinusoidal voltage whose V_m=24V is applied to half-wave rectifier. The diode may be considered to be ideal and R_L=1.8KΩ is connected as load. Find out peak value of current, RMS value of Current, DC value of current and Ripple factor.
b)   Compare HWR, FWR and Bridge rectifier.   [6+4]

OR

5.a)   Explain the operation of Full Wave Rectifier with necessary graphs and calculate the efficiency and Ripple factor of it.
b)   Explain the necessity of filter circuit after the rectifier circuit.   [6+4]

6.a)   Compare CB, CE and CC Transistor configurations.
b)   Explain the operation of CB Configuration of BJT and its input and output Characteristics briefly.   [5+5]

OR

7.a)   A transistor with α = 0.985 has a reverse saturation current of 2μA in CB configuration. Calculate the value of leakage current in the CE configuration. Also find the collector current and the emitter current if the value of base current is 25μA.
b)   Describe about Early Effect.   [7+3]

8.a) If the various parameters of a CE amplifier which uses the self bias method are $V_{CC}=12V$, $R_1=10K\Omega$, $R_2=5K\Omega$, $R_C=1K\Omega$, $R_e=2K\Omega$ and $\beta=100$, find:
   i) The coordinates of the operating point and
   ii) The stability factor, assuming the transistor to be of silicon.
   b) Explain in brief about Thermal stability.   [7+3]

OR

9.a) Draw the circuit diagram of a collector to base bias circuit of CE amplifier and derive expression for Stability factor.
   b) Derive the operating point using AC and DC load lines.   [5+5]

10.a) Draw the circuit diagram of Common Drain amplifier and derive expressions for voltage gain and input resistance.
   b) Derive the relation between g_m, μ and r_d.   [5+5]

OR

11.a) Explain the drain and transfer characteristics of N-channel JFET.
   b) Explain the operation Enhancement mode MOSFET in detail.   [5+5]

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